

## Acknowledgements

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EDAP logo



The image shows the promotional banner for the 19th European Symposium on Urogenital Radiology & 7th BSUR Annual Scientific Meeting. The banner features the ESUR 2012 logo in large yellow and white text, with the European Society of Urogenital Radiology name below it. To the right is a photograph of the Edinburgh Castle on a hill, with a fountain in the foreground. The BSUR logo is also present in the top right corner of the banner area.

**19<sup>th</sup>** European Symposium  
on Urogenital Radiology &  
7th BSUR Annual Scientific Meeting

**ESUR 2012**  
European Society of Urogenital Radiology

The Royal College of Surgeons of Edinburgh  
September 13-16, 2012

## ESUR – BSUR 2012

**International Urogenital Radiology  
Joint Meeting of European Society of Urogenital  
Radiology  
and British Society of Urogenital Radiology**

**Congress Chairman:** Sami Moussa (UK)  
**President ESUR:** Gertraud Heinz-Peer (AT)  
**President BSUR:**  
**SUR Honorary Lecture:** Stuart Silverman (US)

**MAIN TOPICS:** Imaging and Management of Stone  
Disease

### CME CREDITS

CPD accreditation has been awarded by the Royal  
College of Radiologists as follows:  
Thursday 13 September (Members' Day): 3  
Friday 14 September: 7  
Saturday 15 September: 7  
Sunday 16 September: 4  
..... European accreditation

### VENUE:

Surgeons' Hall  
Edinburgh, UK

### LOCAL CONGRESS ORGANISER

Intelligent Events Limited  
[www.intel-events.co.uk](http://www.intel-events.co.uk)

### Scientific Committee

Chairman: Sami Moussa (UK)  
Boris Brkljacic (HR)  
Michel Claudon (FR)  
Phil Cook (UK)  
Nigel Cowan (UK)  
Lorenzo Derchi (IT)  
Vikram Dogra (US)  
Nicolas Grenier (FR)  
Gertraud Heinz-Peer (AT)  
Vibeke Løgager (DK)  
Sameh Morcos (UK)  
Parvi Ramchandani (US)  
Michael Riccabona (AT)  
John Spencer (UK)  
Harriet Thoeny (CH)  
Ahmet Turgut (TR)

### Programme Committee

### Local Committee

Sami Moussa  
John Brush  
Julian Keanie  
Sameh Morcos  
Phil Cook  
Paul Spencer

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Dear Friends and Colleagues,

As chairman of ESUR 2012, it gives great pleasure to welcome you to the historic city of Edinburgh for the 19<sup>th</sup> European Symposium on Urogenital Radiology and the 7<sup>th</sup> Annual Scientific Meeting of BSUR.

Over many years the ESUR symposia have gone from strength to strength. We had an excellent joint meeting with our American colleagues last year in Dubrovnik under the chairmanship of Prof Boris Brkljacic. This year's meeting is combined with the annual meeting of BSUR, bringing closer cooperation between the two societies. I am confident that ESUR 2012 will continue to follow the trend set by previous organisers.

The local organising committee and the scientific programme committee have combined to organise a very interesting, stimulating and enjoyable programme covering a wide range of topics and debates delivered by world class speakers with eight lecture sessions, lunch symposia and lectures sponsored by industry, eight workshops and six scientific paper presentation sessions including the traditional members' day.

The Symposium this year takes place in the Royal College of Surgeons, one of our oldest medical establishments. It was established in 1505 and later granted its Royal Charter in 1506 by King James IV of Scotland. It celebrated its quincentenary year in 2005. The College offers excellent conferencing facilities. This imposing venue was chosen for its obvious medical connection as well as its central location, allowing delegates to visit our capital city easily.

There is always more to the meeting than the scientific programme. I have always found ESUR a particularly friendly and informal society. Our meetings are a great occasion to meet with good friends and colleagues from many parts of the world. Please take the opportunity to enjoy our social events and activities.

As a capital city, Edinburgh has much to offer its visitors, from the magnificent Castle overlooking the old and new town to the Royal Palace of Holyrood which is within walking distance from the venue. There are multitudes of multicultural restaurants, typical Scottish pubs, contemporary bars and great shopping opportunities.

I must take this opportunity to thank our colleagues from industry who have supported this meeting and so enabled it to take place. Their contributions to this meeting and hopefully future meetings are greatly appreciated.

I thank and acknowledge the hard work from the scientific programme committee, the local organising committee for their continuous support and last but not least our organisers from Intelligent Events.

Wishing you all an excellent conference,

Sami Moussa  
Chairman  
ESUR 2012

On behalf of the local organising committee of ESUR 2012  
Sami Moussa MB BCh, FRCS(Ed), FRCR  
Consultant Radiologist  
Western General Hospital, Edinburgh

John Brush MB ChB, FRCP, DMRD, FRCR  
Consultant Radiologist  
Western General Hospital, Edinburgh

Julian Keanie  
Sameh Morcos  
Phil Cook

Paul Spencer

## Faculty

1. Clare Allen (UK)
2. Celine Alt (DE)
3. Vincent Anaf (BE)
4. Mac Armstrong (UK)
5. Moji Balogun (UK)
6. Harry Bardgett (UK)
7. Jelle Barentsz (NL)
8. Grant Baxter (UK)
9. Marc Bazot (FR)
10. Marie-France Bellin (FR)
11. Antonina Bergman (SE)
12. Michele Bertolotto (IT)
13. Ennio Biscaldi (IT)
14. Alison Bradley (UK)
15. John Brush (UK)
16. Mark Callaway (UK)
17. Filipe Caseiro-Alves (PT)
18. Michel Claudon (F)
19. Richard Cohan (US)
20. Phil Cook (UK)
21. Francois Cornud (FR)
22. Jean Michel Correas (FR)
23. Nigel Cowan (UK)
24. Teresa Margarida Cunha (PT)
25. Lorenzo Derchi (IT)
26. Vikram Dogra (US)
27. Tarek EL Diasty (EG)
28. Mark Emberton (UK)
29. Rania Farouk (EG)
30. Thomas Fischer (DE)
31. Rosemarie Forstner (AT)
32. Jurgen Futterer (NL)
33. Suzan Goldman (BR)
34. Nicolas Grenier (FR)
35. Bernd Hamm (DE)
36. Sameh Hanna (EG)
37. Gertraud Heinz-Peer (AT)
38. Seung Hyup Kim (KR)
39. Jarl Jakobsen (DK)
40. Julian Keanie (UK)
41. Phil Kenney (US)
42. Chris King (UK)
43. Karen Kinkel (CH)
44. Alex Kirkham (UK)
45. Ercan Kocakoc (TR)
46. Maria Luisa Lobo (PT)
47. Anders Magnusson (SE)
48. Gabriele Masselli (IT)
49. Ian McCafferty (UK)
50. Jo McHugo (UK)
51. Lee Mitsumori (US)
52. Sameh Morcos (UK)
53. Sami Moussa (UK)
54. Jeff Newhouse (US)
55. Paul Nikolaidis (US)
56. Olivera Nikolic (RS)
57. Raymond Oyen (BE)
58. Mustafa Ozmen (TR)
59. Valeria Panebianco (IT)
60. Frederica Papadopoulou (GR)
61. Nick Papanikolaou (US)
62. Uday Patel (UK)
63. Alf Pollard (UK)
64. Emilio Quaia (IT)
65. Parvati Ramchandani (AT)
66. Gennaro Restaino (IT)
67. Michael Riccabona (AT)
68. Jonathan Richenberg (UK)
69. Andrea Rockall (UK)
70. Giles Roditi (UK)
71. Stuart Silverman (US)
72. Marjorie Stein (US)
73. Stuart Taylor (UK)
74. Harriet Thoeny (CH)
75. Henrik Thomsen (DK)
76. David Tolley (UK)
77. Jonathan Tuck (UK)
78. Ahmet Turgut (TR)
79. Neil Turner (UK)
80. Sadhna Verma (US)
81. Pierre-Hughes Vivier (FR)
82. Tze Wah (UK)
83. Dominik Weishaupt (CH)
84. Graham Wilkinson (UK)
85. Ulrich Willi (USA)

## Accreditation

The 19<sup>th</sup> European Symposium on Urogenital Radiology is accredited by the Royal College of Radiologists (and UEMS?) to provide the following CME activity for medical specialists.

The 19<sup>th</sup> European Symposium on Urogenital Radiology is designed for a maximum of 21 hours of CME credits. Each medical specialist should only claim those hours of credit that he/she actually spent in the educational activity.

Distribution of CPD credits for ESUR 2012 are as follows:

Thursday September 13 2012: **3** credits

Friday September 14 2012: **7** credits

Saturday September 15 2012: **7** credits

Sunday September 16 2012: **4** credits

## Social Programme

### Accompanying Persons' Programme

The fee for the accompanying persons includes a guided?

### Evening Programme

#### Members' Dinner



On Thursday September 13, 2012 the traditional ESUR Members' Dinner will be held at the Playfair Library in the Old College, South Bridge, Edinburgh

Built in the sixteenth century, William Playfair's impressive Edinburgh landmark is the birthplace of the University of Edinburgh

Tickets booked on-line will be handed out with your registration pack. On-site registrations are subject to availability.

### Welcome Reception

All participants are warmly welcome to join the welcome reception at the Signet Library on Friday 14 September. Entrance is free of charge for all registered participants.

The Signet Library in the centre of Edinburgh's old town is synonymous with prestige and Georgian elegance. Steeped in history, the building, with its lower and upper libraries, was completed in 1822 in time for the celebrated visit to Edinburgh of King George IV who described the upper library as "the finest drawing room in Europe". The Signet Library continues to be owned by The Society of Writers to Her Majesty's Signet (also known as The WS Society) – an association of Scottish lawyers and one of the oldest professional bodies in the world. The Society's origins lie in the 15th century as the "writers" of documents sealed with "the Signet", the private seal of the Scottish Kings – hence "Writers to the Signet" or "WS".



### Course Dinner

On Saturday 15 September the Course Dinner will be held at the Mansfield Traquair. Tickets booked on-line will be handed out with your registration pack. On-site registrations are subject to availability.

The Mansfield Traquair Centre is a former Catholic Apostolic Church located on the edge of Edinburgh's historic New Town. The building was designed by the prominent nineteenth-century architect Sir Robert Rowand Anderson and completed in 1885. The most outstanding feature of the church is the vast scheme of mural decoration painted by Scotland's leading Arts and Crafts artist Phoebe Anna Traquair in the 1890s.

## General Information

### Abbreviations

MS	Members' Session
LS	Lecture Session
Ws	Workshop
ScS	Scientific Session
P	Poster Session

Presenting authors underlined

### Badges

It is mandatory for all participants to wear their badges visibly throughout the meeting as it is the entrance ticket to all sessions. In the event of badge loss, please contact the registration desk.

### Certificate of Attendance

A certificate of attendance including a CME/CPD credits will be handed out with your congress documents.

### Coffee breaks

Coffee, beverages and food will be available for registered participants during the designed coffee break times on the ground floor.

### Lunches

There will be no breaks for lunches.  
Lunch boxes will be served during lunch symposiums in Wolfson Hall, sponsored by:  
Hitachi: Friday 14 September, 12.30-13.30  
Bayer: Saturday 15 September, 12.30-13.30

### Conference Language

Conference language is English

### Conference Venue

Royal College of Surgeons of Edinburgh, Edinburgh, UK  
EH8 9DW. Tel: 0131 527 1600

### Conference Office/Registration

Quincentenary Hall  
Opening hours:  
Thursday September 13 (Members' Day): 1000-1900  
Friday September 14: 0730-1800  
Saturday September 15: 0800-1800  
Sunday September 16: 0830-1300

### Liability

The organiser cannot be held responsible for any personal injury, accident, damage to private property or additional expenses incurred as a result of changes of dates, venue, programme or otherwise.

### Photographing/Recording

It is prohibited to take pictures, record or tape any presentations or sessions without official permission of the organisers.

### Poster Exhibition

Scientific posters are exhibited in the poster area in Seminar Room A, off Quincentenary Hall reception.

The poster exhibition is open from Thursday September 13 until Sunday 16 September.

### Poster Prizes

The three best scientific exhibits will be awarded a diploma during the opening ceremony. Evaluation of the posters will be based on novelty, accuracy, educational value and design.

### Preview Centre

The preview centre is located behind the registration desk in Quincentenary reception area.

Opening hours:

Thursday September 13 (Members' Day):

Friday September 14:

Saturday September 15:

Sunday September 16:

All lectures, workshops and scientific papers have to be submitted to the presentation centre at least 2 hours (website says 4?) prior to the beginning of the respective session. It will not be possible to use your own laptop computer. Please adhere to restrictions on Powerpoint software (no younger than Powerpoint 2003 for Windows) and Windows operating systems (no younger than Windows 2000 or XP). For example, it will not be possible to make a presentation based on Windows Vista or on Powerpoint 2007 for Windows. Please note that if you have prepared your presentation on a Macintosh computer, you should convert it such as to match with Windows programmes as mentioned above.

There will be no option of presenting conventional slides or overhead sheets or other lecture modalities.

Please refrain from bringing your own personal computer for your presentation, since it may not be compatible with the equipment on site.

Please ensure your final presentation is handed in to the staff in the preview room on USB.

**Thursday 13 September      Members' Day**

- Symposium Hall**  
14:00 **Welcome:** Sami Moussa (UK) & Gertraud Heinz-Peer (AT)
- 14.10-15.30 **Members' Day Session 1**  
**Symposium Hall**  
**Moderators:** Gertraud Heinz-Peer (AT) & Phil Cook (UK)
- 14.10 MDSS01 **Visualising Complex Renal Calculi with DECT and Image Merging: A New Technique**  
Allina Dimopoulou, Centre for Medical Imaging, University Hospital, Uppsala, SE
- 14.20 MDSS02 **Mini Percutaneous Nephrolithotomy; Initial Experience at a UK Urology Centre**  
Rosemina Ahmad, Dept of Radiology, Nottingham University Hospitals, UK
- 14.30 MDSS03 **Retrospective Review of Percutaneous Nephrostomies +/- Stenting Performed in 2010**  
Max Osborne, Russell's Hall Hospital, UK
- 14.40 MDSS04 **Subclinical Renal Abnormalities in Primary Hypertension are Predictors of Diabetes**  
Lorenzo Derchi, Department of Nephrology, University of Genoa, IT
- 14.50 MDSS05 **Long Term Oncologic Outcome Following RFA of RCC**  
Tze Wah, St. James's University Hospital, Leeds, UK
- 15.00 MDSS06 **CT-Guided Biopsy for Incidentally Detected Indeterminate Renal Masses**  
Rajesh Ramaswamy, Western General Hospital, Edinburgh, UK
- 15.10 MDSS07 **Accuracy of Preoperative Staging of Renal Cell Carcinoma (RCC)**  
Robert Johnson, Manchester Radiology Training Scheme, UK
- 15.20 MDSS08 **Renal Denervation Treatment for Uncontrolled Hypertension – Technique and Initial Results**  
Boris Brkljacic, University Hospital Dubrava, Zagreb, HR
- 15.30-1600 Coffee
- 16:00–17:30 **Members' Day Session 2**  
**Symposium Hall**  
**Moderators:** Bernd Hamm (DE) & Michel Claudon (FR)
- 16.00 MDSS09 **Metabolic Atrophy and 1H-MRSpectroscopy Correlation After EBRT for Prostate Cancer**  
Valeria Panebianco, Dept. of Radiological Sciences, Sapienza University of Rome, IT
- 16.10 MDSS10 **Functional DCE-MRU in Chronic and Intermittent Urinary Obstruction**  
Michel Claudon, Chu Nancy, FR
- 16.20 MDSS11 **Myasthenia Gravis Symptom Exacerbation Following Low-Osmolality Iodinated Contrast Material Administration**  
Deepak Somashekar, University of Michigan, US
- 16.30 MDSS12 **Role of Imaging in Borderline Ovarian Tumors**  
Weining Ma, Memorial Sloan Kettering Cancer Center, New York, US
- 16.40 MDSS13 **Missed Lesions on MDCT in Patients with Advanced Ovarian Cancer**  
Dae Chul Jung, Severance Hospital, Yonsei University College of Medicine
- 16.50 MDSS14 **CT Urography for Hematuria: 10 Years Work in 10 minutes**  
Nigel Cowan, University of Oxford, UK
- 17.00 MDSS15 **Dual Energy CT for Detection of Urothelialtumors: Preliminary Study**  
Diomidis Botsikas, Geneva University Hospital, CH
- 17.10 MDSS16 **Model-Based Iterative Reconstruction (MBIR) for Low Dose Renal CT**  
Graham Sommer, Stanford University School of Medicine, US
- 17.20 MDSS17 **Prostate MRI at 3.0T ersus Endorectal 1.5T: Comparison of Spectral and Overall Image Quality**  
Pieter De Visschere, Ghent University Hospital, BE
- 17.30 Close of Scientific Session
- 17:30 - 18:00 **ESUR Assembly by the President**  
**Symposium Hall**  
Gertraud Heinz-Peer

**Friday 14 September****Wolfson Hall**

08:55 - 09:00 **Welcome: Sami Moussa (UK) & Gertraud Heinz-Peer (AT)**

09:00 - 10:30 **Lecture Session 1: Stone Disease**

**Moderators:** Sami Moussa (UK) & Parvati Ramchandani (US)

- a) From the Stone Age to the New Age - Improving Outcomes - David Tolley (UK)
- b) The Contribution of Imaging in Planning Urinary Stone Therapy - Uday Patel (UK)
- c) Imaging of Stone Disease in Pregnancy - Gabriele Masselli (IT)

10:30-11:00 Coffee, posters and exhibition

11:00 – 12:30 **Lecture Session 2: Paediatric Imaging**

**Moderators:** Michael Riccabona (AT) & Graham Wilkinson (UK)

- a) Imaging of Neonatal and Infant Genital Tract - Maria Luisa Lobo (PT)
- b) Neonatal Uroradiology: Yesterday, Today and Tomorrow - Ulrich Willi (USA)
- c) Imaging in Childhood Urolithiasis and Nephrocalcinosis: What is Different in Children? - Michael Riccabona (AT)
- d) Paediatric PCNL - Tze Wah (UK)

12:30 – 13:30 **Lunch Symposium sponsored by HITACHI**

Fusion of Multimodality Imaging Technologies to Improve Prostate Cancer Detection - Prof Thomas Fischer (DE)

**Moderator:** Duncan McLaren (UK)

13:30 – 15:00 **Lecture Session 3: Functional Imaging**

**Moderators:** Nicolas Grenier (FR) & Prof Neil Turner (UK)

- a) Filtration Function Measurement, an Update? - Pierre-Hugues Vivier (FR)
- b) Renal Perfusion and Diffusion, Potential for Nephrologists - Emilio Quaia (IT)
- c) Renal Elastography: Principles, Limitations and Potential in Nephrology - Nicolas Grenier (FR)
- d) Role of Functional Imaging in the Assessment of Renal Tumours - Harriet Thoeny (CH)

15:00 – 15:45 **Bracco Invited Lecture**

**Developments in contrast media safety: What you should know**

**Moderator:** Giles Roditi (UK)

- a) The calm after the NSF storm: what have we learnt? **Name of speaker TBC**
- b) Delayed AEs to iodinated contrast media - Marie-France Bellin (FR)

16:00 – 17:30 **Workshops 1-4**

**Playfair Hall Workshop 1: Stone Disease**

**Moderators:** Julian Keanie (UK) & Jarl Jakobsen (DK)

- a) Stone Imaging and Prone PCNL - Parvati Ramchandani (US)
- b) Supine PCNL - Alf Pollard (UK)
- c) PCNL Planning and Complications - Anders Magnusson (SE)

**Symposium Hall Workshop 2: Scrotal Imaging**

**Moderators:** Lorenzo Derchi (IT) & Jonathan Tuck (UK)

- a) Case Based Discussion on Testicular Abnormalities - Vikram Dogra (US)
- b) Gonadal and Extragonadal Malignancies - Marjorie Stein (US)
- c) Knocks, Nasties and the Knife - The Acute Scrotum - Jonathan Richenberg (UK)

**Wolfson Hall Workshop 3: Prostate Imaging and Biopsy**

**Moderators:** Raymond Oyen (BE) & John Brush (UK)

- a) TRUS Bx: Technique and Controversies - Seung Hyup Kim (KR)
- b) Advanced MRI - Sadhna Verma (US)
- c) MRI Guided Biopsy - Jurgen Futterer (NL)
- d) MRI-TRUS Fusion Biopsy - Francois Cornud (FR)

**Alistair Duff Room Workshop 4: Ultrasound Contrast CEUS**

**Moderators:** Michel Claudon (FR) & Grant Baxter (UK)

- a) CEUS in the Evaluation of Native Kidney - Michele Bertolotto (IT)
- b) CEUS in the Evaluation of Transplants - Jean Michel Correas (FR)

- c) Voiding Urosonography for Vesicoureteric Reflux - Frederica Papadopoulou (GR)

**Saturday 15 September**

- Wolfson Hall**
- 09:00– 10:30 **Lecture Session 4: Endometriosis**  
**Moderators:** Andrea Rockall (UK) & Rosemarie Forstner (AT)  
a) Transvaginal Sonography - Marc Bazot (FR)  
b) MR Imaging - Karen Kinkel (CH)  
c) CT Urography and Intestinal CT Enteroclysis - Ennio Biscaldi (IT)  
d) State of the Art Surgical Management - Vincent Anaf (BE)
- 10:30-11:00 Coffee, posters and exhibition
- 11:00 – 12:30 **Lecture Session 5: Pelvic Floor: Combined with ESGAR**  
**Moderators:** Gertraud Heinz-Peer (AT) & Filipe Caseiro-Alves (PT)  
a) Overview and Communicating Findings - Rania Farouk (EG)  
b) Anterior and Middle Compartments Dysfunction - Celine Alt (DE)  
c) Obstructed Defaecation - Dominik Weishaupt (CH)  
d) Anal Incontinence - Stuart Taylor (UK)
- 12:30 – 13:30 **Lunch Symposium Sponsored by “BAYER”**  
**Moderator:** Sameh Morcos, UK  
a) Difficult Liver Lesions in Oncology Patients - Mark Callaway (UK)  
b) Weight-Based contrast dosing for body CT - Lee Mitsumori (US)
- 13:30 – 14:15 **Lecture Session 6: SUR Honorary Lecture**  
**Moderator:** Gertraud Heinz-Peer (AT)  
The Incidental Small Renal Mass: Image it, Treat it or Ignore it? - Stuart Silverman (US)
- 14:15 – 14:20 ESUR 2013 Presentation - Ahmet Turgut (TR)
- 14:20 – 14:45 **Presentation of Awards for Winning Papers from Members Day**  
President: Gertraud Heinz-Peer
- 14:45 – 15:30 **Lecture Session 7: Guidelines**  
**Moderators:** Sameh Morcos (UK) & Marie-France Bellin (FR)  
a) Upper Tract Imaging - Nigel Cowan (UK)  
b) Update on New Paediatric Imaging Recommendations - Michael Riccabona (AT)  
c) Contrast Update - Henrik Thomsen (DK)
- 10:30-11:00 Coffee, posters and exhibition
- 16:00 – 17:30 **Workshops 5-8**
- Symposium Hall Workshop 5: Trauma**  
**Moderator:** Harry Bardgett (UK) & Marie-France Bellin (FR)  
a) Trauma on the front line: Imaging and Management - Mac Armstrong (UK)  
b) Trauma of the Upper Urinary Tract - Ercan Kocakoc (TR)  
c) Trauma of Lower Urinary Tract - Alex Kirkham (UK)
- Alistair Duff Room Workshop 6: CT Urography**  
**Moderators:** Nigel Cowan (UK) & Richard Cohan (USA)  
**CT Urography; a Global Perspective**  
a) Tarek El Diasty (EG)  
b) Jeff Newhouse (US)  
c) Olivera Nikolic (RS)  
d) Chris King (UK)  
e) M N Ozmen (TR)
- Wolfson Hall Workshop 7: Female Imaging: How I do it?**  
**Moderators:** Teresa Margarida Cunha (PT) & Jo McHugo (UK)  
a) Imaging Female Congenital Anomalies - Gennaro Restaino (IT)  
b) PET-CT in the Female Pelvis: How I Do It - Andrea Rockall (UK)  
c) Pitfalls of Pelvic MR Imaging - Rosemarie Forstner (AT)  
d) How I Image Mucinous Tumours of the Ovary - Antonina Bergman (SE)

**Playfair Hall Workshop 8: Adrenal Imaging**

**Moderators:** Sameh Hanna (EG) & Nick Papanikolaou (US)

- a) Imaging and Characterization of Adrenal Masses - Phil Kenney (US)
- b) Functional Imaging of Adrenals Including PET/CT, MRS and DWI - Suzan Goldman (BR)
- c) Adrenal Lesions Beyond Adenomas and Metastases - Paul Nikolaidis

**Sunday 16 September**08:30 – 10:00 **Scientific Sessions****Scientific Session I: Interventional Radiology and Renal****Room:** Tausend**Moderators:** Uday Patel (UK) and John Brush (UK)

- 08.30 SSI.01 **PTFE-Covered Metallic Stent to Treat the Malignant Ureteral Obstruction Palliatively**  
Kang Byung Chul, Department of Radiology, Mokdong Hospital, EWUMC, KR
- 08.40 SSI.02 **Pathological Nature of Renal Tumours - Does Size Matter?**  
Lutfi Kurban, Aberdeen Royal Infirmary, UK
- 08.50 SSI.03 **The Effects of Cryoablation on Renal Cell Carcinoma Perfusion and GFR**  
Stephen Chapman, University of Leeds, UK
- 09.00 SSI.04 **Radio frequency Ablated Renal Tumors Since 2007 - What Affect Results?**  
Vanessa Acosta Ruiz, University Hospital of Uppsala, SE
- 09.10 SSI.05 **Cost-effectiveness of CT-guided Biopsy for Incidentally Detected Indeterminate Renal Masses**  
Karim Samji, Western General Hospital, Edinburgh, UK
- 09.20 SSI.06 **Retrograde Endovascular Sclerotherapy in Patients with Varicocele and Pathospermy**  
Oleg Zhukov, FSBI Scientific and Research Institute of Urology, Moscow, RU
- 09.30 SSI.07 **CEUS for Assessment of Therapeutic Response after RFA of Small RCC**  
Manca Garbajs, Institute of Radiology, University Medical Centre Ljubljana, SI
- 09.40 SSI.08 **Percutaneous Radiofrequency Ablation of Solid Renal Masses: Techniques and Outcomes**  
Manca Garbajs, Institute of Radiology, University Medical Centre Ljubljana, SI
- 09.50 SSI.09 **Audit of the First 35 Renal Cryoablations Performed in Glasgow**  
Desmond Alcorn, GGC NHS, UK

**Scientific Session II: Prostate and Paediatrics****Room:** Wolfson**Moderators:** Alex Kirkham (UK) and Ian McCafferty (UK)

- 08.30 SSII.01 **Diffusion-Weighted Imaging in the Diagnosis of APN in Children**  
Pierre-Hugues Vivier, Rouen University Hospital, FR
- 08.40 SSII.02 **Application of Multiparametric MRI in the Diagnosis of Prostate Cancer**  
Richard Hammond, University of Edinburgh, UK
- 08.50 SSII.03 **Assessment of Prostate Cancer Aggressiveness Using Multiparametric MR Imaging**  
Tsutomu Tamada, Kawasaki Medical School, JP
- 09.00 SSII.04 **"Histoscanning" in PCa Identification in Patients with Previous Negative Biopsies**  
OB Zhukov, Research Institute of Urology, Moscow, RU
- 09.10 SSII.05 **Multiparametric MRI of the Prostate Cancer in Prebiopsy, Pretreatment and Postprostatectomy Patients**  
Gulya Hagverdiyeva, N.N. Blokhin Russian Cancer Research Center, RU
- 09.20 SSII.06 **Does Pre-biopsy MRI Increase Cancer Detection of Transrectal Prostate Biopsy?**  
Pavlo Somov, The Royal Liverpool and Broadgreen University Hospitals NHS Trust, UK
- 09.30 SSII.07
- 09.40 SSII.08 **Salvage CT-guided Percutaneous Cryotherapy for Locally Recurrent Prostate Cancer**  
François Cornelis, CHU Bordeaux, FR
- 09.50 SSII.09 **Real-time CEUS guided biopsies to improve prostate cancer detection**  
François Cornelis, CHU Bordeaux and Institut Bergonié, FR

**Scientific Session III: Female Imaging, Ultrasound and Scrotal Imaging****Room:** Wadsworth**Moderators:** Moji Balogun (UK) and Jonathan Richenberg (UK)

- 08.30 SSIII.01 **CT Depiction of Ovarian Vein Flow Alteration in Ovarian Torsion**  
Eun Ju Lee, Ajou University Hospital, KR
- 08.40 SSIII.02 **Scaled SI of Fibroids in T2; Objective Parameters for MRgFUS**  
Kyoung Ah Kim, CHA Bundang Medical Center, KR
- 08.50 SSIII.03 **MR Imaging Findings in Patient with Ovarian Endometriomas with a Very High Serum CA-125 Level**

- Youngrae Lee, Kangbuk Samsung Hospital, KR
- 09.00 **SSIII.04 Enhancement of Ovarian Malignancy on Clinical Contrast Enhanced MRI Studies**  
Harpreet K. Pannu, New York, US
- 09.10 **SSIII.05 Use of Contrast Enhanced Ultrasound in Kidneys**  
Cherian George, University Hospital of North Staffordshire, UK
- 09.20 **SSIII.06 Ultrasound Volume of the Testes in Infertile Men with Azoospermia**  
Min Hoan Moon, Seoul National University College of Medicine, KR
- 09.30 **SSIII.07 Non Palpable Incidentally Found Testicular Tumors: Sonographic, MRI and Pathologic Correlations**  
Laurence Rocher, Service de Radiologie Adulte, FR
- 09.40 **SSIII.08 Contrast Enhanced Ultrasound: Setting up the Service**  
Cherian George, University Hospital of North Staffordshire, UK
- 09.50 **SSIII.09 Bosniak Classification System: Usefulness of Contrast Enhanced Ultrasonography**  
Ole Graumann, Denmark Institute of Regional Health Services Research, DK

#### **Scientific Session IV: Stone Disease, CTU, Functional Imaging and Contrast**

**Room:** Playfair Main Hall

**Moderators:** Sameh Morcos (UK) and Alison Bradley (UK)

- 08.30 **SSIV.01 CT Urography – Optimizing Bladder Opacification in the Excretory Phase**  
Anton Jansson, Uppsala University Hospital, SE
- 08.40 **SSIV.02 Triple-bolus MDCT Urography Performance for Upper Urinary Tract Tumors**  
Maka Kekelidze, Erasmus Medical Center, NL
- 08.50 **SSIV.03 Ureteral Calculus – Does All Stones Require Radiological Follow-Up?**  
Axel Trägårdh, Uppsala University Hospital, SE
- 09.00 **SSIV.04 Solitary Upper Pole Puncture for Management of Complex Renal Stones**  
Sara Ramsey, Western General Hospital, Edinburgh, UK
- 09.10 **SSIV.05 Radiological Reporting Errors Identified in the Endourology Meeting - A Prospective Review to Identify the Patterns and Severity of Errors at Second Reporting - Beware the Common Pitfalls**  
Steven Kennish, Sheffield Teaching Hospitals, UK
- 09.20 **SSIV.06 IVIM-DWI of Transplanted Kidneys: Reduced Diffusion and Perfusion Dependent on Cold Ischemia Time**  
Daniel Gnutzmann, University of Heidelberg, DE
- 09.30 **SSIV.07 Corticomedullary Differentiation of Kidney: Evaluation with SSFP MRI with Time-SLIP**  
Akira Yamamoto, Kawasaki Medical School, JP
- 09.40 **SSIV.08 Renal Safety Evaluation of Dotarem in At-Risk Patients**  
Nicolas Grenier, Groupe Hospitalier Pellegrin, Bordeaux, FR
- 09.50 **SSIV.09 Prevalence of NSF In Dialysis Patients: The Pro-Finest Study**  
Nicolas Janus, Hospital de la Pitié-Salpêtrière, Paris, FR
- 10.00 **Close of Scientific Sessions and Coffee**

#### **10:15–11:45 Lecture Session 8: Prostate Imaging**

**Moderators:** Francois Cornud (FR) & Valeria Panebianco(IT)

- a) Imaging of Benign Prostate Disorders - Ahmet Turgut (TR)
- b) Structured Reporting of Multimodality MRI- ESUR Guidelines - Jelle Barentsz (NL)
- c) Multiparametric MRI for Focal Therapy - Clare Allen (UK)
- d) Focal Therapy for Prostate Cancer - Mark Emberton (UK)

#### **11:45–12:15 Film Interpretation: Prof Lorenzo Derchi (IT) & Michel Claudon (FR)**

#### **12:15–12:30 Award presentation: Best Scientific Paper and Poster**

#### **12:30–12:45 Closing Remarks**

**Posters****I. Pelvis and Female Imaging****PI.01 Primary Signet Ring Cell Carcinoma of Young Female Urethra**

Kyoung Ja Lim, Hallym University College of Medicine, KR

**PI.02 Radiological and Pathological Illustration of Uterine Leiomyoma and Adenomyosis**

Soo Youn Park, Seoul St. Mary's Hospital, KR

**PI.03 Hysterosalpingography (HSG): A Pictorial Review**

Silvia Tomas Hernandez, Birmingham Women's Hospital, UK

**PI.04 CT Diagnosis of Ruptured Ectopic Pregnancy in 12 Patients**

Youngrae Lee, Kangbuk Samsung Hospital, KR

**PI.05 Diffusion-weighted Imaging in the Complex Adnexal Masses: Pearls and Pitfalls**

Sung Eun Rha, Seoul St. Mary's Hospital, College of Medicine, KR

**PI.06 Hydatid Disease of the Seminal Vesicle: A Rare Presentation Of Hydatid Cyst**

Serdar Karaköse, Necmettin Erbakan University, Meram Faculty of Medicine

**PI.07 Radiologic Imaging of Ovarian Transposition**

Daniela Condess, Centro Hospitalar Universitário de Coimbra (CHUC), PT

**PI.08 Pelvic Endometriosis Associated with Mucinous Borderline Tumors**

Sung Eun RHA, Seoul St. Mary's Hospital, College of Medicine, KR

**PI.09 Trachelectomy a Fertility-Preserving Procedure for Cervical Cancer - MR Imaging Features**

Melanie Claudino, Hospital Central de Faro, PT

**PI.10 TCC Coincidentally Involving Ovaries and Uterine Endometrium: A Case Report**

Kyung Bum Nam, Hallym University Hospital, Chuncheon, KR

**PI.11 MR of Large Pelvic Female Lesions**

Daniela Condesso, Centro Hospitalar Universitário de Coimbra (CHUC), PT

**PI.12 Severe Endometriosis, Pictorial Review with Emphasis on MRI/Laparoscopy Correlation**

Adalgisa Guerra, Hospital da Luz, Lisbon, PT

**II. Paediatric Imaging****PII.01 Radiological Evaluation of Pediatric Congenital Urinary Tract Anomalies**

Seong Su Hwang, St. Vincent's Hospital, The Catholic University of Korea, KR

**PII.02 Developmental Anomalies in the Kidney and Renal Vessel**

Young Mi Ku, Catholic University Medical College Uijeongbu St. Mary's Hospital, KR

**PII.03 Pediatric Gynecological Emergencies – Pictorial Review**

Mariana Roque, Hospital de Santa Maria, PT

**PII.04 Radiological Role in Diagnosis, Management Decision Making and Follow-up of Unilateral PUJO in Pediatrics**

Hossam Gad, Urology and Nephrology Center, Mansoura, EG – offered to upgrade to oral

**PII.05 Botryoid Genitourinary Rhabdomyosarcoma in Pediatrics - A Case Report**

Ricardo Patrão, University Hospital Center of Coimbra, PT

**III. MRI and Functional Imaging****PIII.01 Dynamic Contrast-Enhanced Subtraction MR Imaging in Characterizing Intratesticular Mass Lesions**

Athina Tsili, University Hospital Of Ioannina, GR

**PIII.02 MR Urography at 3 T**

Takehiko Gokan, Showa University Hospital, JP

**PIII.03 Method of Magnetic Resonance Urethrography using “Cathegel” in Men with Urethral Strictures**

Farkhad Akilov, Republican Specialized Center of Urology, UZ

**PIII.04 The Role of Magnetic Resonance Imaging (MRI) of the Penis in Clinical Practice**

Jim Zhong, University of Edinburgh, UK

**IV. Renal and Upper Tract Imaging****PIV.01 Gallbladder Wall Thickening and Periportal Tracking Associated with Acute Pyelonephritis**

Deuk Jae Sung, Korea University, College of Medicine, KR

**PIV.02 Follow-Up of Cryoablated Renal Cell Carcinoma with Residual Contrast Enhancement on CT and MRI**

Deuk Jae Sung, Korea University, College of Medicine, KR

**PIV.03 Renal Leiomyoma on CT and Pathology**

Jongchul Kim, Chungnam National University Hospital, KR

**PIV.04 Multiphase MDCT with Multiplanar Reformations in Detecting Pseudocapsule in RCC**

Athina Tsili, University Hospital Of Ioannina, GR

**PIV.05 Combined MR sequences help to differentiate oncocytomas from RCC**

Francois Cornelis, CHU Bordeaux, FR

**PIV.06 Differentiation of Subtypes of Renal Cell Carcinoma: DCE vs DWI**

Akira Yamamoto, Kawasaki Medical School, JP

**PIV.07 Medullary Nephrocalcinosis: Ultrasound and Multidetector Computadorized Tomography Appearance**

Isabel Bello, Garcia de Orta Hospital, PT

**PIV.08 Non-lithiasic Acute Renal Pain: Computerized Tomography Evaluation**

Ricardo Patrão, University Hospital Center of Coimbra, PT

**PIV.09 Renal PEComa: A Case Report**

Ricardo Patrão, University Hospital Center of Coimbra, PT

**PIV.10 Trauma and Latrogenic Changes of the Genitourinary Tract - CT Evaluation**

Ricardo Patrão, University Hospital Center of Coimbra, PT

**PIV.11 Calyceal Diverticulum Mimicking Different Pathologies on Multiple Imaging Modalities**

Jane Belfield, Royal Liverpool University Hospital, UK

**PIV.12 Nutcracker Syndrome: Needs Diagnostic Clue at Noninvasive Imaging**

Seung Hyup Kim, Seoul National University Hospital, KR

**PIV.13 CT Assessment of Indeterminate Renal Masses: How Accurate Are We?**

Karim Samji, Western General Hospital, Edinburgh, UK

**PIV.14 Differential Imaging Diagnosis of Small Benign Renal Tumors from RCC**

Jeong Yeon Cho, Seoul National University Hospital, KR

**PIV.15 Ruptured Asymptomatic and Undetected Pelviureteric Junction Obstruction after Abdominal Trauma**

Serdar Karaköse, Necmettin Erbakan University, Meram Faculty of Medicine

**PIV.16 F-10 CT Diuresis Urography**

Alfred Pollard, Stepping Hill Hospital, Stockport, UK

**PIV.17 Permanent Urinary Incontinence: A Case Report**

Ricardo Patrão, University Hospital Center of Coimbra, PT

**PIV.18 Bosniak Classification System - Interobserver Agreement Between Three Radiologists**

Ole Graumann, Fredericia Hospital and Institute of Regional Health Services Research, DK

**PIV.19 Novel Kidney Segmentation to Describe Renal Tumors Eligible for Nephron-Sparing**

Valeria Panebianco, Sapienza University of Rome, IT

**PIV.20 CT Urography: Evaluation of an Established Investigation in a Large Urology Centre**

Jim Zhong, University of Edinburgh, UK

**V. Prostate imaging****PV.01 Congenital Seminal Vesicle Cyst Accompanying Ipsilateral Renal and Ureteral Agenesis**

Serdar Karaköse, Necmettin Erbakan University, Meram Faculty of Medicine

**VI. Stones and PCNL****PVI.01 Urinary Tract Diseases Related to Urolithiasis: MDCT findings**

Seong Kuk Yoon, Dong-A Medical Center, KR

**PVI.02 Simultaneous Endoscopic Removal of Bilateral Upper Urinary Tract Stones**

Furkat Nasirov, Republican Specialized Center of Urology

**PVI.03 Complications of PCNL: A Pictorial Review**

Cherian George, University Hospital of North Staffordshire, UK

**PVI.04 CTKUB – Does Side Matter? Re-audit May 2012**

Flavius Parvulescu, Royal Liverpool University Hospital, UK

**VII. Interventional Radiology****PVII.01 Retrograde Warm Pyelo-Perfusion for Protection of the Ureter During Cryoablation of Central Renal Cell Carcinoma**

Stephen Chapman, St. James's University Hospital, UK

**PVII.02 Percutaneous Varicocele Embolization: Minimally Invasive Treatment of Male Infertility**

Ricardo Patrão, University Hospital Center of Coimbra, PT

**PVII.03 Evaluation of Protective Hydrodissection and Pneumodissection During CT-Guided Renal Cryoablation**

Jim Zhong, University of Edinburgh, UK

**PVII.04 Retrospective Observational Review of Consecutives Percutaneous Nephrostomies Performed in 2010**

Max Osborne, Russell's Hall Hospital, UK

**PVII.05 Interventional Radiology & Urology: Integrated Care**

Lisa Henderson and Rebecca Powell, Imperial College, UK

**PVII.06 Radiofrequency ablation in germ cell cancer. A Case Report**

Lisa Bashford, Beatson West of Scotland Cancer Centre, UK

**PVII.07 Role of Twinkling Artefact in a Paediatric PCNL Population**

David Hughes, Sheffield Children's Hospital, UK

**VIII. Ultrasound****PVIII.01 US and Color-Doppler Findings in Testicular Lymphoma and Their Mimics**

Lorenzo E. Derchi, University of Genoa, IT

**PVIII.02 Testicular Assessment, The Ultrasound Way – A Pictorial Review**

Karen Chetcuti, The Royal Liverpool and Broadgreen University Hospitals, UK

**IX. Others****PIX.01 Does Size Matter in Uroradiology?**

Flavius Parvulescu, Royal Liverpool University Hospital, UK

**PIX.02 Atypical Radiological Manifestations of Common Genitourinary Diseases**

Patricia Blanco-Lobato and M.Milagros Otero-Garcia, Complejo Hospitalario Universitario de Vigo (CHUVI), ES

**PIX.03 A-Z of Adrenal Lesions : The Radiologist's Roadmap!**

Alison Bradley, University Hospital of South Manchester NHS Trust, UK

**PIX.04 Hereditary Renal Tumours: A Pictorial Review**

Laura Coleman, Queen Elizabeth Hospital Birmingham, UK

**PIX.05 Role of Multidetector CT Urography (MD-CTU) in Evaluation of Urothelial System**

Mohamed Abd El-Baky, Urology & Nephrology Center, Mansoura University, EG

**PIX.06 Imaging of Adrenal Masses**

Sameh Hanna, Faculty of Medicine - Cairo University, EG

**PIX.07 US and MRI Imaging Correlation in Scrotal Tumours and Pseudotumours**

Tamer Soliman, Urology & Nephrology Center, Mansoura, EG

**PIX.08 Manual Squeezing Management with Small Stab Incision in a Large Volume of Subcutaneous CME**

Sook Namkung, Hallym University Hospital, KR

**PIX.09 Role of MRI in Follow-up of Post Radical Cystectomy Patients**

Abd Allah Abd El-Hamid, Urology & Nephrology Center, Mansoura University, EG

**PIX.10 Role of Imaging in Male Infertility**

Min Hoan Moon, SMG-SNU Boramae Medical Center, Seoul National University College of Medicine

**PIX.11 Bladder Cancer – Tumor Attenuation in Multiphase CT Urography**

Malin Helenius, Uppsala University Hospital, SE

**PIX.12 Imaging of Persistent Müllerian Duct Syndrome: Report of 4 Cases and Review of the Literature**

Jim Zhong, University of Edinburgh, UK

**PIX.13 Testicular Multi-Disciplinary Team Meeting: The Radiologist's Role**

Jane Belfield, Royal Liverpool University Hospital, UK



## Abstracts

### Members' Day

#### MDSS01

##### **Visualising Complex Renal Calculi with DECT and Image Merging: A New Technique**

Allina Dimopoulou, Anders Magnusson

*Centre for Medical Imaging, University Hospital, Uppsala, SE*

**Objective:** To develop a new technique of material characterisation by constructing virtually unenhanced images (VUI) and comparing them to truly unenhanced images (TUI) in patients with complicated renal calculi undergoing Dual Energy CT (DECT), prior to Percutaneous Nephrolithotripsy (PNL). A new type of merged images and their impact on the preoperative assessment will be described.

**Method:** The DECT Urography examinations of 29 patients with complicated renal calculi were retrospectively reviewed and a series of image reconstructions was performed in order to create VUI and merged images for optimum material characterisation in the excretory phase (calculi within contrast). Various parameters were evaluated e.g. calculi changes in size and form between VUI and TUI were graded in a three-grade scale (insignificant, average and significant). The new method was compared with the pre-existing one, and measurements on effective dose radiation were performed.

**Results:** The study included 31 renal units; the construction of VUI was feasible in all. The merging of reconstructed images for optimum material characterisation resulted in 93% of calculi visible within contrast. The change of calculi size between VUI and TUI scored 1 (average) and calculi form scored 0 (insignificant). The new method of image reconstruction did not change the operative approach of the PNL procedures compared to the old one. The average effective dose for the unenhanced series was  $1,93 \pm 0,81$  mSv, which accounted for approximately 28% of the total effective dose.

**Conclusion:** The new image reconstruction method and material characterisation can make the unenhanced series of DECTU examinations superfluous.

#### MDSS02

##### **Mini Percutaneous Nephrolithotomy; Initial Experience at a UK Urology Centre**

Rosemina Ahmad<sup>[1]</sup>, Sharon Scriven<sup>[2]</sup>, Rajiv Karia<sup>[3]</sup>, John Lloyd<sup>[4]</sup>, R.J Lemberger<sup>[5]</sup>

<sup>1</sup>Dept of Radiology, Nottingham University Hospitals, UK <sup>2</sup>Urology Centre, Nottingham City Campus, UK <sup>3</sup>Dept of Radiology, Nottingham University Hospitals, UK <sup>4</sup>Dept of Radiology, Nottingham University Hospitals, <sup>5</sup>Nottingham Urology Centre, Nottingham City Campus, UK

**Objective:** To evaluate the safety and efficacy of the modular mini nephroscope system (Mini PCNL) in the management of renal calculi.

Mini PCNL is not routinely used in the management of adult urolithiasis. We report our experience of the technique and outcomes for our first 34 cases.

**Method:** 34 consecutive cases performed between 2009 and 2010 for renal stones were reviewed.

The parameters reviewed were stone volume, patient demographics, operative time, haemoglobin level, complications, length of stay, post operative urinary drainage and stone clearance.

**Results:** Stone volume ranged from 1.7cc to 20.12 cc. The median stone volume was 6.4cc. Median operative time was 2.54 hours. The stone free rate was 61% (21/34 cases). Of the 13 patients with residual stones, 5 had staghorn calculi, 5 had greater than 10 stones pre operatively, 1 had an upper ureteric stricture and 2 had a residual calculus in a lower pole calyx.

The stone free rate for patients with a stone volume >10cc was significantly less than those with smaller stones using Fisher's exact test (P=0.0174).

No patient required blood transfusion or developed sepsis. Median length of stay was 4 days.

13/34 patients had nephrostomies inserted after the procedure.

32 patients had a ureteric drainage catheter placed through the access tract into the ureter, 1 patient had a tubeless Mini PCNL.

**Conclusion:** In our experience, mini PCNL offers benefits over conventional PCNL with reduced trauma during kidney access and good visibility intraoperatively. Operating time and complication rates are comparable to conventional PCNL. Post procedure nephrostograms are not routinely required.

### **MDSS03**

#### **Retrospective Review of Percutaneous Nephrostomies +/- Stenting Performed in 2010**

Max Osborne, Fiona Fuerstenberg, Sherif Latif

*Department of Radiology, Russells Hall Hospital, Dudley, UK*

**Objectives:** To identify the immediate effects of percutaneous nephrostomy (PN) on renal function and markers of infection. What is the effect of ureteric stent (PNS) placement as compared to PN alone?

**Method:** This review was carried out at Russells Hall Hospital, Dudley. Using the CRIS database we identified each PN and PNS procedure during 2010. We gathered data on pre- and post-procedure serum creatinine, urea, estimated GFR, white cell count (WCC) and CRP.

**Results:** 69 procedures were reviewed. Overall renal function was improved at 24hrs with a mean increase in eGFR of 1.4%, and by 30% at day 5. 32% (22) procedures included PNS placement. Mean eGFR improves in the PNS group by 9.5% at 24hr and 10% at 48hrs. Those who underwent PN alone showed an initial reduction in eGFR of 1.8% followed by 3.9% improvement at 48hrs. By day 5 eGFR had increased in both groups, 34% in the PN alone group and a 23% in the PNS group.

Markers of infection showed a mean reduction of 6% in WCC and 9.3% in CRP. After an initial deterioration in the PN group, by day 7 there is a 22.8% reduction in CRP and 9.1% in WCC. In the same time period, PNS patients showed no improvement in markers of infection.

**Conclusion:** Overall greatest improvement in renal function was in the patients who had PN alone however this was not significant ( $p=0.81$  MWW). The greatest immediate improvement in renal function was demonstrated in PNS patients ( $p=0.084$  MWW). Markers of infection are improved by intervention however this was demonstrated best in the group who underwent PN without stent placement.

### **MDSS04**

#### **Subclinical Renal Abnormalities in Primary Hypertension are Predictors of Diabetes**

Francesca Viazzi<sup>[1]</sup>, Giovanna Leoncini<sup>[1]</sup>, Giacomo Deferrari<sup>[1]</sup>, Roberto Pontremoli<sup>[1]</sup>, Lorenzo Derchi<sup>[2]</sup>

*University of Genoa, IT, Departments of: <sup>1</sup>Nephrology <sup>2</sup>Radiology*

**Objective:** Recent papers suggest close relationship between renal dysfunction and new onset diabetes (NOD). Aim of this study was to investigate the association between subclinical functional and structural renal abnormalities and NOD in primary hypertension (PH).

**Method:** This observational prospective study (9.1±2.2 years follow-up) includes 231 consecutive untreated nondiabetic patients with PH and without overt nephropathy. Primary end point was NOD. Albuminuria (albumin/creatinine ratio, ACR), glomerular filtration rate (eGFR), and renal structure and hemodynamics (renal volume at US and resistive index from intrarenal arteries at spectral Doppler) were evaluated at baseline.

**Result:** During 2106 person-years of follow-up, 10 patients developed diabetes (incidence rate 4.7/1000 personyears). Patients with NOD had higher body mass index, serum uric acid, serum creatinine and ACR, and lower eGFR and renal volume (RV) to resistive index (RI) ratio (RV/RI) at baseline, as compared with the 221 controls who did not develop diabetes. When all renal variables were taken into consideration, RV/RI was the only variable significantly related to diabetes (hazard ratio 1.04,  $P=0.0342$ ). Patients in the lowest tertile of RV/RI were more likely to develop diabetes (10.4 vs 2.6 vs 0%,  $P=0.0044$ ). For each s.d. decrease of RV/RI, the risk of NOD increased by 68% ( $P=0.0012$ ).

**Conclusion:** Subclinical functional and structural renal abnormalities are independent predictors of diabetes in PH.

**MDSS05****Long Term Oncologic Outcome Following RFA of RCC**

Tze Wah, Henry Charles Irving

*St. James's University Hospital, Leeds, UK*

**Purpose:** There is limited long term outcome data for the RFA of RCC. This study aims to evaluate our long term oncologic outcomes with percutaneous image-guided radiofrequency ablation (RFA) of renal cell carcinoma (RCC) in patients treated with curative intent in a single institution.

**Materials and Methods:** RFA was performed on 200 RCCs in 165 patients from June 2004 to June 2012 in a single large teaching hospital institution over an 8 year period. Data collected prospectively for the tumour ablation database included demographics, clinical details, treatment parameters and imaging characteristics which were reviewed. The inclusion criteria were patients who had 3 years follow-up post RFA of RCC and were treated with curative intent from the outset with renal tumour size <4cm.

**Results:** In this cohort, a total of 69 patients with 72 RCCs treated with RFA were identified according to the inclusion criteria. The treated RCCs with size ranged from 1.4 to 3.9 cm (mean=2.8 cm) with a mean follow-up period of 57.5 months. The initial overall treatment success rate and recurrence free survival rate in this cohort of patients were 100% and 93.5% respectively. The rates of local disease progression and distant metastasis progression were 5.5% and 1.4% respectively.

**Conclusions:** Image-guided RFA for RCC (< 4cm) in our series has shown durable oncologic outcomes and this is very comparable to the current published data.

**MDSS06****CT-Guided Biopsy for Incidentally Detected Indeterminate Renal Masses**

Rajesh Ramaswamy<sup>[1]</sup>, Karim Samji<sup>[1]</sup>, Julian Keanie<sup>[2]</sup>, John Brush<sup>[2]</sup>

<sup>1</sup>Radiology Specialty Registrar, Western General Hospital, Edinburgh, UK <sup>2</sup>Consultant Uroradiologist, Western General Hospital, Edinburgh, UK

**Objective:** To evaluate the feasibility, accuracy, and impact on clinical management of CT-guided core renal biopsy on indeterminate renal masses that cannot be classified as benign or malignant on imaging. The year before the CT-guided renal biopsy service commenced, 16 patients were retrospectively identified who underwent nephrectomies for an average tumour size of 3.6cm. Histopathology showed 18.75% (3) kidneys to be benign.

**Methods:** 28 consecutive CT-guided biopsies for indeterminate renal masses, performed at our Institution between January 2011 and April 2012, were retrospectively analysed. All biopsies were performed with an 18G coaxial core biopsy system in an outpatient setting. Analysis was based on the imaging appearances (size and characteristics) of the renal mass on both ultrasound and CT, laterality of tumour, seniority of clinician performing the biopsy, procedural complications, biopsy histopathology report and impact on final treatment decision.

**Results:** Mean patient age was 64.6 years, and mean tumour size was 3.3cm. 15 lesions were on the right, and 13 lesions were on the left. All patients had a CT as part of their diagnostic workup, and 92% of patients had an ultrasound in addition. 78.6% (n=22) of biopsies were performed by a consultant radiologist. There were no technical failures, and no major complications. Histopathology revealed 28.6% (n=8) of lesions to be benign, and 71.4% (n=20) of lesions to be malignant. Unnecessary treatment was avoided in all 8 benign lesions. No discrepancies were recorded between CT-guided core and surgical excision biopsies, where this information was available (n=13).

**Conclusion:** Image guided renal biopsy is a safe and reliable technique in the evaluation of indeterminate renal masses, and can influence management decisions. We therefore advocate its use in clinical practice.

**MDSS07****Accuracy of Preoperative Staging of Renal Cell Carcinoma (RCC)**Robert Johnson<sup>[1]</sup>, Lois Farrow<sup>[1]</sup>, Alison Bradley<sup>[2]</sup>, Yit Lim<sup>[2]</sup>, Jonathan Tuck<sup>[2]</sup><sup>1</sup>Manchester Radiology Training Scheme, UK <sup>2</sup>University Hospital of South Manchester, UK

**Objectives:** 1. To determine the accuracy of the radiological preoperative T staging of RCC and 2. To elucidate patterns of discordance with surgical-pathological staging.

**Materials and Methods:** The pre-operative tumour staging of 90 patients (90 CT, 3 MR scans) with post-nephrectomy pathologically proven RCC were obtained from radiology reports and MDT review notes, and compared against the surgical-pathological staging as the reference standard.

Imaging and surgical-pathological staging was classified using 2010 TNM 7<sup>th</sup> staging. Agreement between the two staging methods was assessed using the weighted kappa statistic.

**Results:** Overall observed agreement for T staging was good, 73% (weighted kappa = 0.71; 95% CI 0.61-0.82, P<0.0001). Observed agreement for T1a = 74% (n=23); T1b = 84%, (n=19), T2a = 58% (n=7); T3a = 79% (n=28); T3b = 86% (n=7); T3c = 75% (n=4); T4 = 0% (n=2).

The 23 discordant cases were classified into 10 categories: perinephric invasion, over staging (n=4), under staging (n=2); size, over staging (n= 6), under staging (n=1); segmental renal vein invasion, over staging (n=1), under staging (n=4); adrenal invasion, over staging (n=1), under staging (n=2); non adrenal visceral invasion, over staging (n=1); renal sinus invasion, under staging (n=1).

**Conclusion:** Overall our pre-operative staging for renal cell carcinoma is good however there are recurring themes of imaging and pathological discordance. We discuss examples of our discordant cases that illustrate the current limitations of CT and MR T staging and offer explanations so as to inform the reporting radiologist of potential pitfalls.

**MDSS08****Renal denervation treatment for uncontrolled hypertension – technique and initial results**Boris Brkljacic<sup>[1]</sup>, Vinko Vidjak<sup>[2]</sup>, Danijel Cvetko<sup>[1]</sup>, Josip Curic<sup>[1]</sup><sup>1</sup>University Hospital Dubrava, Zagreb, Croatia, HR <sup>2</sup>University Hospital Merkur, Zagreb, Croatia, HR

**Objective:** to present technique and initial results of renal denervation (RDN) for uncontrolled hypertension.

**Method:** Sympathetic nervous system hyperactivation is established contributor to hypertension and sympathetic nerves located along renal artery allow endovascular approach for the ablation treatment. Between March and May 2012 we treated under six patients (4F,2M, age range 48-61) with uncontrolled hypertension with RDN. All patients had duplex-US, CT of kidneys and CTA of renal arteries performed prior to the procedure. All renal arteries had suitable anatomy and diameter  $\geq 4$  mm. None had renal artery stenosis or considerable atherosclerotic plaques. Standard femoral access with 6F sheath was used to introduce steerable denervation catheter (Simplicity, Medtronic) with radiofrequency energy electrode tip into the both renal arteries. Along each renal artery six different areas were treated for two minutes in each treatment session. During energy delivery power was continuously monitored and controlled based on impedance and temperature measured at the treatment site, which allows secure procedure performance with adequate electrode adherence to the arterial wall.

**Results:** Complete technical success was achieved in all patients. None had any treatment-related complications during follow-up. Postprocedural DSA was normal, without evidence of vascular injury/stenosis at the site of the treatment. Follow-up of 1-7 weeks demonstrated mean decrease of systolic blood pressure by 22 mmHG and of the diastolic blood pressure by 11 mm Hg. All patients were treated with less antihypertensive agents. None demonstrated elevation of blood pressure or worsening of renal function.

**Conclusion:** RDN is technically safe endovascular treatment method for uncontrolled hypertension. The longer follow-up results will be presented at the meeting since this is initial and ongoing study.

**MDSS09****Metabolic Atrophy and 1H-MRSpectroscopy Correlation After EBRT for Prostate Cancer**

Valeria Panebianco, Valerio Forte, Flavio Barchetti, Daniela Musio, Vincenzo Tombolini, Carlo Catalano

Dept. of Radiological Sciences, Sapienza University of Rome, IT

**Purpose:** Evaluation and correspondence between the achievement of the metabolic Nadir (MRI 1H-Spectroscopy) with the haematochemical one (PSA) in order to demonstrate glandular atrophy in patients with prostate cancer undergoing radiotherapy.

**Materials and Method:** Between January 2011 and January 2012, 22 patients with unresectable prostate cancer and treated with Radiation Therapy underwent multiparametric MRI before radiation treatment (time 0), 3 months, 6 months, 12 months and 18-24 months after the treatment. The protocol included the use of an endorectal and a surface coil and the use of the following scans: High resolution T2-weighted morphological sequences, diffusion sequences (DWI), 3D CSI Hydrogen spectroscopic sequences and GRE T1 weighted perfusional sequences. All patients took serial samples with evaluation of PSA during follow up.

**Results:** The data obtained from hydrogen spectroscopic study were analyzed by dedicated software evaluating both (choline+creatine)/citrate ratio and the direct Choline/Citrate ratio; these results already showed metabolic glandular atrophy (ratio equal to 0) in 18 of the 24 patients who had MRI performed at the 6th month, while only 6 of these showed haematochemical glandular atrophy (minimum values of PSA in 3 subsequent measurements) after 6 months from start of radiotherapy. The subsequent follow-up at 18 months showed that both values of PSA and Spectroscopy are indicative of glandular atrophy in 22 of 24 patients (acc. 91.6%,  $P < 0.05$ ).

**Conclusions:** Through the analysis of the data obtained from MRS it was possible to determine the glandular atrophy through the achievement of the metabolic NADIR earlier and with greater accuracy than the single haematochemical evaluation of the PSA.

**MDSS10****Functional DCE-MRU in Chronic and Intermittent Urinary Obstruction**

Michel Claudon<sup>[1]</sup>, Nicolas Grenier<sup>[2]</sup>, Cédric Pasquier<sup>[1]</sup>, Guy Sebag<sup>[3]</sup>, Kathia Chaumoitre<sup>[4]</sup>

<sup>1</sup>Chu Nancy, <sup>2</sup>Chu Bordeaux, <sup>3</sup>Hôpital R Debré Paris, <sup>4</sup>Chu Marseille, FR

**Purpose :** To compare dynamic contrast-enhanced MR urography (DCE-MRU) and renal scintigraphy for determination of the split renal function (SRF) in chronic and intermittent urinary obstruction (UO).

**Material and methods:** 369 children and adults presenting with chronic or intermittent UO were included in 14 centres. DCE-MRU consisted in a dynamic coronal T1-weighted sequence repeated for 10 minutes after administration of diuretics and Gd-chelate (0,1 ml/kg). Diuretic renal scintigraphy was performed within two months. MRU and scintigraphy data from 295 patients were judged in a blind review by a panel of 12 practitioners then 3 experts of each specialty: radiology and nuclear medicine. For DCE-MRU, signal intensity-time curves were obtained from ROIs on renal parenchyma and aorta. SRF was calculated successively by the Area under the Curve (AUC) and Patlak-Rutland (PR) methods, after normalization by parenchymal volume. Reproducibility was assessed for intra- and interobserver agreement.

**Results:** Reproducibility was good to excellent for both methods, with  $\kappa$  values ranging from 0.75-0.90 for scintigraphy and 0.72-0.81 for DCE-MRU, and improved with the expert review. At the group level, equivalence between DCE-MRU and scintigraphy was demonstrated for calculation of SRF with both PR ( $p < 0.001$ ) and AUC ( $p = 0,029$ ) methods. The distribution of differences followed a Gaussian law 95%CI[-26.2;+30.2]. Underestimation of SRF by DCE-MRU was observed in severe hydronephrosis.

**MDSS11****Myasthenia Gravis Symptom Exacerbation Following Low-Osmolality Iodinated Contrast Material Administration**

Deepak Somashekar, Matthew Davenport, Richard Cohan, Jonathan Dillman, James Ellis

*University of Michigan, US*

**Purpose:** To determine if intravenously (IV) administered low-osmolality iodinated contrast material (LOCM) is associated with disease-specific myasthenia gravis (MG) symptom exacerbation.

**Materials and Methods:** Institutional review board approval was obtained and patient consent waived for this HIPAA-compliant, retrospective case-control study. CT examinations performed on unique patients with clinically confirmed MG between January 1, 1995 and December 31, 2011 were identified (N=155 without [NC-CT] and N=112 with [CE-CT] IV contrast material). Electronic medical records were queried to identify disease-specific MG symptoms prior to (within 14 days) and following (within 45 days) each CT. Fisher's exact test was used to compare rates of disease-specific symptoms during three post-CT time periods: 1) 0-1 days, 2) 2-7 days, and 3) 8-45 days.

**Results:** The NC-CT and CE-CT groups had similar thymectomy rates (16% [25/155] vs. 15% [17/112]) and disease-specific symptom trends before the CT (stable 54% [83/155] vs. 59% [66/112], worsening 22% [34/155] vs. 15% [17/112], improving 0% [0/155] vs. 0% [0/112], new diagnosis 25% [38/155] vs. 26% [29/112]). There were significantly more disease-specific symptom exacerbations within 1 day of the CT in the CE-CT group (6.3% [7/112] vs. 0.6% [1/155],  $p=0.01$ ). Acute exacerbations were primarily respiratory (N=5 new-onset dyspnea [4 CE-CT, 1 NC-CT], N=2 progressive dyspnea [2 CE-CT], N=1 progressive weakness [CE-CT]). There was no difference in symptoms between groups at 2-7 days ( $p=0.96$ ) or 8-45 days ( $p=0.81$ ).

**Conclusions:** IV LOCM administration is significantly associated with disease-specific MG symptom exacerbation within one day. Exacerbations most commonly present as new or progressive respiratory compromise.

**MDSS12****Role of Imaging in Borderline Ovarian Tumors**

Weining Ma, Harpreet Pannu

*Memorial Sloan Kettering Cancer Center, New York, US*

**Objective:** The purpose of our study is to assess if imaging can differentiate borderline ovarian tumors from ovarian cancers, and to evaluate the role of imaging in detecting extra ovarian findings.

**Method:** A total 261 patients diagnosed with borderline ovarian tumors at our institution during the period of 16 years. Among them, 110 patients had preoperative imaging studies. We evaluated morphologic features of borderline ovarian tumors, and assessed for extraovarian findings such as peritoneal implants, and lymph node involvement.

**Results:** The borderline ovarian tumors occur mostly in women of reproductive age, and have superior overall survival. The serous borderline ovarian tumor is the most common histologic subtype (74%), and is unique among borderline ovarian tumors in that invasive or noninvasive peritoneal implants may occur. The pathologist has pivotal role in identifying invasive peritoneal implants. The mucinous borderline ovarian tumor is the second most common histologic subtype (23%), and the endometrioid and clear cell borderline ovarian tumors are rare.

**Conclusion:** The borderline ovarian tumors usually present as unilateral or bilateral adnexal complex cystic mass/masses containing mural nodule, septation, or solid component. The imaging findings of borderline ovarian tumors significantly overlap with those of ovarian cancers. Imaging studies play a major role in the diagnosis, management and surveillance of patients with borderline ovarian tumors.

**MDSS13****Missed Lesions on MDCT in Patients with Advanced Ovarian Cancer**Dae Chul Jung<sup>[1]</sup>, Young Taik Oh<sup>[1]</sup>, Sun Ho Kim<sup>[2]</sup>, Sokbom Kang<sup>[2]</sup><sup>1</sup>Severance Hospital, Yonsei University College of Medicine, KR <sup>2</sup>Research Institute and Hospital, National Cancer Center, KR

**Objectives:** To illustrate the patterns of erroneous interpretation of pre- & post-operative MDCT for detection of peritoneal lesions in patients with advanced ovarian cancer.

**Methods:** Between 2007 and 2011, Pre-operative MDCT of 148 FIGO stage IIIC-IV ovarian cancer patients, who underwent MDCT before primary cytoreduction, were reviewed and compared with the surgical findings from the operation records, in relation to the anatomic location of the peritoneal lesions. For the discrepant cases, we re-evaluated the MDCT after the surgical findings became known, and categorized the cases as either absence of lesion or presence of lesion (missed case). We reviewed follow up MDCT or PET-CT of 64 image based recurrent cases after primary cytoreduction. We re-evaluated the MDCT taken just before recurrence was found and the case was categorized and analyzed same way to pre-operative cases.

**Results:** On pre-operative CT review, 63% (43/68) of false negative cases showed lesions on re-evaluation. The most common discrepant regions were the small bowel mesentery (21%), sub-diaphragmatic space (19%) and porta hepatis (16%). On post-operative follow up CT review, 67.2% (43/64) of recurrent cases (22 of 35 recurred cases on CT and 21 of 29 on PET-CT) were missed in previous follow-up on re-evaluation. The most common missed sites were the porta hepatis (10/43) and abdominal Lymph nodes.

**Conclusion:** The most commonly missed locations of peritoneal implants were the same as preoperative imaging criteria that could predict suboptimal primary cytoreduction. Familiarity with these imaging features may aid in prediction of resectability and facilitate appropriate management.

**MDSS14****CT Urography for Hematuria: 10 years work in 10 minutes**

Nigel Cowan, Sue Mallett, Jeremy Crew

University of Oxford, UK

Evaluation of a diagnostic strategy using CT urography as the initial imaging technique in patients with visible hematuria (VH) at high-risk for urothelial carcinoma.

The clinical cohort consisted of a consecutive series of 1001 patients, age  $\geq 40$ -years of age, presenting with VH, over a 57-month period, UTI excluded. Same day CT urography and flexible cystoscopy (FC) were performed. Reference standard was histopathology from biopsy or surgery, and 1-5 year imaging and histopathology database follow-up. Disease prevalence for upper urinary tract urothelial cell carcinoma (UUT-UUC) =2.2% (n=22/1001), renal cell carcinoma (RCC) =2.4% (n=24/1001), UUT stones =15.1% (n=151/1001), normal UUT's=80.3% (n=804/1001). For CT urography for diagnosing UUT-UCC; Se=1.0, Sp=0.98, PPV=0.72, and NPV=1.0.

The prevalence of BCa in the clinical cohort was 20% (n=156/778). For the diagnostic strategy using CT urography for diagnosing BCa as an additional test to FC, Se=1.0, Sp=0.94, PPV=0.80 and NPV=1.0, as a replacement test for FC, Se=0.95, Sp=0.83, PPV=0.58, and NPV=0.98 and for CT urography and FC as a triage test for rigid cystoscopy and follow-up (option-1), Se=1.0, Sp=0.94, PPV=0.80, NPV=0.99, and for (option-2), Se=0.95, Sp=0.98, PPV=0.93, NPV=0.99.

High disease prevalence and high sensitivity of CT urography for diagnosing UUT-UCC can justify use of CT urography as a first-line imaging test for hematuria in patients at high-risk. For diagnosing BCa, there is a clear advantage for the diagnostic strategy triage test option-1, where patients with a positive CT urography score are directly referred to rigid cystoscopy, but all other patients undergo flexible cystoscopy.

**MDSS15****Dual Energy CT for Detection of Urothelial Tumors: Preliminary Study**

Diomidis Botsikas, Catrina Hansen, Christoph Becker, Xavier Montet

Geneva University Hospital, CH

**Purpose:** To study the added benefit of dual-energy CT (DECT) for the detection of urothelial tumors, particularly by analyzing tumoral enhancement.

**Methods:** A 3-phase acquisition DECT examination was performed in 69 consecutive patients with known or suspected urothelial tumor, including an unenhanced, an arterial phase (35 seconds after contrast injection) and a mixed nephrographic-excretory phase with a split-bolus protocol. 13 patients were excluded because of non-available follow-up. The remaining 56 patients had a total of 35 urothelial tumors confirmed by cystoscopy and histopathology. We visually evaluated the average-weighted 120Kv series of the nephrographic-excretory phase and the arterial phase as well as the 100kv component of the arterial phase for the presence of tumor. Additionally, we measured the true enhancement of tumors based on the arterial phase and the true non-contrast series (TNC), and calculated virtual enhancement based on the virtual non-contrast (VNC) series and iodine concentration of tumors based on the dual-energy raw data.

**Results:** Mean virtual enhancement of tumoral lesions based on the VNC images was 40.67±10.93HU and was significantly different ( $p \leq 0.05$ ) from non-tumoral lesions (30.49±15.70HU). Virtual enhancement and iodine concentration of tumors correlated with true mean enhancement.

Per patient sensitivity and specificity were 0.62 and 0.97 based on the interpretation of the arterial phase, 0.81 and 0.97 of the 100kv and 0.69 and 0.97 of the mixed nephrographic-excretory phase.

Combining all studied parameters, sensitivity was 0.94 and specificity 0.93.

**Conclusions:** DE-CT with a supplementary arterial phase for the detection of urothelial tumors improves the diagnostic performance of CT-urography.

**MDSS16****Model-Based Iterative Reconstruction (MBIR) for Low Dose Renal CT**Eric Olcott<sup>[1, 2]</sup>, Graham Sommer<sup>[1]</sup>, Lewis Shin<sup>[1, 2]</sup>, Ian Chan<sup>[1]</sup>, Dominik Fleischmann<sup>[1]</sup><sup>1</sup>Stanford University, <sup>2</sup>VA Palo Alto Health Care System, US

**Objective:** To compare CT images of the kidneys and adjacent retroperitoneum generated using model-based iterative reconstruction (MBIR) to images generated from the same raw data using adaptive statistical iterative reconstruction (ASIR) and filtered back projection (FBP).

**Method:** Fifteen adults underwent 27 contrast-enhanced helical CT acquisitions utilizing a GE Discovery CT750 HD scanner, with HIPAA compliance and informed consent. Each scan employed a constant tube current between 30 and 300mA, 120kV, and slice thickness of 0.63mm. Each acquisition was obtained in the excretory phase of enhancement and reconstructed with MBIR, ASIR (50%) and FBP. Four independent readers observed each triplet of reconstructed scans and rated each reconstruction according to the quality of specific imaging features. Observations were compared using the exact binomial test.

**Results:** MBIR was significantly superior to both ASIR and FBP in depicting corticomedullary differentiation, renal hilar structures, the retroperitoneal fascia and cystic lesions, and in producing images resistant to streak artifact, both within the entire sample and when acquisitions were stratified as 255-300mA, 135-225mA, and 30-105mA. Among these stratified categories, MBIR was superior to both ASIR and FBP in 83.3% to 100.0% of observations for each of the five imaging features ( $p < 0.001$  to  $p = 0.002$ ).

**Conclusion:** MBIR provides superior depiction of renal and adjacent retroperitoneal features for acquisitions in the usual mA range and those acquired at moderately and markedly reduced mA ranges. Accordingly, MBIR appears advantageous for renal CT at conventional mA levels and may enable scanning at reduced mA levels with correspondingly reduced radiation exposure.

**MDSS17****Prostate MRI at 3.0T versus Endorectal 1.5T: Comparison of Spectral and Overall Image Quality**Pieter De Visschere<sup>[1]</sup>, Gert De Meerleer<sup>[2]</sup>, Karel De Caestecker<sup>[3]</sup>, Piet Ost<sup>[2]</sup>, Geert Villeirs<sup>[1]</sup>*Ghent University Hospital, BE, Departments of: <sup>1</sup>Radiology, <sup>2</sup>Radiotherapy, <sup>3</sup>Urology***Objective:** To compare the quality of prostate MRI at 3.0T versus endorectal (ER) 1.5T.**Materials and Methods:** 30 patients underwent prostate MRI at both 1.5T using an endorectal coil and at 3.0T. Mean time interval between the scans was 2.4 years (range 0.3-7.7). In each patient, three transverse slices (at prostatic base, midprostate and apex) were selected on ER-1.5T and the corresponding slices were chosen on 3.0T on the basis of anatomical landmarks. In these slices the quality of all spectroscopic voxels within the prostate contour were evaluated. In total, 6101 voxels were evaluated at ER-1.5T and 5672 at 3.0T. Additionally, overall exam quality, quality of T2-weighted images and quality of diffusion-weighted images were rated.**Results:** There was no significant difference in the spectral quality at ER-1.5T versus 3.0T (78.2% and 78.9% voxels of good quality, respectively), although ER-1.5T showed significantly more good quality voxels in the posterior two rows of the prostate (89.0% versus 75.4%,  $p = 0.019$ ). Overall quality of the MRI exam was rated higher at 3.0T than at ER-1.5T ( $p = 0.021$ ). There was no significant quality difference on T2-weighted images, but quality of diffusion-weighted images was significantly better at 3.0T compared to ER-1.5T ( $p < 0.001$ ).**Conclusion:** Spectral quality at 3.0T is equivalent to ER-1.5T, although the latter shows better quality in the posterior rows of the prostate, close to the endorectal coil. Overall prostate MRI image quality and quality of diffusion-weighted imaging is better at 3.0T compared to ER-1.5T.

## Lecture Sessions

### Lecture Session 1: Stone Disease

**Moderators:** Sami Moussa (UK) & Parvati Ramchandani (US)

#### LS1a

##### **From the Stone Age to the New Age - Improving Outcomes**

David Tolley (UK)

#### LS1b

##### **The Contribution of Imaging in Planning Urinary Stone Therapy**

Uday Patel (UK)

#### LS1c

##### **Imaging of Stone Disease in Pregnancy**

Gabriele Masselli MD and Gianfranco Gualdi MD

Sapienza University Rome (IT)

Urolithiasis and urinary tract infection represent the most common causes of abdominopelvic pain in pregnancy. In addition, urolithiasis is the most common nonobstetric indication for hospitalization of pregnant patients.

US is considered the usual initial test of choice for suspected urolithiasis in pregnancy, despite its substantial limitations and a reported sensitivity as low as 34%. False positives are mainly due to the evidence of nonobstructive dilatation of collecting systems that occurs physiologically in pregnancy.

Only rarely transvaginal US may directly visualize the stone, either at the ureteropelvic or ureterovesical junction. However, small calculi are difficult to visualize and are hardly distinguished from blood clots, debris, polypoid lesions and flow artifacts of and flow artifacts.

False-negatives occur soon after acute obstruction, that is predictable with 99% accuracy by the evidence of a difference of greater than or equal to 0.04 in RI of intrarenal arteries between the kidney on the symptomatic side and the opposite kidney.

Absence of the ureteral jet on the symptomatic side reached a 100% sensitivity and 91% specificity for obstruction but the diagnostic value of this sign is hampered by its absence in 15% of asymptomatic pregnant women. Possible false positive results can be decreased by imaging patients in the contralateral decubitus position.

Transvaginal imaging should also be considered because it can occasionally show distal renal calculi at the ureterovesical junction. IVP use in pregnancy is limited, due to the confounding role of physiological hydroureter and superimposed gravid uterus. Moreover the fetal osseous structures can obscure visualization of ureteral calculi and the radiation dose is not significantly lower than that from the standard radiation dose for renal stone CT.

MR imaging, particularly MR urography (MRU) (ie, heavily T2-weighted multiplanar images), is a supplemental examination, differentiating physiologic urinary tract dilatation (without renal enlargement and perinephric edema and often tapering at the middle third of the ureter because of the mass effect from the uterus) from abnormal dilatation related to urolithiasis.

In unresolved cases, CT remains a reliable technique for depicting obstructing urinary tract calculi in pregnant women. The average estimated fetal dose, using a low- radiation-dose CT technique, was 7 mGy, therefore below the 50-mGy

(5-rad) limit above which fetal teratogenesis can occur. However, since there is no known maternal radiation limit for fetal stochastic effects such as carcinogenesis, the principle of ALARA should be strictly adhered.

## Lecture Session 2: Paediatric Imaging

**Moderators:** Michael Riccabona (AT) & Graham Wilkinson (UK)

### LS2a

#### **Imaging of Neonatal and Infant Genital Tract**

Lobo ML, Lisbon (PT)

**Objective:** The aim of this lecture is to discuss the role of imaging and how to image the neonatal and infant genital tract, primarily focusing on congenital malformations with particular interest in female anomalies.

**Content:** Knowledge of the genital tract embryology, familiarity with normal appearances of inner genitalia in neonates and infants, and awareness of typical malformations - and other genital pathologies - are important basic aspects to keep in mind when imaging the neonatal and infant genital tract.

The typical prominent uterus in female neonates and infants allows a unique opportunity to detect and characterize uterine congenital anomalies, which is crucial for therapeutic planning and to prevent later complications at onset of puberty.

Neonates and infants (particularly females) with a multicystic dysplastic kidney, a unilateral dysplastic kidney, or a single kidney are at high risk for further genital malformations, and therefore early and accurate imaging assessment of the inner genitalia is advisable. Likewise, neonates and infants with genital tract malformations should undergo a complete evaluation of the urinary tract system to search for associated and/or combined anomalies. Other indications for imaging of neonatal and infant genital tract include patients with obvious genital malformations, cloacal malformations and congenital adrenal hyperplasia.

Important groups of genital anomalies include among others undescended testis, congenital inguinal hernia and the various types of congenital hydrocele, cystic dysplasia of the rete testis and cystic dysplastic seminal vesicles in males, and müllerian duct anomalies, vaginal anomalies, urogenital sinus and cloacal malformations, and ovarian pathology in females. Furthermore, disorders of sexual differentiation (or intersex) cover a wide and complex group of abnormalities resulting from non-accordance between chromosomal, gonadal and genital sex. Due to their complexity and to the need of a multidisciplinary team approach, these patients should be referred to a dedicated pediatric centre.

*Ultrasound* (US), including Doppler tools, is the primary imaging modality to evaluate both male and female genitalia. A dedicated and good ultrasound technique examination is essential to obtain maximum diagnostic information. In females, a systematic transabdominal and transperineal US approach of the pelvic cavity with a full or filled bladder is fundamental. Fluid instillation into the vagina considerably improves visualization of the uterus and vagina by US, and this so-called *US-genitography* should be carried out whenever genital US is insufficient for adequate characterization of uterovaginal anomalies. Additional rectal saline filling may be useful, such as in müllerian duct agenesis to assure the absence of the uterus. Further imaging, when needed, includes *fluoroscopy* and *MRI*, and is usually reserved for more complex malformations and for surgical planning. Unlike in adults or in older children, MR evaluation of the genital tract is very limited and rarely useful in neonates and infants. If required, high resolution 3D sequences, potentially after saline instillation of the vagina, may be useful. "Morphologic" MR urography may be added for evaluation of associated or combined urinary tract malformations.

**Summary:** Congenital malformations are the most common pathology seen in the genital tract of neonates and infants. Imaging evaluation should always also include the entire urinary tract system due to the high probability of associated and/or combined anomalies. US is the first-step and basic imaging modality, and often sufficient. A careful and detailed US technique examination is crucial to improve diagnostic potential and to provide maximum information needed for appropriate clinical and therapeutic decisions. In this age group of patients, further imaging - with fluoroscopic genitography and MR imaging - are usually reserved for complex malformations requiring early surgical treatment, such as urogenital sinus and cloacal malformations.

**LS2b****Neonatal Uroradiology: Yesterday, Today and Tomorrow**

Ulrich Willi (US)

**LS2c****Imaging in Childhood Urolithiasis and Nephrocalcinosis: What is Different in Children?**

Riccabona Michael, Graz, (AT)

**Objective:** To briefly revisit imaging in childhood urolithiasis and nephrocalcinosis in the light of present imaging potential and therapeutic impact in terms of efficacy.

**Content:** After a brief revision of the differences in children from adults (physiology, size, frequency, radiation sensitivity ...) the impact of these considerations on the imaging algorithms will be outlined, also taking into account therapeutic necessities.

Particularly the role and potential of ultrasound (US) and the requisites to yield the best results from US studies will be addressed. Furthermore, the role and indication of supplementing imaging – most commonly by plain film (KUB), rarely by a focused “short adapted IVU” – will be discussed.

Finally, indications for CT and the applicable CT techniques will be mentioned for complicated and equivocal cases, as stone-CT should be far less frequently used in children than in adults particularly for radiation concerns.

**Summary:** Sophisticated and detailed comprehensive US is the mainstay for imaging in childhood urolithiasis, complemented by plain film and - in rare cases after thorough patient selection and justification – stone CT which has mostly replaced IVU. Both IVU and CT should be performed with adapted protocols. For imaging childhood nephrocalcinosis, US is mostly sufficient and even the best imaging tool; again in complications a CT may become necessary.

**LS2d****Paediatric PCNL**

Tze Wah (UK)

The aims of this lecture:

1. To provide the overview of the epidemiology of renal stone disease in children
2. To outline the management of renal stone diseases and discuss the treatment options
3. To review the minimally invasive techniques in the current literature for renal stone extraction in the paediatric population, especially the various techniques used in the paediatric PCNL
4. To report our initial experience of MINI percutaneous nephrolithotomy (PCNL) in a paediatric population using a miniature nephroscope through a 16F metal access sheath in Leeds to date.

**Lecture Session 3: Functional Imaging****Moderators:** Nicolas Grenier (FR) & Prof Neil Turner (UK)**LS3a****Filtration Function Measurement, an Update?**

Pierre-Hugues Vivier (FR)

**LS3b****Renal Perfusion and Diffusion, Potential for Nephrologists**

Emilio Quaia, Trieste (IT)

Nowadays, the different imaging modalities offer the possibility to obtain a functional evaluation of the kidney. The assessment of the contrast dynamics caused by iodinated or Gd-based contrast material transit through the renal cortex, medulla and the collecting system allow the possibility to calculate the glomerular filtration rate is possible both on CT and MR imaging by using the Patlak method. Contrast-enhanced US and MR imaging allow a valuable assessment of renal perfusion. Contrast-enhanced US, through the quantitative analysis of time-intensity curve, provide semiquantitative parameters related to renal perfusion. The use of high-relaxivity Gd-based agents such as gadobenate dimeglumine (Gd-BOPTA) may improve the assessment of renal perfusion quantitation. Diffusion-weighted imaging (DWI) with the calculation of ADC, intravoxel incoherent motion (IVIM), diffusion tensor imaging (DTI) provide information on diffusion and perfusion on a microstructural level. Measurement of renal perfusion may be a tool to assess the significance of renal artery stenosis and to assess acute and chronic renal failure, ischemic nephropathy, and it may be used in renal transplant assessment.

**LS3c****Renal Elastography: Principles, Limitations and Potential in Nephrology**

Nicolas Grenier (FR)

**LS3d****Role of Functional Imaging in the Assessment of Renal Tumours**

Harriet C. Thoeny (AT)

In recent years advances in MR imaging improved the differentiation between benign and malignant solid renal tumors and most functional MR techniques can also be applied in patients with renal insufficiency thanks to the lack of contrast medium administration. The most frequently applied MR technique in this context is Diffusion-weighted MRI (DWI) providing information on the microstructure of the underlying tissue. Several studies showed the potential of DWI to detect renal cell carcinoma (RCC) in patients with renal impairment and even showed its potential to differentiate RCC subtypes. In addition, arterial spin labeling (ASL) providing information on renal perfusion and blood oxygen level dependent (BOLD) MRI providing information on renal oxygen content are other imaging techniques that already showed the potential in the noninvasive evaluation of renal neoplasms. DCE-MRI also demonstrated promising results in differentiation of RCC subtypes. All functional MR techniques have already been successfully applied for monitoring of treatment response to new therapies as these treatments lead only late to change in size. Therefore, functional MR methods are ideal in the noninvasive assessment of treatment response to targeted therapies at an early time point.

**Lecture Session 4: Endometriosis****Moderators:** Andrea Rockall (UK) & Rosemarie Forstner (AT)**LS4a****Transvaginal Sonography**

Marc Bazot (FR)

**LS4b****MR Imaging**

Karen Kinkel (CH)

**LS4c****CT Urography and Intestinal CT Enteroclysis**

Ennio Biscaldi (IT)

**Learning objectives:** to describe technique and clinical applications of Multi Detector CT enteroclysis (MDCTe) of the colon, to know how to detect intestinal nodules of endometriosis and how to use MDCTe to evaluate the urinary tract, in case of deep endometriosis.

**Background:** since the presence of pelvic and intestinal endometriosis cannot be reliably established in all cases by only one imaging technique, a dedicated imaging was developed to detect bowel endometriosis.

This talk reviews the clinical impact of MDCTe, after over six years of experience in this field.

**Imaging findings:**

1) MultiDetector Computerized Tomography enteroclysis diagnoses accurately the presence of intestinal endometriosis, the depth of infiltration of the lesions in the bowel wall and the size of the nodules;

2) the split bolus technique allows to explore the urinary tract.

Clinical cases will be presented to show how to use MDCTe in daily activity. The advantages and disadvantages of this technique, its dosimetric benchmark will be discussed.

**Conclusion:** MDCTe explores whole the colon and a long tract of the small intestine, showing high sensitivity and specificity in detecting bowel endometriosis. The split bolus technique helps to simultaneously evaluate bowel loops and the urinary tract. X-ray dose and the use of iodinated contrast medium are well known disadvantages of CT.

Today new scanners and software reduce exponentially the concern of radiation exposure.

**LS4d****State of the Art Surgical Management**

Vincent Anaf (BE)

**Lecture Session 5: Pelvic Floor: Combined with ESGAR****Moderators:** Gertraud Heinz-Peer (AT) & Filipe Caseiro-Alves (PT)**LS5a****Overview and Communicating Findings**Rania Farouk El Sayed, MD, Department of Radiology  
Cairo University Hospitals, Cairo University (EG)

In pelvic floor dysfunction (PFD), magnetic resonance imaging of the pelvic floor supporting system from a functional point of view allows radiologists to recognize and classify the types of defects in each supporting system (namely, the urethral supporting system, the vaginal supporting system, and the anal sphincter complex).

Combined analysis of both static and dynamic images of patients reporting stress urinary incontinence pelvic organ prolapse and anal incontinence has revealed a close relationship between certain anatomical defects in the pelvic organ support system and specific PFD [1]. This is important because even those patients presenting with the same clinical symptoms may have different underlying structural derangement that may warrant a different treatment plan or management.

In view of the reported high rate of dysfunction recurrence after surgical treatment [2] and clinicians' desire for a test that can pinpoint each patient's structural and anatomical defects [3], combined MR image analysis can provide the necessary scientific evidence on which better clinical practice can be based. With the improved radiological evidence made possible by this analytic approach, clinicians can have the documentation that they need to plan more effective procedures and thus produce better outcomes [4].

The learning objectives of this lecture are:

- 1) To learn the normal and abnormal MR imaging features of the pelvic floor supporting system.
- 2) To understand the vital role of the radiologist in obtaining accurate images for the clinician to use in planning reconstructive surgery.
- 3) Case examples are included to illustrate how to report MRI findings systematically and comprehensively using an integrated MRI analytical approach that can enhance radiologists' interaction with clinicians.

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#### LS5b

##### **Anterior and Middle Compartments Dysfunction**

Celine Alt (DE)

#### LS5c

##### **Obstructed Defaecation**

Dominik Weishaupt

#### LS5d

##### **Anal Incontinence**

Stuart Taylor

#### **Lecture Session 6: SUR Honorary Lecture**

**Moderator:** Gertraud Heinz-Peer (AT)

#### **The Incidental Small Renal Mass: Image it, Treat it or Ignore it?**

Stuart Silverman (US)

## Lecture Session 7: Guidelines

**Moderators:** Sameh Morcos (UK) & Marie-France Bellin (FR)

### LS7a

#### **Upper Tract Imaging**

Nigel Cowan (UK)

### LS7b

#### **Update on New Paediatric Imaging Recommendations**

Michael Riccabona, Graz (AT)

**Objective:** To present the two new proposals for imaging and procedural recommendations in paediatric uro radiology for discussion before finalisation and approval. The 2011 recommendations on imaging in childhood renal transplantation and paediatric cystic kidney disease have been published, as well as the survey on childhood contrast-enhanced ultrasound (US).

**Content:** Two new recommendations have been drafted as always - by the ESUR paediatric work group together with the ESPR task force for uro radiology - after thorough review of the literature and consultations with clinical colleagues and experts. The presented versions are the result of the group's consensus, as there is restricted evidence for many aspects in children as usual. The comments and suggestions of the discussion during the public presentations at the annual ESPR meeting in May 2012 have been integrated.

The first topic addresses *how to image the neonatal genitalia - with particular interest in female anomalies*. Besides a proposal for an imaging algorithm for neonates and infants with suspected genital anomalies that elucidates the role of US, fluoroscopy and MRI, some procedural details are given for US-genitography and MRI.

The second topic is a procedural recommendation on *how to perform renal biopsy in children*. As many variations are presently observed at different institutions, and often even a blind renal biopsy is still performed in spite of the increased risk of potentially dangerous complications, a proposal is issued to standardise the procedure in order minimize risk and optimise yield and outcome. The essential features are standardised and detailed pre-, peri- and post-interventional US examinations, the standardized US guidance during the procedure and the selection of the optimal needle (size and length) with reduction of the number of passes in relation to the required histological information.

**Summary:** We present the two most recent proposals for discussion hoping to eventually yield wide acceptance that will allow further improvement in standardising paediatric uro radiology not only as a quality measure, but also to provide comparable data for multicenter studies and meta-analysis in future that will hopefully provide also more evidence for future revisions of these recommendations.

### LS7c

#### **Contrast Update**

Henrik Thomsen (DK)

## Lecture Session 8: Prostate Imaging

**Moderators:** Francois Cornud (FR) & Valeria Panebianco (IT)

### LS8a

#### **Imaging of Benign Prostate Disorders**

Ahmet Turgut (TR)

### LS8b

#### **Structured Reporting of Multimodality MRI- ESUR Guidelines**

Jelle Barentsz (AN)

**LS8c**

**Multiparametric MRI for Focal Therapy**

Clare Allen

**LS8d**

**Focal Therapy for Prostate Cancer**

Mark Emberton

## Sponsored Lectures

### Friday 14 September

#### Lunch Symposium sponsored by HITACHI

Fusion of Multimodality Imaging Technologies to Improve Prostate Cancer Detection

Prof Thomas Fischer, Berlin, DE

Men with an elevated serum level of prostate-specific antigen (PSA) or suspicious findings on digital rectal examination (DRE) are examined by transrectal ultrasound (TRUS). For histological confirmation and therapeutic planning, ultrasound guided systematic biopsy of the prostate is performed. However, in a subgroup of patients with elevated PSA levels, no malignancy is detected by biopsy or up to four biopsies are performed before prostate cancer is detected. A negative biopsy therefore does not exclude prostate cancer. In consequence, unnecessary biopsies with an increase of complications are performed in healthy men.

Several studies have shown that the development of prostate cancer is associated with metabolic changes, which in turn alter perfusion in tumor tissue. The TRUS is an established tool for guiding systematic needle biopsy but not for detecting suspicious areas within the prostate. The detection of prostate cancer with contrast-enhanced TRUS may be improved relative to baseline TRUS, but substantial uncertainty remains in the interpretation of contrast-enhanced TRUS images. A limitation of contrast-enhanced TRUS is the short time window of the arterial phase for detection and characterisation and the inability to scan the whole prostate gland at the same time. MRI is known to delineate prostate cancer. For the staging and the detection of a prostate gland carcinoma by means of MRI fast T2 weighted spin echo sequences are usually used.

For the improvement of the TRUS in the study presented here, we used ultrasound contrast agent imaging and compared it to magnetic resonance imaging (MRI), Elastography, Image Fusion (ultrasound plus MRI) and histology after biopsy.

## Friday 14 September

### Bracco Invited Lecture

#### Developments in contrast media safety: What you should know

**Moderator:** Giles Roditi (UK)

- a) The calm after the NSF storm: what have we learnt? **Name of speaker TBC**
- b) Delayed AEs to iodinated contrast media - Marie-France Bellin (FR)

**Saturday 15 September**

**Lunch Symposium Sponsored by "BAYER"**

- a) Difficult Liver Lesions in Oncology Patients - Mark Callaway (UK)
- b) Weight-Based contrast dosing for body CT - Lee Mitsumori (US)

## Workshops

### Workshop 1: Stone Disease

**Moderators:** Julian Keanie (UK) & Jarl Jakobsen (DK)

#### WS1a

##### Stone Imaging and Prone PCNL

Parvati Ramchandani (US)

#### WS1b

##### Supine PCNL

Alf Pollard (UK)

#### WS1c

##### PCNL Planning and Complications

Anders Magnusson (SE)

### Workshop 2: Scrotal Imaging

**Moderators:** Lorenzo Derchi (IT) & Jonathan Tuck (UK)

#### WS2a

##### Case Based Discussion on Testicular Abnormalities

Vikram Dogra (US)

#### WS2b

##### Gonadal and Extragenital Malignancies

Marjorie Stein (US)

#### WS2c

##### Knocks, Nasties and the Knife - The Acute Scrotum

Jonathan Richenberg, Brighton (UK)

Acute scrotal pain may be due to trauma, infection or torsion. Clinical management is the mainstay for these conditions, but mismanagement may result in testicular loss - and litigation!

Ultrasound therefore has a crucial albeit limited role in diagnosis of the acute scrotum.

1. Trauma: looking for testicular integrity, for size and liquidity of haematoma.
2. Infection: sub acute phase - imaging when the clinical course is not as expected. Look for abscess or collection. Assess testicular viability, and look for venous infarction.
3. Torsion: surgery should never be delayed by imaging; however, in equivocal cases (early in the presentation or 18 plus hours from onset) ultrasound may help, notably to look for infection masquerading as torsion. Equivocal ultrasound should always lead to surgery.

The presentation will address trauma (knocks), infection (nasties) and torsion (the knife), with an emphasis on images and practical tips when faced with scanning the acute scrotum.

**Workshop 3: Prostate Imaging and Biopsy****Moderators:** Raymond Oyen (BE) & John Brush (UK)**WS3a****TRUS Bx: Technique and Controversies**

Seung Hyup Kim (KR)

**WS3b****Advanced MRI**

Sadhna Verma

**WS3c****MRI Guided Biopsy**

Jurgen Fütterer

**WS3d****MRI-TRUS Fusion Biopsy**

Francois Cornud (FR)

**Workshop 4: Ultrasound Contrast CEUS****Moderators:** Michel Claudon (FR) & Grant Baxter (UK)**WS4a****CEUS in the Evaluation of Native Kidney**

Michele Bertolotto

**WS4b****CEUS in the Evaluation of Transplants**

Jean Michel Correas (FR)

The renal transplant is facing many complications particularly during the first trimester following the surgery. Conventional ultrasonography of the kidney, including tissue-harmonic imaging and colour/Power Doppler US is still facing some limitations due to poor contrast ratio of gray-scale imaging and limited sensitivity of color Doppler US for the detection of intra cortical capillaries and deep pedicular vessels. Ultrasound contrast agents improve these two limitations and allow the development of a novel semiology of microvascular disorders, as well as new applications for renal blood flow quantification. However, the specific acoustic response obtained from the microbubbles requires the use of specific pulse sequencing and signal processing. Contrast-enhanced US of the renal transplant has become the modality of choice for perfusion deficit detection and renal artery stenosis diagnosis (in selected cases), as well as for characterization of indeterminate renal lesions and atypical cystic lesions. This imaging modality is offering some major advantages due to the lack of renal toxicity of ultrasound contrast media, the cost effectiveness, and the high frame rate that allows real-time acquisition with limited microbubble destruction.

**WS4c****Voiding Urosonography for Vesicoureteric Reflux**

Frederica Papadopoulou

**Workshop 5: Trauma****Moderator:** Harry Bardgett (UK) & Marie-France Bellin (FR)**WS5a****Trauma on the front line: Imaging and Management**

Mac Armstrong

**WS5b****Trauma of the Upper Urinary Tract**

Ercan KOCAKOC (TR)

Genitourinary injuries occur in the setting of polytrauma and often overlooked in the setting of acute trauma. Trauma to the kidney is seen in about 8%–10% of patients with blunt or penetrating abdominal injuries. Ureteral injury is rare and occurs more commonly iatrogenic than from external trauma. Radiologic imaging often plays a key role in diagnosing injuries of the upper genitourinary tract.

The gold standard imaging technique for a renal injury is contrast-enhanced CT. CT has replaced intravenous urography as the primary modality for the evaluation of suspected renal injuries. Trauma protocols are usually designed for evaluation liver and splenic injury, because of this many major renal or ureteral injury cannot be detected by CT. Proper urinary CT protocol for trauma is crucial to diagnose important injuries. CT can show a renal laceration, hematoma with or without active arterial extravasation or devascularized segments of renal parenchyma. Excretory phase images demonstrate the presence of urinary extravasation. In this presentation, imaging techniques and CT protocols of renal and ureteral trauma will be discussed. Examples of different type and severity of cases will be demonstrated.

**WS5c****Trauma of Lower Urinary Tract**

Alex Kirkham

**Workshop 6: CT Urography****Moderators:** Nigel Cowan (UK) & Richard Cohan (USA)**CT Urography; a Global Perspective****Learning Objectives**

1. To appreciate variations in clinical practice according to a global perspective.
2. To understand CT urography techniques.
3. To identify problems and provide solutions arising from using CT urography in our own practice.

**WS6a**

Tarek El Diasty (EG)

**WS6b**

Jeff Newhouse (US)

**WS6c**

CTU- HOW I DO IT?

Olivera Nikolic, Marijana Basta Nikolic, Sanja Stojanovic, Tijana Mrdjanin

Center of Radiology, Clinical center of Vojvodina, Novi Sad, CS

Objectives:

1. To present the development of CTU at our Department including previous and current protocols
2. To discuss the operative statistics
3. To review the existing obstacles in everyday work
4. To point out the future perspectives in terms of irradiation dose reduction

**WS6d**

Chris King (UK)

**WS6e**

M N Ozmen (TR)

**Workshop 7: Female Imaging: How I do it?**

**Moderators:** Teresa Margarida Cunha (PT) & Jo McHugo (UK)

**WS7a****Imaging Female Congenital Anomalies**

Gennaro Restaino

**WS7b****PET-CT in the Female Pelvis: How I Do It**

Andrea Rockall (UK)

PET-CT has become an important tool in the imaging evaluation of women with a gynaecologic malignancy. It may be used in the context of primary staging as well as initial treatment planning and is widely used in patients with cervix cancer being treated with primary chemo-radiotherapy. It may be used in patients with suspected recurrent disease, including cervical, endometrial or ovarian cancer. PET-CT may also be used for early response assessment to chemotherapy in patients with ovarian cancer, although this is still under development.

In this workshop, the topics that will be covered include the indications for PET-CT in the female pelvis, important technical considerations, interpretation of images with typical cases as well as a few tricky problems and pitfalls.

Cases of both primary and recurrent disease will be demonstrated as well as some examples of PET-CT in evaluating response to chemotherapy.

**WS7c****Pitfalls of Pelvic MR Imaging**

Rosemarie Forstner (AT)

**WS7d****How I Image Mucinous Tumours of the Ovary**

Antonina Bergman

**Workshop 8: Adrenal Imaging**

**Moderators:** Sameh Hanna (EG) & Nick Papanikolaou (US)

**WS8a****Imaging and Characterization of Adrenal Masses**

Phil Kenney (US)

**WS8b****Functional Imaging of Adrenals Including PET/CT, MRS and DWI**

Suzan Goldman (BR)

**WS8c****Adrenal Lesions Beyond Adenomas and Metastases**

Paul Nikolaidis (US)

While common entities such as adenomas and metastases are frequently encountered on imaging, numerous other types of lesions may occur in the adrenal gland that may pose a diagnostic challenge.

Learning objectives:

1. To describe features of less common and some frankly unusual neoplastic lesions.
2. To review unusual benign adrenal lesions along with inflammatory and infectious processes, including parasitic and granulomatous diseases.
3. To discuss the difficulties posed by collision tumors.



## Scientific Sessions

### Scientific Session I: Interventional Radiology and Renal

#### **SSI.01**

##### **PTFE-Covered Metallic Stent to Treat the Malignant Ureteral Obstruction Palliatively**

Kang Byung Chul, Choi Sun Young

*Department of Radiology, Mokdong Hospital, EWUMC, KR*

**Purpose:** To evaluate the efficacy of the polytetrafluoroethylene-covered metallic stent in the treatment of inoperable malignant ureteral obstruction

**Materials and Methods:** From April 2009 to March 2011, eight patients with a mean age of 67.1 years (range 48 to 84) old with ureteral obstruction due to extrinsic ureteral compression and/or encasement by primary metastatic tumors underwent implantation of self-expandable polytetrafluoroethylene-covered metallic stents. A total of twelve ureters were managed. We had got blood biochemistry tests and imaging test such as intravenous urography or CT urography for the follow-up.

**Results:** They had carcinomas with obstructive uropathy; three had colorectal cancers, another three had uterine cervix cancers, one stomach cancer, and one urinary bladder cancer. All obstructive ureters were invaded by malignant cancers and we inserted 7 mm polytetrafluoroethylene-covered metallic stents through the PCN (percutaneous nephrostomy) tracts. Of twelve invaded ureters, one was a proximal 1/3 ureter, one mid 1/3 ureter, and the others involved mid and distal ureters. We followed imaging studies for three to 10 months. During the follow-up periods, ten ureters except two were resolved the obstructive uropathy after polytetrafluoroethylene-covered metallic stent; these two failed ureters were invaded by recurred tumors through the ileal conduit. Three ureters showed recurrent acute pyelonephritis.

**Conclusion:** Internal drainage of inoperable malignant ureteral obstruction with polytetrafluoroethylene-covered metallic stents provides relatively effective decompression of the ureteral obstruction.

#### **SSI.02**

##### **Pathological Nature of Renal Tumours - Does Size Matter?**

Lutfi Kurban<sup>[1]</sup>, Alireza Vosough<sup>[1]</sup>, Bhaskar Somani<sup>[2]</sup>, Preman Jacob<sup>[1]</sup>, Deepak Prasad<sup>[3]</sup>

<sup>1</sup>Aberdeen Royal Infirmary, UK <sup>2</sup>Southampton General Hospital, UK <sup>3</sup>Bradford Royal Infirmary, UK

**Objective:** Most solid renal masses are malignant. Recent studies have suggested that small renal masses (SRM) have higher chance of being benign. Hence, there is a new emerging indication to perform biopsy in SRM. Our aim is to examine the correlation between size and pathological nature of renal masses.

**Methods:** Retrospectively, we reviewed 323 nephrectomies between 2000 and 2008. Based on size, 3 groups were identified namely; small  $\leq 4$  cm (SRM), medium 4-7 cm and large  $> 7$  cm. The relation between size and benignity, histological grading, presence of necrosis and sarcomatous change and T staging was assessed.

**Results:** Compared to medium and large tumours, SRM were more likely to be benign, of low histological grade, have no necrosis or sarcomatous change and have a T staging of  $\leq T2$ . Of the 91 SRM, 77 (85%) were malignant. 14 were benign, of which 10 were oncocytomas (71%).

Despite the increased likelihood of benignity in SRM, biopsy is unlikely to change management in the majority of patients. In our series 71% of benign SRM were oncocytomas. These tumours have uncertain natural history and are normally surgically removed. Moreover, obtaining a biopsy proven oncocytoma does not secure a benign diagnosis as chromophobe carcinoma co-exists in 10-15% of cases. Biopsy of SRM is not required routinely but it can be useful in selected cases.

**Conclusion:** We demonstrated an increase likelihood of benignity in SRM, majority being oncocytomas. Biopsy of SRM may have a role in selected cases.

**SSI.03****The Effects of Cryoablation on Renal Cell Carcinoma Perfusion and GFR**Stephen Chapman<sup>[1]</sup>, Tze Wah<sup>[2]</sup>, Steven Sourbron<sup>[1]</sup>, David Buckley<sup>[1]</sup><sup>1</sup>Division of Medical Physics, University of Leeds, Leeds, UK <sup>2</sup>St. James's University Hospital, Leeds, UK

**Purpose:** To assess the effect of cryoablation on renal cell carcinoma (RCC) perfusion and single kidney glomerular filtration rate (GFR) using dynamic contrast-enhanced (DCE) MRI.

**Materials And Methods:** Twenty patients undergoing percutaneous cryoablation of a solitary RCC between August 2010 and November 2011 were evaluated with DCE-MRI immediately before and one month post-cryoablation. DCE-MRI data were acquired with 2 s temporal resolution in a coronal plane during the first pass of a 0.1 mmol/kg bolus dose of Gd-DOTA. Perfusion of the RCC (in ml/min/100 ml tissue) was estimated using a maximum slope technique. Single kidney GFR (in ml/min) was assessed using data acquired every 30 s for the following 3 mins in the axial plane and analysed using Rutland-Patlak plots.

**Results:** Perfusion in the zone of ablation decreased significantly ( $p=0.001$ ) from a mean of  $104 \pm 41$  ml/min/100ml pre-cryoablation to  $12 \pm 4$  ml/min/100ml post-cryoablation; a mean reduction of 86%. Functional analysis was performed in nineteen patients. GFR was underestimated by MRI and decreased significantly in tumour-bearing (-37%,  $p=0.01$ ) and contralateral kidneys (-37%,  $p=0.02$ ).

**Conclusion:** It is feasible to measure RCC perfusion pre- and post-cryoablation using DCE-MRI. The significant decrease within the zone of ablation suggests that this technique may be useful for assessment of treatment response. Further work is required to develop MRI measures of GFR and to validate these findings.

**SSI.04****Radio frequency Ablated Renal Tumors Since 2007 - What Affect Results?**Vanessa Acosta Ruiz<sup>[1]</sup>, Pär Dahlman<sup>[1]</sup>, Einar Brekkan<sup>[2]</sup>, Anders Magnusson<sup>[1]</sup>, Maria Lönnemark<sup>[1]</sup>University Hospital of Uppsala, SE, Departments of: <sup>1</sup>Radiology, <sup>2</sup>Urology

**Introduction:** As medical imaging expands, more renal tumors are found incidentally. The majority are found in elderly with reduced renal function favoring less invasive treatment methods such as Radiofrequency Ablation (RFA). RFA is a relatively new method; more long-term follow-up studies are needed to assess longterm treatment results.

**Objective:** The objective of the study was to evaluate the result after RFA in renal tumors and identify the factors leading to incomplete tumor ablation. Our hypothesis was that needle placement and tumor size may be factors that affect ablation successfulness.

**Method:** Since 2007 we have treated ablated 60 renal tumors. Patients have been followed up with routine contrast-enhanced CT scans at 3, 6, 12 months and yearly after treatment. Collection of data includes patient information (age, gender, previous renal tumor treatment) tumor data (its position in the kidney, tumor type, size), RFA treatment data (needle placement, complication rate, ablations success) and follow-up results (tumor relapse).

**Results:** The complete ablation success rate has been 70% after a single treatment session. Second treatment of incomplete ablated tumors increased the success rate to 80%. Complications were two cases of pneumothorax, one case of neuralgia and two cases of severe pain during ablation leading to interrupted treatment.

**Conclusion:** Variables such as large tumor size (>3 cm), non-optimal needle placement, small tumor-renal sinus distance (<5 mm) seem to increase the frequency of non-fully ablated tumors. These variables may be useful to assess in the future when considering potential patients for RFA.

**SSI.05****Cost-effectiveness of CT-guided Biopsy for Incidentally Detected Indeterminate Renal Masses**

Karim Samji<sup>[1]</sup>, Rajesh Ramaswamy<sup>[1]</sup>, Julian Keanie<sup>[2]</sup>, John Brush<sup>[2]</sup>

<sup>1</sup>Radiology Specialty Registrar, Western General Hospital, Edinburgh, UK <sup>2</sup>Consultant Uroradiologist, Western General Hospital, Edinburgh, UK

**Objective:** To determine the cost-effectiveness of CT-guided biopsy in the management of incidentally detected indeterminate renal masses.

**Methods:** The cost-effectiveness of three different strategies was compared. The first strategy used empiric surgery for all masses. The second strategy used CT-guided biopsy to triage patients to either surgery or discharge. The third strategy used a combination of surgery (for all masses equal to or greater than 3cm), and follow-up (at 6, 12, 24 and 36 months for those masses less than 3cm). The third strategy assumed that malignant lesions would demonstrate some growth between 12 and 24 months, and would then subsequently undergo surgery. Based on a previous study by the authors, it was also assumed that 64.3% of lesions will be equal to or greater than 3cm, and that 71.4% of all lesions will be malignant. The costs for contrast-enhanced CT, laparoscopic renal surgery, inpatient stay and outpatient appointments were derived from the Department of Health's National Tariff Information for 2011-12 (UK). The cost of a CT-guided renal biopsy was derived from US data.

**Results:** The costs used were £156 per initial contrast-enhanced CT, £124 per follow-up contrast-enhanced CT, £187 per initial outpatient appointment, £100 per follow-up outpatient appointment, £6807 per admission for laparoscopic renal surgery, and £530 per CT-guided biopsy. The second strategy was found to be cheaper than both the first strategy (by £1345.40 per patient) and the third strategy (by £874.40 per patient).

**Conclusion:** CT-guided biopsy is cost-effective in the management of incidentally detected indeterminate renal masses.

**SSI.06****Retrograde Endovascular Sclerotherapy in Patients with Varicocele and Pathospermy**

Oleg Zhukov, Yevgeniy Efremov, Stepan Krasnyak, Vladimer Ukolov, Pavel Penkov

FSBI "Scientific and Research Institute of Urology" Ministry of Healthcare and Social Development, Moscow, RU

**Introduction:** The indication for surgery in these patients are vascular pathospermy after exclusion of hormonal, autoimmune, obstructive, and other factors leading to disruption of ejaculate's fertility. Prognostic factors in this case are clinically significant varicocele, sperm concentration less than 5 million per ml, a normal FSH levels, and total testicular volume more than 30 cm<sup>3</sup>

**Materials and methods:** In 2012 the 54 patients were operated with varicocele and pathospermy. Of these, 39 patients were married. Three patients were operated with subclinical varicocele, 18 patients with the 1<sup>st</sup> stage and with the 2<sup>nd</sup> stage – 35 patients. Age of operated patients was 18-41 years (34,1 ± 7,2 years). Patients underwent endovascular sclerotherapy of testicular vein with ethoxysclerol 3% -2 ml, three patients underwent bilateral surgery.

Quality control of ejaculate passes through the 6 months. The presence of spontaneous pregnancy was assessed during the first year after surgery.

**Results:** After 6 months in patients undergoing endovascular thrombosing testicular vein sperm concentration increased by 65% compared with the baseline. Motility has improved by 67%.

The onset of spontaneous pregnancy was observed in nine patients with female partners. Pregnancy occurred after 4-7 months after surgery.

**Conclusions:** Restoration of spermatogenesis in patients with varicocele after surgery occurs in a period of 4 months. In this method the operation is not provided by the damaging effect on the paravasal tissue. Complications such as thrombophlebitis, extravasations and acute or delayed reactions to the contrast were not detected.

**SSI.07****CEUS for Assessment of Therapeutic Response after RFA of Small RCC**

Manca Garbajs, Dubravka Bračička Vidmar, Darja Babnik-Peskar, Peter Popovič

*Institute of Radiology, University Medical Centre Ljubljana, SI*

**Objective:** The purpose of our study in progress was to evaluate the diagnostic performance of contrast-enhanced ultrasound in the assessment of therapeutic response after percutaneous radiofrequency ablation of small renal tumors.

**Methods:** Between March and May 2012 twelve patients treated with percutaneous radiofrequency ablation (8 men, 4 women; mean age, 79 years; range 62–89 years; mean tumor size, 2,5 cm; range 0,5–4,3 cm) underwent CT, followed by contrast-enhanced ultrasound one week later. Diagnostic imaging was performed 2 to 50 months (mean, 24 months) after radiofrequency ablation.

**Results:** All 12 patients underwent CT with contrast media. Contrast-enhanced ultrasound was performed on 8 out of 12 patients (66.7%); 6 patients had complete response and 2 patients had residual tumor. 2 patients had tumors that were too small to detect on conventional ultrasound and 2 patients had contraindications for application of ultrasound contrast agent. Although all tumors with complete response showed lack of enhancement in the treated area on both imaging modalities, CT proved to be better in assessing tumor size, location and characteristic imaging features of successfully ablated tumors, such as local perinephric stranding, halo sign and fat invagination.

**Conclusion:** Contrast-enhanced ultrasound is a promising imaging modality in assessing residual disease after percutaneous radiofrequency ablation of small renal cell carcinoma.

**SSI.08****Percutaneous Radiofrequency Ablation of Solid Renal Masses: Techniques and Outcomes**

Peter Popovič, Manca Garbajs, Darja Babnik-Peskar, Dimitrij Kuhelj

*Institute of Radiology, University Medical Centre Ljubljana, Slovenia, SI*

**Objective:** The purpose of this study was to retrospectively evaluate the results of percutaneous radiofrequency ablation (RFA) of solid renal masses.

**Materials and methods:** 28 patients (29 tumors) were treated with 34 percutaneous RFA sessions over a 5.5 - year period. During 24 sessions, radiofrequency ablation was performed using CT guidance, 8 were performed using ConeBeam CT guidance and one using sonographic guidance. The indications for nonsurgical treatment were high surgical risk (n=23), bilateral renal cell carcinomas (n=1), solitary kidney (n=3), and the presence of metastatic disease (n=1). The average patient age was  $75.9 \pm 7.4$  years (range, 58-86 years) and the average renal mass size was  $30.1 \pm 8.6$  mm (range, 16-45 mm). Follow-up imaging was performed at 3 and 12 months and yearly thereafter.

**Results:** 22 of 29 tumors were successfully treated using percutaneous imaging-guided radiofrequency ablation. Successful treatment was defined as lack of enhancement of the treated region on follow-up CT. 7 of 29 tumors had residual enhancing tissue after the first treatment session and required a second session. 5 residual tumors were successfully ablated by a second RFA procedure. One patient was not treated because of progression of metastatic disease and the other one refused second RFA. 4 patients had minor complications and one patient had large perinephric abscess needing drainage. The average follow-up time was  $24.5 \pm 15.6$  months (range, 3-62 months).

**Conclusion:** Percutaneous imaging-guided radiofrequency ablation is a successful method for patients with small solid renal masses, which are not ideal candidates for surgical resection.

**SSI.09****Audit of the First 35 Renal Cryoablations Performed in Glasgow**

Desmond Alcorn

GGC NHS, UK

**Purpose:** To Audit The Percutaneous Cyoablation Service we have provided for Renal Masses Since it Began in November 2011 - with emphasis on referral criteria ,technical success, complications and outcomes

**Materials and Methods:** The first 35 consecutive Percutaneous Cryoablations performed in Glasgow were included. The following factors were examined- indication for procedure, lesion pathology, size, position, procedure technique, technical success, immediate and delayed complications, hospital stay, impact on renal function, outcome with presence or absence of residual disease, recurrent or new disease.

**Results:** 35 cryoablations were performed on 30 patients since November 2011 follow up range is from 36 – 3 month

**Indications:** Impaired renal function 26/35, inherited renal cancer 5/35, synchronous malignancy 2/35, treatment of residual disease 2/35

20/30 patients had biopsy proven renal cancer

5/30 patients suffered form VHL/ Burt Hogg Dube

Histology unavailable on 5/30

Mean tumour size 33mm (range 70-13mm)

Extensive hydrodissection was required in 10/35 ablations, pyeloperfusion was preformed in 3 cases

**Results:** Technical success 100%

Extensive hydrodissection was required in 10/35 ablations, pyeloperfusion was preformed in 3 cases

2 patients had residual disease at 3 months

1 patient had renal vein thrombus at follow-up which in retrospect had been present prior to ablation

1 patient developed adrenal metastatic disease

All patients discharged 2days or less following procedure

**Complications:** 1 patient suffered PTE at 6 days

No permanent deterioration in renal function noted in any patient

**Conclusion:** Our initial experience suggests Percutaneous Cryoablation appears to be a safe and effective procedure.

## Scientific Session II: Prostate and Paediatrics

### SSII.01

#### Diffusion-Weighted Imaging in the Diagnosis of APN in Children

Asmaa Sallem<sup>[1]</sup>, Jean-Nicolas Dacher<sup>[1]</sup>, Jérôme Caudron<sup>[1]</sup>, Agnès Liard<sup>[2]</sup>, Pierre-Hugues Vivier<sup>[1]</sup>  
*Rouen University Hospital, FR, Departments of: <sup>1</sup>Pediatric Radiology, <sup>2</sup>Pediatric Surgery*

**Purpose:** To compare Diffusion-Weighted Imaging (DWI) with Gadolinium-enhanced T1-Weighted imaging (Gd-T1W) in the diagnosis of acute pyelonephritis (APN) in children.

**Material and methods:** Children with a doubtful diagnosis of APN underwent an MRI scan between March 2010 and June 2012, accordingly to ESUR-ESPR guidelines. Urinary culture, blood count and renal ultrasound had been performed prior to MRI in all patients. The MR protocol included DWI and Gd-T1W at 1.5 Tesla. Each study was read in double-blind fashion by two radiologists. The McNemar statistic was used to test the null hypothesis that there is no difference between DWI and Gd-T1W in the diagnosis of APN.

**Results:** Thirty-four children (23 girls, age range: 6 months – 11.4 years) were enrolled. Sixty-eight kidneys were analyzed. Thirty-nine kidneys were considered normal with both sequences, 25 were positive for both sequences, 3 were positive with Gd-T1W and negative with DWI, and one was negative with Gd-T1W while positive with DWI. No significant difference in terms of diagnosis of APN was observed (McNemar statistic = 0.25, p=0.63). Both readers rated higher the conspicuity of DWI compared to Gd-T1W.

**Conclusion:** If MRI is performed in case of doubtful diagnosis of APN, perfusion of contrast medium does not seem mandatory. DWI provides comparable results to Gd-T1W with high quality images.

### SSII.02

#### Application of Multiparametric MRI in the Diagnosis of Prostate Cancer

Richard Hammond<sup>[1]</sup>, Julian Keanie<sup>[2]</sup>, Fiona Ewing<sup>[2]</sup>

*<sup>1</sup>University of Edinburgh, UK <sup>2</sup>Western General Hospital, Edinburgh, UK*

**Objective:** Prostate biopsy is invasive and is associated with potential complications. The search to find an effective alternative is a justified research objective. Newer MRI imaging techniques offer the potential to achieve this goal. The present study measures the sensitivity and specificity of multiparametric MRI of the prostate and compares the results to current literature.

**Methods:** Forty nine patients at the Western General Hospital Edinburgh underwent multiparametric MRI investigation before histological analysis of the prostate. This retrospective study compared radiological opinion with histological diagnosis. MRI sensitivity and specificity was calculated. For patients with histologically confirmed cancer, the Gleason score was compared to MRI opinion.

**Results:** The calculated sensitivity was 89% and specificity 46%. There was an inverse relationship between the Gleason score and the number of cancers missed on MRI. The cohort was divided into groups A, B and C according to clinical history and individual sensitivity and specificity calculated (A: 100% and 100%; B: 71% and 50%; C: 91% and 40%).

**Conclusion:** The present study confirms the view that multiparametric MRI techniques have high sensitivity in the detection of prostate cancer and suggests this technique can detect aggressive tumours with a high degree of accuracy. The lower specificity found is not in keeping with comparable studies: this is thought to be due to our lack of previous experience in this technique; examples of false positives will be presented.

**SSII.03****Assessment of Prostate Cancer Aggressiveness Using Multiparametric MR Imaging**

Tsutomu Tamada<sup>[1]</sup>, Teruki Sone<sup>[1]</sup>, Naoki Kanomata<sup>[2]</sup>, Akira Yamamoto<sup>[1]</sup>, Katsuyoshi Ito<sup>[1]</sup>  
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**Objective:** To investigate whether signal intensity (SI) on T2-weighted imaging, ADC derived from DWI and enhancement effects on DCE-MRI correlate with the clinical risk scores of prostate cancer evaluated with whole-mount step-section pathologic specimens from radical prostatectomy.

**Method:** Fifty-eight patients (mean age, 69 years; range, 56-82 years) with prostate cancer underwent multiparametric MR imaging including T2-weighted imaging, DWI (b factors: 0 and 800 s/mm<sup>2</sup>) and DCE-MRI at 1.5T before prostatectomy. As the MR measurements of prostate tumor, tumor-muscle SI ratio on T2 weighted imaging, ADC, and enhancement effects at early phase ((SI<sub>post</sub> - SI<sub>pre</sub>)/SI<sub>pre</sub>) were calculated. Associations of each MR measurement with Gleason score and D'Amico clinical risk score were assessed by using Spearman's rank correlation coefficient and Mann-Whitney U test.

**Results:** Significant correlations were identified between ADC values in all cancers and their Gleason score ( $\rho = -0.341, P=0.005$ ) and D'Amico clinical risk score ( $\rho = -0.376, P = 0.002$ ). Furthermore, ADC values were found to distinguish significant tumors in the peripheral zone with Gleason score  $>$  or  $= 7$  from insignificant tumors with Gleason score  $<$  or  $= 6$  ( $P = 0.011$ ). However, no significant correlation was observed between clinical risk scores and tumor-muscle SI ratio and enhancement effects at early phase.

**Conclusion:** Among multiparametric MRI, DWI with ADC may play an important role as compared with T2-weighted imaging and DCE-MRI in the noninvasive assessment of prostate cancer aggressiveness, which is a patient prognostic indicator.

**SSII.04****"Histoscanning" in PCa Identification in Patients with Previous Negative Biopsies**

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**Introduction:** The problem of visualization of prostate cancer (PCa) in the early stages of the disease are not solved in the present time. Attempts of correlating the US, MRI and X-ray characteristics of prostate adenocarcinoma with the performance of PSA and its fractions, and subsequently with the pathologic material gives conflicting information. One possible solution to this problem may be the biopsy of suspicious areas, identified by computer-assisted ultrasonography "Histoscanning".

**Materials and Methods:** We performed 7 RPE and 22 template-biopsies to patients who underwent Histoscanning in pre-intervention period. The mean age was  $62,4 \pm 7,1$  (51 - 73) years, mean PSA values  $7,3 \pm 4,1$  (3,8 - 11,3) ng / ml. In 18 of the 22 patients it was a re-biopsy, which was indicated by the absence of changes with respect to reduction the PSA and the presence of suspicious lesions obtained at Histoscanning. It should be noted that every third patient from this group received therapy with 5 $\alpha$ -reductase inhibitors for long-term (more than 3 per month), for symptomatic and pathogenetic treatment of BPH.

**Results and discussion:** In the pathologic study, of removed prostates after RPE in 5 cases we found a high correlation of this method with the amount and localization of tumor lesions, in 2 cases Histoscanning showed greater volume of lesions, with good correlation of the tumor localisation.

After the template-biopsies: 45% of patients (9 of 22) we first detected prostate cancer, the average Gleason was (6.4), in 3 - HPIN, and 5 - low-grade PIN.

**Conclusion:** Due to the high percentage of newly diagnosed adenocarcinomas of the prostate, Histoscanning appears to be effective for targeted biopsy of the prostate.

Our further investigations will evaluate sensitivity and specificity of this method and compare it with MR technology to develop a rational diagnostic algorithm. Histoscanning will form the basis of creating a virtual stereoscopic organ model before biopsy or surgery, and will be used in choosing a method of treatment and evaluation of radical therapy.

**SSII.05****Multiparametric MRI of the Prostate Cancer in Prebiopsy, Pretreatment and Postprostatectomy Patients**

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mpMRI is important to improve diagnostic accuracy of prostate biopsy, in surveillance of prostate cancer patients(PC) and with persistent clinical suspicion for PC, in exclusion of local relapse after radical prostatectomy (RP) in patients suitable for salvage radiotherapy and to compare MRI findings with postoperative prostate pathology.

Prostate T2WI, DWI with ADC and dynamic contrast enhanced (DCE) T1WI were obtained on Magnetom Espree 1.5T in patients before prostate biopsy, RP, and salvage radiotherapy in patients suspicious for local relapse after RP.

In 30 patients mpMRI was done before biopsy. Suspicious areas were found in 25 of them. 19 patients with suspicious MRI were biopsied and in 8 cases (42%) biopsy was positive. One to three previous negative biopsies were done in 12 of them (63%).

5 of 28 (18%) suspicious areas in transitional zone were positive on biopsy where as 3 of 10 (30%) suspicious peripheral zone were positive.

In all 11 patients before RP with biopsy confirmed PC were identified in prostate by MRI.  
6 of 9 patients with biochemical relapse after RP and PSA less than 1 ng/ml had positive DCET1WI.  
mpMRI data allows to decrease the number of cores about twofold.

mpMRI before TRUS-guided biopsy is comparable to saturation biopsy in PC detection rate and requires significantly less biopsy cores. The specificity is low especially in case of central lesions. Its sensitivity in detection of clinically significant PC is high.

mpMRI may reduce the number of biopsy cores and increase the detection rate of PC.

**SSII.06****Does Pre-biopsy MRI Increase Cancer Detection of Transrectal Prostate Biopsy?**

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**Objective:** This study aims to assess the impact of pre biopsy MRI on carcinoma detection rate in patients who have undergone at least one negative transrectal ultrasound guided prostate biopsy (TRUB).

**Methods:** Consecutive patients with elevated PSA and at least 1 negative TRUB had 1.5T MRI with T1, T2 and diffusion weighted imaging (DWI) prior to repeat biopsy. Repeat biopsies were either extended protocol TRUBs under local anaesthesia with particular attention to abnormal areas suggested by MRI, or transperineal template biopsies under general anaesthesia. Patients who could not tolerate extended protocol TRUBs had targeted biopsies of suspicious areas only.

**Results:** Twenty patients with mean age 62 (median 62) and mean PSA 13.1 (9.95) ng/ml were included. All patients had low signal abnormality in the peripheral zone on T2 and 17 had corresponding abnormality on DWI. Fourteen patients had 20-23 cores taken following extended TRUB protocol; 3 had transperineal template biopsies (26-38 cores); 3 had 2 to 8 cores taken from the suspicious areas only. 3/3 (100%) patients with normal DWI had no prostate carcinoma detected at biopsy. 9/17 (53%) cases with abnormalities on DWI and 2/3 (66.7%) patients, who had only targeted biopsy, had carcinoma detected on histological examination.

**Conclusion:** MRI of the prostate performed prior to repeat TRUB increases the predicted cancer detection rate (13.5-41%), which is comparable with reported results of MRI guided biopsy of prostate. All patients with normal DWI had no malignancy detected on prostate biopsies.

**SSII.07****SSII.08****Salvage CT-guided Percutaneous Cryotherapy for Locally Recurrent Prostate Cancer**

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**Purpose:** To evaluate the tolerance and the technical success of percutaneous prostate cryotherapy proposed as an alternative therapeutic option for locally recurrent prostate cancer following primary or secondary radiotherapy in patients considered as inoperable.

**Patients And Methods:** This retrospective study was institutional review board approved; informed consent was waived. Seven focal CT-guided percutaneous prostate cryoablation procedures were performed after discussion in multidisciplinary committee under general anesthesia for local recurrence of prostate cancer. Patients' median age was 65 years, and the average pretreatment PSA was 2.99 ng/dL (0.56-4.23). Five patients had primary radiotherapy 134 months (107-173) before cryoablation while two patients had history of surgical resection and secondary radiotherapy 106 months in mean (103-109) before. All patients with primary radiotherapy history were contraindicated for surgery due to high risk of urinary incontinence after surgery and coexisting morbidity. MRI and trans rectal contrast enhanced ultrasound biopsies were performed in all cases before the procedure. Clinical and biological (PSA) follow-up were performed at 1, 3 and 6 months and MRI at 3 and 6 months.

**Results:** All procedures were performed under general anesthesia in a 3-day hospitalization and only 2 cryoprobes were used per procedure for all patients. The follow-up period ranged from 3 to 10 months (median, 6 months). Overall complication rates were low, without urinary incontinence, rectal injury or erectile dysfunction occurred. Cryoablation procedure was complete in all cases in one session. On MRI, a local progression was only observed outside the ablative site for the patient with local recurrence after initial prostatectomy. For the 6 other patients, a significant decrease of PSA was observed at 1, 3 and 6 months follow-up.

**Conclusion:** Salvage CT-guided percutaneous cryoablation of the prostate seems to be a safe minimally-invasive treatment in case of local recurrence after primary or secondary radiotherapy.

**SSII.09****Real-time CEUS guided biopsies to improve prostate cancer detection**Gérald Rigou<sup>[1]</sup>, François Cornelis<sup>[1,2]</sup>, Yann Le Bras<sup>[1]</sup>, Régis Hubrecht<sup>[1]</sup>, Nicolas Grenier<sup>[1]</sup><sup>1</sup>CHU Bordeaux, FR <sup>2</sup>Institut Bergonié, FR

**Purpose:** To evaluate, in patients with persistent elevated PSA and previous random negative biopsy, the combination of multiparametric MR imaging (mpMRI) and real-time contrast-enhanced ultrasound (CEUS), to increase the performance of transrectal US (TRUS) biopsies.

**Material and Methods:** This prospective single institution study was approved by the institutional review board. From Sep 2007 to Sep 2011, patients with increased PSA and previous negative random biopsies showing a possible target on mpMRI (hypervascularity with restricted diffusion) underwent TRUS guided prostate biopsy after injection of Sonovue®. Two to three CEUS-targeted biopsies were systematically performed on the suspected sextant (targeted biopsies), followed by 14 non-targeted cores in all sextant of prostate.

**Results:** A total of 178 patients were included in this study with a mean PSA level of 10.7 ng/ml (2.5 - 50). Among the 388 CEUS-targeted biopsies, 30.9% (N=120) were positive for prostatic carcinoma (PCa) while among the 2492 non-targeted biopsies, 5.9% (N=148) were. PCa was confirmed in 83 patients (global detection rate: 46.6%). PCa was detected by targeted biopsies only in 20 patients (24.1%), by non-targeted biopsies only in 24 (28,9%) and by both in 39 (47%). Global detection rate of targeted biopsies is 71% (59/83). All PCas detected by non-targeted biopsies only showed Gleason score of 6 while all PCas with Gleason score higher than 6 (n=13) were detected by the targeted biopsies.

**Conclusion:** Combination of mpMRI and real-time CEUS for TRUS guided biopsy improves the detection of PCa in case of previous negative random biopsy and can be a simple and efficient alternative to other biopsy approaches.

## Scientific Session III: Female Imaging, Ultrasound and Scrotal Imaging

### SSIII.01

#### **CT Depiction of Ovarian Vein Flow Alteration in Ovarian Torsion**

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**Objective:** To assess the value of depiction of ovarian vein flow alterations for the diagnosis of ovarian torsion using multidetector CT(MDCT).

**Method:** 102 patients suspected as ovarian torsion were examined with MDCT prospectively. The CT findings of ovarian veins were evaluated for the maximum diameter and flow patterns with enhancement grade according to enhancing segment and its density. Diagnostic accuracy of MDCT in ovarian torsion was assessed comparing these CT features with surgical findings. 46 patients were surgically confirmed to have ovarian torsion; right(n=34) and left(n=12) side. For those 56 patients whose ovaries were not twisted, pathologic diagnosis revealed either ovarian tumors(n=38) or endometriotic cysts(n=18).

**Results:** The diameters of ovarian veins were decreased in 28(61%) of 46 patients with ovarian torsion. The absent and partial flow patterns of ovarian veins were identified in 27(59%) of 46 torsion patients. 16(35%) of 19 torsion patients with total flow pattern seen on CT had decreased enhancement and the remaining 3 torsion patients showed normal enhancement, whereas only 2 of 56 patients without torsion had the total flow pattern with decreased enhancement. The sensitivity, specificity, positive and negative predictive values, and accuracy of the presence of ovarian vein flow alteration in ovarian torsion using MDCT were 93.5%, 96.4%, 95.6%, 94.7%, and 95.1% respectively.

**Conclusion:** Thus, the demonstration of the ovarian vein flow alterations on MDCT could be a specific finding indicative of ovarian torsion, which may facilitate early confident diagnosis and salvage of involved adnexal structures.

### SSIII.02

#### **Scaled SI of Fibroids in T2; Objective Parameters for MRgFUS**

Kyoung Ah Kim, Sang-Wook Yoon

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**Purpose:** MR guided focused ultrasound surgery (MRgFUS) is a non-invasive treatment for symptomatic uterine fibroids. Patient selection is the most important step to achieve good result. The purpose of this study is to assess the initial efficacy of scaled signal intensity (SSI) of uterine fibroids in T2 weighted MR images as a new objective parameter to determine the suitability for MRgFUS.

**Materials and Methods:** Twenty four uterine fibroids in twenty premenopausal women were treated using MRgFUS. Treatments were performed from October 2008 to January 2010 and mean age of the patients was 37.9±5.9 years. SSI was measured at T2-weighted MR images by standardizing its mean pixel intensity to a 0-100 scale, using reference intensities of muscle (0) and fat (100), respectively. SSI in each fibroid was retrospectively analyzed, according to the non-perfusion volume (NPV) ratio.

**Results:** Mean NPV ratio in uterine fibroid of SSI, less than 10 (n=28), was 65±17.5%. In the case of uterine fibroid of SSI more than 10 (n=18), mean NPV ratio was 51.8±21.0%. Uterine fibroids of SSI less than 10 in T2 weighted MR images showed higher NPV ratio than uterine fibroids of SSI more than 10.

**Conclusion:** Scaled signal intensity of uterine fibroids in T2 weighted MR images can be suggested as an objective parameter for the patient selection in MRgFUS. Uterine fibroids of SSI less than 10 is more eligible for MRgFUS

**SSIII.03****MR Imaging Findings in Patient with Ovarian Endometriomas with a Very High Serum CA-125 Level**

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Serum CA-125 concentrations in patients with endometriosis are rarely >100 IU/mL. We speculated that ovarian endometriomas in patients with a very high serum CA-125 level would be different than those in normal or slightly elevated serum CA-125 level. The objectives of the present study were to evaluate the MR imaging findings in patients with ovarian endometriomas with a very high serum level of CA-125.

Eighty-one female patients who had undergone MRI examination for suspected endometriosis were retrospectively evaluated. We describe the morphologic characteristics of endometriomas; special attention was focused on the presence of the following findings: bilaterality, the maximum diameter of the largest cyst, the lump sum of the diameters of multiple cysts, the maximum cyst wall thickness and the presence or absence of cyst wall enhancement. Analysis of the presence of the signs of adhesions and rupture on the MR imaging was also performed.

There were some morphologic differences of endometriomas with a very high serum CA-125 level as compared to the endometriomas with a normal or slightly elevated serum CA-125 level. And the patients with a very high serum CA-125 level with ovarian endometriomas showed more frequently found MR signs of adhesion and rupture.

**SSIII.04****Enhancement of Ovarian Malignancy on Clinical Contrast Enhanced MRI Studies**

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**Purpose:** To perform a pilot study to assess if there is a significant difference in enhancement of high grade serous carcinoma of the ovary compared with other ovarian malignancies on clinically performed contrast enhanced MRI studies with pathologic correlation.

**Methods:** In this institutional-review-board-approved, HIPAA-compliant study, two radiologists retrospectively, independently reviewed contrast enhanced fat-saturated gradient-echo MRI scans acquired between December 2004 and January 2011 in 37 patients with ovarian cancer. Readers measured the signal intensity (SI) of the ovarian mass and gluteal fat pre- and post-contrast administration. Percent enhancement (PE) was calculated as [(post-pre)/pre-contrast SI] x100. Findings were correlated with surgical pathology.

**Results:** Pathology revealed 19 patients with unilateral and 18 patients with bilateral malignancies for a total of 37 patients and 55 malignant ovaries. High-grade serous carcinoma was present in 25/55 ovaries (45%), other epithelial carcinomas occurred in 12 ovaries (22%), non-epithelial cancers in 8 ovaries (14%) and borderline tumors in 10 ovaries (18%). The percent enhancement of high grade serous carcinoma was not significantly different from other invasive ovarian malignancies (Reader 1 p=0.865; Reader 2 p=0.353). The percent enhancement of invasive ovarian malignancies was more than borderline tumors (Reader 1 p=0.102; Reader 2 p=0.072).

**Conclusion:** On clinically performed contrast enhanced MRI studies, enhancement of high grade serous ovarian carcinoma is not significantly different from other ovarian malignancies. Invasive tumors enhanced more than borderline tumors.

**SSIII.05**

Use of Contrast Enhanced Ultrasound in Kidneys

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Contrast enhanced ultrasound (CEUS) for interrogating renal lesions is an emerging imaging investigation especially in patients with renal impairment and in patients where a CT or MRI scan is contraindicated. Since starting CEUS service in our hospital about two years ago and we have had a total of 20 patients referred for CEUS of the kidneys. We discuss our initial experience and the outcome of for our patient group. Case mix consisted of suspected renal masses, characterization of cystic lesions, and post-radiofrequency ablated lesion assessment. We found CEUS a very useful investigation tool in the assessment of most of these patients resulting in cost savings and clinical benefits.

**SSIII.06**

**Ultrasound Volume of the Testes in Infertile Men with Azoospermia**

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**Objectives:** The purpose of our study was to assess the usefulness of ultrasound (US)-determined testicular volume in the evaluation of the infertile men with azoospermia.

**Materials and Methods:** Our institutional review board approved this retrospective study and the need for informed consent was waived. A computerized search, dated from October 2003 to June 2010, generated a list of 45 infertile men with azoospermia (mean age, 34 years; age range, 26-44 years) who underwent both scrotal US and testis biopsy. US-determined testicular volumes were compared between infertile men with obstructive azoospermia and those with non-obstructive azoospermia.

**Results:** Testicular volume for obstructive azoospermia (ranged from 6.4 ml to 26.9 ml, with a median volume of 14.0 ml) was significantly larger than those for non-obstructive azoospermia (ranged from 1.0 ml to 12.8 ml, with a median volume of 6.1 ml) ( $P < .001$ ). Area under the ROC curve for distinguishing non-obstructive azoospermia from obstructive azoospermia using testicular volume was 0.91. A cutoff value of less than or equal to 11.4 ml could distinguish non-obstructive azoospermia from obstructive azoospermia, with a sensitivity of 94.1 % (95% CI; 71.3%-99.9%) and a specificity of 73.3 % (95% CI; 54.1%-87.7%).

**Conclusion:** US-determined testicular volume can be helpful in the differentiation of obstructive azoospermia from non-obstructive azoospermia.

**SSIII.07**

**Non Palpable Incidentally Found Testicular Tumors: Sonographic, MRI and Pathologic Correlations**

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**Objective:** To describe sonographic and mri aspects of 30 incidentally founded tumors in 29 infertile men and to correlate them with pathologic findings.

To propose criteria for benignity and malignity and an algorithm for the management of such tumors.

**Method:** Among 6000 scrotal sonographic examinations performed for male infertility, we identified 29 patients with non palpable nodules. 16 patients underwent partial tumorectomy, 8 total orchidectomy, and 5 were followed. MRI was obtained in 14 patients.

**Results:**

We found :

-14 benign Leydig cell and 1 Sertoli cell benign tumor that appeared weakly hypoechoic, small (mean 5.8 mm), with peripheric vessels. Adjacent pulp was normal, with no microlithiasis, and no hypoechoic zones. They were hypointense on T2-weighted images and strong enhanced.

-6 seminomas (bilateral in 1 patient) that were strongly hypoechoic (except for one), with hypoechoic adjacent areas, microlithiasis or calcifications around the lesion and perforating vessels. They were hypointense with heterogeneous enhancement at MRI findings.

-3 burned-out tumors that appeared avascular hypoechoic with microlithiasis.

-1 embryonal carcinoma: heterogeneous tumor with microlithiasis

The others 5 tumors demonstrated no change over 6 months-5 years period, because they were supposed to be benign.

**Conclusion:** The diagnosis of benign Leydig cell tumor should be raised in case of small lesions (<6mm) weakly hypoechoic, without microlithiasis but normal adjacent pulp and corbelled vascularisation. Simple tumorectomy or follow up without surgery should be discussed. On the contrary, visualisation of strongly hypoechoic lesions, hypoechoic adjacent zones, conglomerate microlithiasis or macrocalcifications are indicators of malignant tumors.

### **SSIII.08**

#### **Contrast Enhanced Ultrasound: Setting up the Service**

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Contrast enhanced ultrasound is an emerging imaging investigation in clinical practice with a wide range of labeled and off-labeled indications. We discuss our experience in setting up a hospital-based CEUS service. We highlight the process of planning a business case proposal, including cost analysis, satisfying clinical governance issues, and continuing audit.

### **SSIII.09**

#### **Is Contrast Enhanced Ultrasonography (CEUS) Able to Differentiate Between Benign and Malignant Complex Renal Cysts?**

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**Introduction:** CT is normally used for categorizing renal cysts according to the Bosniak classification. It results, however, in high doses of ionized radiation. Non-radiation imaging modalities are therefore highly warranted.

**Purpose:** The aim of this study was to investigate the usefulness of Contrast Enhanced Ultrasonography (CEUS) in the evaluation of complex renal cysts with triple phase CT as golden standard. **Materials and Methods:** From February 2011 to May 2012 patients with Bosniak type II, IIf, III and IV cysts were evaluated using both CT and CEUS. The radiologist performing CEUS was blinded from the CT results. Weighted kappa statistics were calculated to assess agreement between CEUS and CT.

**Results:** Using CT as Golden Standard 40 of 42 lesions (95%) were correctly diagnosed by CEUS; weighted kappa 0.99 (CI: 0.96 – 0.99). Pathology results for B III and B IV lesions were all clear cell carcinomas. Four lesions were too small to categorize (mean diameter: 11.3 mm) and two lesions were incorrectly categorized by CEUS (one B IIf as B III and one B III as B IIf). The B III lesion was surgically removed; histology revealed chronic infection.

**Conclusion:** We found a high degree of agreement between CT and CEUS for categorizing complex renal cysts according to the Bosniak classification. In this series CEUS actually was better able to distinguish between benign and malignant lesions than CT, making CEUS a potential powerful clinical tool with the added advantage of no ionized radiation. Small cystic renal masses do, however, represent a challenge for CEUS.

## Scientific Session IV: Stone Disease, CTU, Functional Imaging and Contrast

### SSIV.01

#### **CT Urography – Optimizing Bladder Opacification in the Excretory Phase**

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**Objective:** CT urography detects bladder tumors in the distended bladder with a sensitivity comparable to cystoscopy. CT urography performed in supine position result in layering in the bladder between urine and contrast in the excretory phase. The aim of the study was to evaluate if bladder opacification improved as patients voided following the corticomedullary scan and returned for a delayed excretory phase scan.

**Method:** Forty patients referred for CT because of suspected urinary tract malignancy was included in the study, twenty patients were examined with delayed- and 20 with the standard 5 min delay excretory phase scan. All patients underwent unenhanced and corticomedullary phase scans. Examinations were performed in supine position and patients ingested 1000ml of water in 2h before the examination and were told not to void.

**Results:** The delayed group waited on average 20 minutes before the excretory scan and the mean contrast opacification of the bladder was 92% compared to 25% in the control group. In the delayed group the mean excretory phase bladder volume was reduced with 37% compared to the corticomedullary scan. Descriptive statistics illustrate that excretory phase bladder volume ought to be similar as in the corticomedullary phase after 30 minutes.

**Conclusion:** Excretory phase bladder opacification was improved from 25 to 92 % if patients left the CT suite, voided and underwent a delayed excretory scan. An increased delay to thirty minutes is suggested to increase bladder distension.

### SSIV.02

#### **Triple-bolus MDCT Urography Performance for Upper Urinary Tract Tumors**

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**Objective:** Our purpose was to assess the performance of triple-bolus MDCT urography using a limited volume contrast material for diagnosis of upper urinary tract malignancies.

**Materials and Methods:** Between February 2005 and December 2008, 374 patients (229 men, 145 women, age range 21-83 years) underwent triple-bolus MDCT as a part of their clinical work-up, 200 of them were investigated due to hematuria. All patients were given 800-1000 ml of water 30min prior to the examination. Scan protocol included two sets of images: unenhanced from the diaphragm to the pelvic symphysis and contrast enhanced set obtained after triple-bolus injection of contrast material. Triple-bolus MDCTU protocol consisted of 30ml/sec at 2mL/sec at 0 seconds, which was meant for the opacification of the urinary tract; followed by 50mL at 1,5mL/sec at 435 seconds and 65mL at 3mL/sec at 488 seconds. Standard of reference included clinical, imaging and final pathology data. Prospective interpretations were retrospectively reviewed by one reader. Sensitivity, specificity, accuracy, and positive and negative predictive value were calculated for prospective and retrospective interpretations.

**Results:** From 200 patients with hematuria 26 (13%) were identified with urothelial malignancies. There were 10 (5%) upper and 16 (8%) lower tract cancers.

Sensitivity, specificity, and accuracy for upper urinary tract cancers for prospective interpretations were 88,9 %, 98,5 %, 98%, and 100 %, 99,5%, 99 % for retrospective interpretations.

**Conclusion:** Limited contrast material (30ml) used in triple-bolus MDCT Urography provided high sensitivity, specificity and accuracy for the detection of upper urinary tract tumors.

**SSIV.03****Ureteric Calculus – Do All Stones Require Radiological Follow-Up?**

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**Objective:** To determine a ureteric calculus size and position that passes spontaneously in 95% of cases, and the total radiation dose of the average ureteric calculus patient.

**Material and Methods:** 112 patients with acute flank pain visiting the emergency department during a two-year period (July 2008 - June 2010) were included in this retrospective study. Inclusion criteria: ureteric calculi confirmed by CT in connection with the emergency visit. Exclusion criteria: multiple ureteral calculi, patient lost to follow-up, follow-up not concluded at the time of data collection (July 2011).

Calculus size was measured with two different protocols: one with a fixed window setting (soft-tissue), another with a window setting depending on calculus density ("standardized"). Calculus position and CT radiation doses were registered. Outcome was grouped as: "unassisted spontaneous passage", "assisted spontaneous passage" (requiring intervention not intended for stone removal) and "non-spontaneous passage" (requiring intervention for stone removal).

**Results:** 97.9% of small distal stones ( $\leq 3$  mm with standardized measuring,  $\leq 4$  mm with soft-tissue window) passed spontaneously. Proximal stones, mid-ureteric stones and distal stones  $>3$  mm required intervention in  $>5\%$  of the cases. The average number of CT-examinations for "unassisted spontaneous passage", "assisted spontaneous passage" and "non-spontaneous passage" was 2.21, 2 and 4.58 respectively, and the average total radiation dose was 14.35 mSv, 17.84 mSv and 21.33 mSv.

**Conclusion:** Not following small distal ureteric stones with CT may halve the patients' radiation dose.

**SSIV.04****Solitary Upper Pole Puncture for Management of Complex Renal Stones**

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**Objective:** Historically upper pole punctures have been associated with higher complication rates, but can provide excellent access for prone percutaneous nephrolithotomy (PCNL.) We report our series of PCNL with upper pole access.

**Method:** A retrospective review of all adult PCNL between Jan 2009 and May 2012. Access was decided jointly by surgeon and radiologist. Imaging and casenotes were reviewed. Complications were graded using the Clavien-Dindo system.

**Results:** 62 patients had an upper pole puncture, 60 notes reviewable. 50 had a single upper pole puncture and 10 had multiple punctures including the upper pole.

Of the solitary punctures, 8 were for solitary upper calyx stones. 10 for full or partial staghorns, 2 for encrusted stents and the remaining 30 for multiple renal stones. This cohort includes two single kidneys, 3 horseshoe kidneys, and a number of patients with spina bifida and urinary diversions.

The absolute stone-free rate for single upper pole puncture was 66% (n=33) based on post-op KUB X-ray, though 86% required no further treatment. One patient required repeat PCNL, and 6 underwent shockwave lithotripsy.

The commonest complication was pyrexia (Grade 1/2.) One pneumothorax occurred intraoperatively but the lung was fully inflated on chest x-ray and required no additional treatment (Grade 1.) One nephrostomy required resiting due to clot colic in a single kidney (Grade 3a). One patient was admitted to ICU with sepsis (Grade 4) but recovered well.

**Conclusion:** Upper pole puncture can give good stone clearance and low complications without the need for multiple access tracts.

**SSIV.05****Radiological Reporting Errors Identified in the Endourology Meeting - A Prospective Review to Identify the Patterns and Severity of Errors at Second Reporting: Beware the Common Pitfalls**

Steven Kennish, Ferekh Salim

*Sheffield Teaching Hospitals, UK*

**Objective:** The endourological radiology meeting offers an opportunity for second reporting of imaging as part of the review process. Errors can be detected, categorised and graded as to potential severity. The frequency, category and pattern of common errors are presented, with case illustrations to help radiologists avoid common pitfalls and improve personal reporting quality.

**Method:** Continuous prospective collection and analysis of errors identified during independent second review of imaging at endourology meetings over a **three month** period. Cases identified by a single radiologist and subsequently confirmed by consensus. Errors were categorised into: false negative, satisfaction of search, interpretation error, typographical error and false positive findings. Severity of error was graded on a scale of 1 to 4.

**Results:** Of 231 patients, 13 radiological errors were identified (5.6%). The majority of errors were interpretation (54%) and satisfaction of search (23%). Failing to identify significant alternative pathology (false negative) and missing subtle but significant findings in the presence of obvious disease (satisfaction of search) were the commonest patterns. Mean severity of error was 3 (2-4), with a high potential for significant consequences.

**Conclusion:** The incidence of errors was low. Nevertheless common patterns of error were detected with potentially significant consequences. The meeting offers an opportunity for double reporting, and increasing accuracy. Education to illustrate common pitfalls may help to reduce the number of future reporting errors for those radiologists involved in the investigation of urological disease.

**SSIV.06****IVIM-DWI of Transplanted Kidneys: Reduced Diffusion and Perfusion Dependent on Cold Ischemia Time**Stephan Rheinheimer<sup>[1]</sup>, Bram Stieltjes<sup>[2]</sup>, Christian Morath<sup>[3]</sup>, Hans-Ulrich Kauczor<sup>[1]</sup>, Peter Hallscheidt<sup>[4]</sup>

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**Purpose:** To evaluate the effect of cold ischemia time (CIT) of **renal allografts** on diffusion and **perfusion using** intravoxel incoherent motion (IVIM) derived parameters.

**Material and methods:** A total of 37 patients with renal allografts (CIT: > 27 <15 h, 10 ≥15 h) and 30 individuals with healthy kidneys were examined at 1.5 T using a single-shot echo-planar diffusion-weighted pulse sequence with nine b-values ranging from 0 to 800s/mm<sup>2</sup>. ADC, perfusion fraction f, and the diffusion coefficient D were calculated using the IVIM model. Parameters of allografts stratified by CIT were compared with healthy kidney groups using the **Mann-Whitney U** test for unpaired data. We computed the Spearman correlation coefficient for correlation with creatinine values.

**Results:** ADC, D, and f of transplanted kidneys were significantly lower than in the healthy controls.

The long-CIT group showed significantly lower diffusion parameters compared with the short-CIT group [mean±SD]: ADC: 1.63±0.14m<sup>2</sup>/ms, f: 11.90±5.22%, D: 1.55±0.25m<sup>2</sup>/ms versus ADC: 1.79±0.13m<sup>2</sup>/ms, f: 16.12 ±3.43%, D: 1.73±0.14m<sup>2</sup>/ms, PADC, f, D < 0.05.

**Conclusion:** Our results suggest that diffusion parameters, especially the ADC, depend on the CIT of the kidney allograft. Potentially, this stands for functional changes in renal allografts. Diffusion-weighted imaging could be used for follow-up examinations. Thus, diffusion parameters may help guide therapy in patients with delayed graft function.

**SSIV.07****Corticomedullary Differentiation of Kidney: Evaluation with SSFP MRI with Time-SLIP**

Akira Yamamoto, Katsuyoshi Ito, Akihiko Kanki, Yasufumi Noda, Tsutomu Tamada  
*Kawasaki Medical School, JP*

**Purpose:** To assess whether non-contrast-enhanced steady-state free precession (SSFP) MR imaging with time-spatial labeling inversion pulse (Time-SLIP) can improve the visibility of corticomedullary differentiation of the normal kidney.

**Materials and Methods:** A series of non-contrast-enhanced SSFP MR imaging with Time-SLIP were performed in 20 patients by using various inversion times (TIs); 500-1800msec in increments of 100msec. In-phase (IP) and opposed-phase (OP) MR images were also obtained. The signal intensity (SI) of the renal cortex and medulla was measured to calculate corticomedullary contrast ratio (SI of cortex/medulla). Additionally, the visibility of corticomedullary differentiation was visually categorized using a four-point scale.

**Results:** In SSFP with Time-SLIP, corticomedullary contrast ratio was highest with TI of 1200msec in 8 subjects (40%), followed by 1100msec in 7 (35%) and 1000msec in 3 (15%). The corticomedullary contrast ratio in SSFP with optimal Time-SLIP (4.93+/-1.25) was significantly higher ( $p < 0.001$ ) than those of IP (1.46+/-0.12) and OP (1.43+/-0.14). The visibility of corticomedullary differentiation was significantly better ( $p < 0.001$ ) in SSFP images with Time-SLIP (averaged grade=4.0) than in IP images (averaged grade=2.63) and OP images (averaged grade=2.05).

**Conclusion:** SSFP MR imaging with Time-SLIP can improve the visibility of renal corticomedullary differentiation without using contrast agents.

**SSIV.08****Renal Safety Evaluation of Dotarem in At-Risk Patients**

Nicolas Grenier<sup>[1]</sup>, Olivier Rouvière<sup>[2]</sup>, Lorenzo Bacigalupo<sup>[3]</sup>, Gilbert Deray<sup>[4]</sup>, RESCUE Team Investigators<sup>[5]</sup>  
<sup>1</sup>Groupe Hospitalier Pellegrin, FR, <sup>2</sup>Hôpital Edouard Herriot, FR, <sup>3</sup>Radiology Department, E.O. Ospedali Galliera, Genova, IT, <sup>4</sup>Hôpital Pitié Salpêtrière, Paris, FR.

**Objective:** To assess the safety profile of Dotarem® in patients with chronic renal failure.

**Methods:** Phase IV, open-label, non-randomized, comparative and multinational study, including 135 patients (male or female, aged  $\geq 18$  years), presenting with known stable stage III to stage IV renal insufficiency (i.e.  $15 < \text{estimated glomerular filtration rate (eGFR)} < 60 \text{ ml/min/1.73m}^2$ ) scheduled to undergo a contrast-enhanced-MRI (Dotarem®) or unenhanced-MRI examination. The primary endpoint was the percentage of patients presenting with nephrotoxicity, defined as a serum creatinine level increase at  $72 \pm 24$ h of at least 25% or 0.5mg/dl compared to baseline, using a non-inferiority analysis. Main secondary criteria were eGFR and serum creatinine variations, influence of hydration protocol and/or prophylactic treatment on the renal function, laboratory parameters, and adverse events (through a follow-up of  $72 \pm 24$ h).

**Results:** The difference (unenhanced-MRI – Dotarem®-MRI) in terms of nephrotoxicity incidence was -1.4% and significantly ( $p=0.001$ ) superior to the clinical non-inferiority limit, demonstrating the non-inferiority. The serum creatinine variation from baseline was  $-1.4 \pm 10.4\%$  for Dotarem®-MRI and  $-3.5 \pm 9.9\%$  for unenhanced-MRI ( $p=0.291$ ). Globally for the secondary endpoints, no relevant differences between the two groups were observed. The good general safety profile of Dotarem® was also confirmed (6 adverse events mostly mild and unrelated).

**Conclusion:** The non-inferiority of Dotarem®-MRI over unenhanced-MRI in terms of nephrotoxicity was demonstrated. Among the few contrast medium-induced nephropathy studies with gadolinium products, this prospective study included a comparison to a control group emphasizing the very good renal tolerance of Dotarem® in at-risk patients.

**SSIV.09****Prevalence of NSF In Dialysis Patients: The Pro-Finest Study**

Olivier Clement<sup>[1]</sup>, Sabine Amet<sup>[2]</sup>, Camille Frances<sup>[3]</sup>, Aurore Tricotel<sup>[4]</sup>, Gilbert Deray<sup>[5]</sup>

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**Objectives:** NSF is a cutaneous and systemic disorder characterized by widespread tissue fibrosis. It has been linked with gadolinium-based contrast agents (GBCA), especially in dialysis patients. The Pro-FINEST study is a national prospective study endorsed by the French Drug Agency (Afssaps), the French Societies of Nephrology, Dermatology, and Radiology. It aims **to determine** the prevalence of NSF after a Magnetic Resonance Imaging (MRI) examination, +/- GBCA, in dialysis patients.

**Method:** The study is based on a 3-section patient form. Section 1: demographics and dialysis; Section 2: MRI examination; Section 3: any dermatological event (DE). Further investigations are planned in case of DE. When **an** NSF diagnosis is confirmed, an ancillary study is scheduled, with random selection of 4 patients (same gender, dialysis technique, centre, GBCA and without any DE after MRI).

**Results:** Since **January 2009**, 571 patients have been included (109 centres): mean age 63.3 years, 58.5% males. 50.3% received GBCA, 88.9% gadoterate. 22 patients reported a DE. Dermatological diagnoses did not report any evidence of NSF.

**Conclusion:** No case of NSF has been reported in 571 dialysis patients among whom the majority received a GBCA. **When good clinical practices are followed and GBCA used in an at-risk group, the NSF frequency is nil.** Amongst injected patients, 2.1% received linear GBCA but 94.4% received a macrocyclic GBCA and 88.9% received gadoterate for which no **unconfounded** case of NSF has been observed yet worldwide in dialysis patients. Almost 76% of injected patients received a **correct** dose of GBCA.

**POSTERS****Posters I - Pelvis and Female Imaging****PI.01****Primary Signet Ring Cell Carcinoma of Young Female Urethra**

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*Department of Radiology, Kangdong Seong-Sim Hospital, Hallym University College of Medicine, KR*

A 39-year-old female presented with anuria for 5 days and gradually decreased urine volume for 10 days. **Past medical history of** sling operation for incontinence a year ago and myomectomy 5 years ago. **On** physical examination, there were no specific findings. Urine analysis showed microscopic haematuria (RBC 1-4) and pyuria (WBC 5-9). **Serum tumour markers were taken: carbohydrate antigen 125 (CA 125) was markedly elevated (> 600 U/mL). Carbohydrate antigen 19-9 (CA 19-9), carcinoembryonic antigen (CEA), alpha-fetoprotein (AFP) and nuclear matrix protein 22 (NMP 22) were normal.**

Abdomen-pelvis CT and pelvic MR **imaging showed a** large enhancing mass **of the** entire urethra with mass effect and multiple enlarged lymph nodes **in the iliac chains and inguinal areas bilaterally**. Positron emission tomography-computed tomography (PET-CT) **showed a** heterogeneous hypermetabolic mass (maxSUV = 7.6) **of the** entire urethra and multiple enlarged **hypermetabolic lymph nodes in the left para-aortic, bilateral iliac, bilateral inguinal and right hilar areas**. Gastrointestinal endoscopy was negative. **Pathology from transvaginal sonography-guided needle biopsy revealed a signet ring cell carcinoma of the urethra. She was treated with adjuvant 5-FU/cisplatin (FP) chemotherapy for 7 months.**

**PI.02****Radiological and Pathological Illustration of Uterine Leiomyoma and Adenomyosis**

Soo Youn Park, Seong Su Hwang

*The Catholic University of Korea, St. Vincent's Hospital, KR*

**Purpose:** To illustrate a wide imaging spectrum of benign uterine myometrial **tumours**, especially uterine leiomyoma and adenomyosis.

**Materials and Methods:** We demonstrate pathological and radiological imaging findings of variable **manifestations** and rare **forms** of uterine leiomyoma and adenomyosis.

**Results:** Demonstrated **a** wide spectrum of uterine leiomyomas and adenomyosis, including uterine leiomyoma with variable degeneration, rare **forms** of uterine leiomyoma such as cellular leiomyoma, benign metastasizing leiomyomatosis, peritoneal disseminated leiomyomatosis, and typical and atypical **manifestations** of adenomyosis and unusual growth **forms** of adenomyosis such as adenomyotic cyst.

**Conclusion:** Radiological and pathological illustration of variable **manifestations** of uterine leiomyomata and adenomyosis is helpful for diagnosis and follow-up in routine radiological practice.

**PI.03****Hysterosalpingography (HSG): A Pictorial Review**

Silvia Tomas Hernandez, Laura Coleman, Moji Balogun, Jo McHugo

*Birmingham Women's Hospital, UK*

**Objectives:** To review HSG indications, technique and complications. To familiarise with normal and abnormal appearances on HSG.

**Background:** Despite advances in other techniques, HSG remains the preferred imaging option in assessing tubal patency. HSG is included as one of the first line investigations of infertility in patients with no risk factors such as pelvic inflammatory disease, endometriosis or known tubal damage as tubal damage or occlusion remains the most common

cause of infertility. It is a reliable test and less invasive than laparoscopy in evaluating tubal patency. It is also used in assessing success of sterilization procedures or reversal of previous sterilization.

In recent years, there has been a **greatly increased demand for** HSG, mainly due to the increase in infertility consultations, but also to new sterilization techniques like hysteroscopic sterilisation. It is therefore vital that radiologists are familiar with the technique, potential complications, normal and abnormal appearances **of** HSG.

We present a pictorial review demonstrating a spectrum of HSG findings including normal variants and **non-pathological** findings, as well as abnormal findings in the context of infertility, assessing success of new sterilization techniques or reversal of sterilization, and we discuss indications, technique and potential complications.

**Conclusion:** HSG remains the preferred technique in assessing tubal patency in patients with no risk factors. Due to increasing demand it is vital that radiologists are familiar with the different indications, technique, complications and normal and abnormal findings.

#### **PI.04**

##### **CT Diagnosis of Ruptured Ectopic Pregnancy in 12 Patients**

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**Ectopic** pregnancy can cause life-threatening bleeding and therefore must be considered in every woman of childbearing age who presents with abdominal or pelvic **pain, but** experience with use of CT scan in ectopic pregnancy diagnosis is limited, because ultrasound is certainly the **first-line** diagnostic modality employed to evaluate these women. We present the CT findings of ruptured ectopic pregnancies in 12 patients.

CT images demonstrate massive **haemoperitoneum** with **high-attenuation** blood clots or **haematoma** in the pelvis, a **strongly** enhancing ring-like adnexal cystic structure, and active free **intraperitoneal** extravasation of intravascular contrast material.

These signs must be known by the radiologist because of the **increasing** use of CT as the **first-line** imaging modality in emergency departments, particularly for patients with abdominal pain **and life-threatening** symptoms. In addition, if **haemoperitoneum** is identified without a clear source of bleeding on ultrasound examination, CT may be helpful for clarification.

#### **PI.05**

##### **Diffusion-weighted Imaging in the Complex Adnexal Masses: Pearls and Pitfalls**

Sung Eun Rha, Soon Nam Oh, Jae Young Byun

*Department of Radiology, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, KR*

**Objective:** To demonstrate pearls and pitfalls of diffusion-weighted imaging (DWI) in differentiation of benign and malignant lesions in patients with complex solid and cystic or predominantly solid ovarian masses.

**Methods:** We retrospectively reviewed conventional MR images and DWI in seventy patients (mean, 49 years old) with **histologically-proven** ovarian masses (47 malignant/borderline and 23 benign **tumours**). Mature cystic teratomas and endometriomas were excluded from this study.

**Results:** Most malignant ovarian **tumours** showed high signal intensity in the solid portion on DWI and low apparent diffusion coefficient (ADC) value. However, there are several kinds of benign ovarian **tumours**, including fibroma(thecoma)s, sclerosing stromal **tumour**, **tubo-ovarian** abscess, and adnexal torsion, that may mimic malignant ovarian **tumours** on DWI.

**Conclusion:** There are pitfalls that the radiologist must be aware of to avoid **interpretation** errors in DWI for differentiating benign and malignant ovarian lesions in patients with complex solid and cystic or predominantly solid ovarian masses.

**PI.06****Hydatid Disease of the Seminal Vesicle: A Rare Presentation Of Hydatid Cyst**

Abdussamet Batur, Serdar Karakose, Abdulkadir Koc, Makhamat Pashaliev  
*Necmettin Erbakan University, Meram School of Medicine, Department of Radiology, Konya, TR*

Hydatid disease (HD) is a unique parasitic disease that can occur almost anywhere in the body and demonstrates a variety of imaging features that vary according to growth stage and affected tissue. Humans are secondarily infected by the ingestion of food or water that has been contaminated by dog **faeces** containing the eggs of the parasite. Echinococcal cysts (EC) of the urinary tract are uncommon manifestation of **echinococcus**. Involvement of the seminal vesicle is very rare. In this case report, we present two rare cases of EC of the seminal vesicle.

## Case 1.

A 63 year old male patient with cardiac **insufficiency** and **dyspnoea** came to us for a CT examination of the thorax and abdomen. **He was on follow-up for hydatid liver disease**. At CT examination, two **para-cardiac** and a left seminal vesicle cyst were found incidentally.

## Case 2.

A 32 year old male patient with a history of **hepatosplenic** hydatid cyst surgery **was referred to us for routine surveillance**. On CT examination, there was a cystic lesion in the left seminal vesicle.

**The cystic lesions in both patients were histopathologically proven to be hydatid cysts.**

Urinary tract involvement by **echinococcus** is uncommon, constituting only 2-4% of all cases of **echinococcus**. The seminal vesicle is a very rare and unusual site for involvement. The role of imaging is to detect and diagnose the lesion so that it can be surgically excised in time without complications or can be followed up conservatively.

**PI.07****Radiologic Imaging of Ovarian Transposition**

Daniela Condesso<sup>[1]</sup>, Teresa Cunha<sup>[2]</sup>

<sup>1</sup>*Centro Hospitalar Universitário de Coimbra (CHUC), Department of Radiology,* <sup>2</sup>*Instituto Português de Oncologia Francisco Gentil - Lisboa (IPOFGL) Department of Radiology, PT*

**Learning objectives:** To review the **radiological** features of normal transposed ovaries as well as the common pathology related to this condition.

**Background:** Ovarian transposition (or oophoropexy) **is** the surgical displacement of one or both ovaries into a fixed anatomic position. It is performed to shield the ovaries from pelvic radiation therapy in cervical cancers or other malignancies, such as Hodgkin's disease or rectal cancer, and therefore to preserve gonadal function in premenopausal women. The most common procedure is the mobilization and fixation of the ovary, the fallopian tube and the vascular pedicle in a superolateral position in the paracolic gutter, up to the level of the lowest ribs. Less frequently the ovaries are located within the pelvis in a more lateral position or anterior to the psoas muscle, above the pelvic brim.

**Discussion:** This pictorial review **is** based on **radiology examinations** performed in our hospital **on** patients with **gynaecological** cancers (most commonly squamous cell cervical carcinoma) **and** ovarian transposition. It is important to be familiar with the **anatomical** position and normal **radiological** appearance of transposed ovaries, and **especially** to avoid misinterpreting **them** as primary or secondary malignancies (most frequently misdiagnosed as peritoneal **deposits**). Additionally, an increased incidence of benign ovarian and peritoneal cysts is reported and recognizing **them** could prevent unnecessary therapeutic procedures.

**Conclusion:** Ovarian transposition is a surgical **manoeuvre** used to protect ovarian function before pelvic radiation therapy. Knowing its normal and **pathologic features on radiology** is crucial in the patient's follow-up and especially in preventing a misdiagnosis.

**PI.08****Pelvic Endometriosis Associated with Mucinous Borderline Tumors**

Sung Eun RHA, Dong-Myung Yeo, Soon Nam Oh, Jae Young Byun

Department of Radiology, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, KR

**Objective:** To demonstrate imaging findings and pathologic background of pelvic endometriosis associated with mucinous borderline **tumours**.

**Content:** Endometriotic foci, especially ovarian ones, with epithelial cytologic atypia may be precursors of cancer. We **will** present MR imaging findings and **pathological** background in a 35-year-old woman with multifocal mucinous borderline **tumours** involving the pelvic cavity associated with pelvic endometriosis.

**PI.09****Trachelectomy: a Fertility-Preserving Procedure for Cervical Cancer - MR Imaging Features**

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<sup>1</sup>Department of Radiology, Hospital Central de Faro, Faro, PT, <sup>2</sup>Department of Radiology, Instituto Português de Oncologia de Lisboa Francisco Gentil, Lisbon, PT.

**Objectives:** To review our case-based experience of trachelectomy; to describe the role of MR, concerning the accurate stage assessment to correctly select young patients for fertility preservation; and to illustrate the typical MR appearances after trachelectomy.

**Introduction:** Cervical cancer is the **third most common gynaecological** malignancy worldwide. Approximately 30% of women with this malignancy are less than 35 years, **thus raising fertility problems**.

Radical trachelectomy (a cervicectomy with removal of its contiguous parametrium and vaginal cuff, with laparoscopic pelvic lymphadenectomy following a vagino-isthmic anastomosis) is a fertility-preserving procedure that has recently gained worldwide acceptance as a method of surgically treating small invasive cervical cancers, which can be performed in stages lower **than** IB1 with less than 2cm.

Radical trachelectomy has been shown to have a lower mortality and morbidity but comparable curative rates to the more traditional hysterectomy.

MRI has been used preoperatively for accurate stage assessment, particularly in local **tumour** extent, to determine the best therapeutic option, and correctly select the young patients that desire to preserve their fertility, and also for **post-operative** follow-up.

**Materials and Methods:** Retrospective study carried out at our institution, based on a review of the clinical-imaging files of the patients who underwent trachelectomy.

**Conclusion:** Radical trachelectomy is an established curative surgical fertility-preserving procedure in young women with cervical carcinoma. MR imaging has an important role in selecting patients suitable for trachelectomy and in the **post-surgical** follow-up of patients.

**PI.10****TCC Coincidentally Involving Ovaries and Uterine Endometrium: A Case Report**

Kyung Bum Nam<sup>[1]</sup>, Sook Namkung<sup>[1]</sup>, Myung Sun Hong<sup>[1]</sup>, Heung Cheol Kim<sup>[1]</sup>, Sang Hak Han<sup>[2]</sup>

Departments of: <sup>1</sup>Radiology, <sup>2</sup>Pathology, Hallym University Hospital, Chuncheon, KR.

**Objective:** To report a case of transitional cell carcinoma coincidentally involving both ovaries **and the uterine endometrium, and to review the literature**.

**Method:** A 69-year-old female presented with vaginal bloody discharge for 1 day. Her past history was **non-contributory**. Transvaginal ultrasonography with curettage biopsy and computed tomography were performed. She underwent right salpingo-oophorectomy and second stage total hysterectomy.

**Results:** Transvaginal ultrasonography revealed lobulated complex masses with solid and cystic components in **both sides of the pelvis**, and a polypoid lesion within the **fluid-filled** endometrial cavity. Normal ovaries could not be identified. Computed tomography showed **poorly** enhancing, large, lobulated or irregular masses with cystic and necrotic portions. A small irregular endometrial mass was faintly **seen** as well. **Metastases** to omentum, mesentery and appendix were also found, but ascites was relatively minimal. **Histopathology of the** right ovarian mass and endometrial biopsy confirmed transitional cell carcinoma of ovary and endometrium.

**Conclusion:** Transitional cell carcinoma of **the** ovary was recently recognized **as** a rare type of ovarian malignant epithelial **tumour**. To the best of our knowledge, transitional cell carcinoma coincidentally involving both ovaries and **endometrium** has not been reported. Imaging findings of lobulated or irregular large mass with internal cystic or necrotic portions with **poorly** enhancing solid component, and **less aggressive** peritoneal seeding as compared to **tumour** size could suggest a possible diagnosis of transitional cell carcinoma of **the** ovary rather than other malignant ovarian epithelial tumor such as mucinous or serous cystadenocarcinoma.

### **PI.11**

#### **MR of Large Pelvic Female Lesions**

Daniela Condesso, Maria José Noruegas, Maria Conceição Sanches, Paulo Coelho  
*Centro Hospitalar Universitário de Coimbra(CHUC)- Department of Radiology, PT.*

**Objectives:** To illustrate the MR appearance of large pelvic lesions (> 5 cm) bringing into focus less frequent pathology.

**Background:** The differential diagnosis for large female pelvic masses is extensive. In women, pelvic lesions may arise from the uterus, ovaries, fallopian tubes, gastrointestinal **or** urological **organs**, as well as from the peritoneum or retroperitoneal space. MR may help determine the lesion's site of origin and imaging features may also give a hint **towards** a specific diagnosis.

**Imaging findings:** This pictorial review points out the MR appearances of some large **gynaecological** lesions and includes both benign and malignant pathology. Common lesions are mentioned but the authors give special attention to less frequent pathology we should be familiar with, such as uterine sarcoma, malignant mixed Mullerian **tumour** of the fallopian tube, bilateral clear cell ovarian **tumour**, broad ligament leiomyoma and others.

**Conclusion:** Large pelvic lesions **often** present a diagnostic challenge because of its dimensions. MR plays an important role in the diagnosis and staging of **these** lesions, and familiarity with the imaging features of common and uncommon pelvic lesions can help in a correct diagnosis and therapeutic procedure orientation.

### **PI.12**

#### **Severe Endometriosis, Pictorial Review with Emphasis on MRI/Laparoscopy Correlation**

Adalgisa Guerra, António Setubal, Vasco Mascarenhas, Hugo Marques, Augusto Gaspar  
*Hospital da Luz, Lisbon, PT*

The aim of this study was to review the MRI findings of women with severe endometriosis.

Endometriosis is an important **gynaecological** disorder that primarily affects women of reproductive age, often causing chronic pelvic pain and infertility. Although laparoscopy is the standard of reference for diagnosis, magnetic resonance (MR) imaging is a **non-invasive** method for evaluating areas inaccessible to laparoscopy.

**We correlated the MRI and laparoscopy findings** of women who had signs and symptoms of severe endometriosis. All women (100 selected cases from our database between 2008 and 2012) **had** a pelvic MRI with particular protocol for endometriosis before surgery, and all the MRI exams and surgery were performed by the same Radiologist and Surgeon.

With this sample, the authors reviewed and documented almost all forms of severe endometriosis in these diagnostic techniques.

Correlation of the radiological imaging features of endometriosis lesions with their laparoscopic appearances may help improve individual proficiency in the radiological diagnosis of endometriosis. Conversely, knowledge of the variety of MRI appearances of endometriosis is important for guiding laparoscopic examination.

## Posters II - Paediatric imaging

### **P11.01**

#### **Radiological Evaluation of Paediatric Congenital Urinary Tract Anomalies**

Seong Su Hwang, Soo Youn Park

*St. Vincent's Hospital, The Catholic University of Korea, KR*

**Purpose:** To illustrate a wide spectrum of congenital anomalies of the urinary tract in children.

**Materials and Methods:** We demonstrate **the** radiological evaluation and clinical significance of congenital anomalies of the urinary tract in **paediatric** patients.

**Results:** Demonstrated various **paediatric** congenital urological anomalies including kidney (renal agenesis, ectopic kidney, multicystic dysplastic kidney, duplication), ureter (primary megaureter, ectopic ureterocele, ectopic insertion of ureter), bladder (anterior bladder diverticulum), and urethra (posterior urethral valve, urethral diverticulum, urethral polyp). We also described **their** clinical significance.

**Conclusion:** Radiological evaluation including Ultrasonography, CT, and/or MRI is very useful for diagnosis and follow-up of **paediatric** urological structural anomalies.

### **P11.02**

#### **Developmental Anomalies in the Kidney and Renal Vessels**

Young Mi Ku, Su Lim Lee

*Department of Radiology, Catholic University Medical College Uijeongbu St. Mary's Hospital, KR*

**Purpose:** To review the embryological **basis of** anomalies of the kidney and renal vasculature. To demonstrate the MDCT findings and clinical implication of renal anomalies, including **vascular** anomalies.

#### **Contents organization:**

1. Comprehensive embryological basis:
  - 1) Brief embryological development of the kidney
  - 2) Rotational anomaly
  - 3) Fusion anomaly
  - 4) Ascent anomaly
  - 5) Vascular anomaly
2. MDCT findings and Clinical implications of renal anomalies:
  - 1) Rotational anomaly
  - 2) Fusion anomaly
  - 3) Ascent anomaly
  - 4) Vascular anomaly

#### **Summary:**

It is important for radiologists to be aware of renal developmental embryology and its MDCT findings.

The major teaching points of this exhibit are:

1. Kidney and vessel anomalies are closely embryologically related to the development of the IVC and metanephros.
2. Knowledge of renal and vascular anomalies is helpful for accurate diagnosis.

**PII.03****Paediatric Gynaecological Emergencies – A Pictorial Review**

Mariana Roque, António Costa, Luisa Lobo, Isabel Távora

*Hospital de Santa Maria, Lisboa PT*

**Objectives:** 1. To describe and illustrate **gynaecological** conditions in **paediatric patients** presenting as emergencies. 2. To highlight the role of imaging in the accurate and timely diagnosis of these entities.

**Background and Discussion:** Paediatric female patients presenting to the emergency department with acute pelvic pain and/or acute pelvic mass may suffer from potential **gynaecological** conditions with significant morbidity and mortality. Differentiating between acute and chronic pain, and determining **gynaecological** versus **non-gynaecological** origins is an important first step, since there are a variety of unique and challenging problems that can present with abdominal/pelvic pain. Ultrasound is the first-step and most important imaging modality, and usually sufficient for the accurate diagnosis in most acute conditions. The authors will review urgent and sometimes life-threatening **gynaecologic** causes of acute pelvic pain in **paediatric patients** in the context of an emergency department visit.

**Conclusion:** Radiologists should be aware **of** these situations in order to recognize them immediately, preventing the complications that may result **from** a delayed diagnosis. Although **operator**-dependent, a good and careful ultrasound technique is essential to quickly achieve all the diagnostic information needed for proper and timely treatment.

**PII.04****Radiological Role in Diagnosis, Management Decision Making and Follow-up of Unilateral PUJO in Paediatrics**

Hossam Gad, Ahmed Shokeir, Mohamed Dawaba, Ashraf Hafez, Rasha Abouelkheir

*Urology and Nephrology Center, Mansoura, EG*

**Objective:** To assess the role of different radiological modalities in diagnosis and management of unilateral PUJO.

**Patients and Methods:** This prospective study included 65 children with suspected unilateral PUJO by ultrasound examination. Dynamic renal scintigraphy using 99mTc-mercapto-acetyltryglycine (MAG3) was done for all cases. On the basis of patients' symptoms and 99mTc-MAG3 renal isotope scan findings, symptomatic patients or those with split function of the corresponding kidney of 40% or less were assigned to group 1 (n=35) and underwent pyeloplasty. Asymptomatic patients with split function greater than 40 % (group 2, n = 30) were treated conservatively. Follow-up 99mTc-MAG3 dynamic studies were performed every 3 months for both groups. Patients who showed renal function deterioration in group 2 underwent pyeloplasty.

**Results:** After pyeloplasty, group 1 had improvement in the glomerular filtration rate (GFR) in 30 (85.7%), stabilization in 2 (5.7%), and deterioration in 3 (8.6 %) patients. In group 1, comparison between the mean value of the baseline GFR (17.1±7.7 ml/min) and its mean value at follow-up (28±6.3 ml/min) showed an increase of statistical significance (P < 0.01).

In the group 2 patients, conservative treatment resulted in improvement in the GFR in 12 (40 %), stabilization in 3 (10%), and deterioration in 15 (50%) patients. In group 2, no significant difference was found between the mean baseline GFR (29.8±9.8 ml/min) and its mean value at follow-up (31.2±5.6 ml/min).

**Conclusion:** Dynamic renal scintigraphy is the **gold standard** method for diagnosing postnatal PUJO and decision making in its management as well as regular follow-up.

**PII.05****Botryoid Genitourinary Rhabdomyosarcoma in Paediatrics - A Case Report**

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**Objectives:** To present a case of the botryoid variant of genitourinary rhabdomyosarcoma (bladder) in **paediatrics**.

**Methods/Discussion:** Rhabdomyosarcoma is the most common **tumour** of the lower genitourinary tract during the first two decades of life. Genitourinary rhabdomyosarcomata include **tumours** originating in the urinary bladder, prostate, testes and **paratesticular** sites, penis, perineum, vagina and uterus.

The botryoid variant represents an exception to **the** commonly **non-specific** morphological appearances of rhabdomyosarcomata. In this subtype of embryonal rhabdomyosarcoma, the tumour does not penetrate the overlying epithelium as it protrudes into hollow organs such as the urinary bladder or vagina, appearing as an intraluminal mass composed of smooth grapelike clusters.

**Results:** The authors report a 3-year-old boy who was admitted to the Pediatric Hospital of Coimbra due to urinary frequency and dysuria. The ultrasound showed a bulky endoluminal exophytic and lobulated bladder mass, infiltrating the prostate and associated with bilateral uretero-hydronephrosis. The CT scan showed marked structural heterogeneity of the mass, with confluent hypodense areas suggestive of necro-haemorrhagic changes, as well as non-homogeneous enhancement.

Cystoscopic biopsy was performed and the pathologic examination revealed it to be a botryoid rhabdomyosarcoma.

The patient is currently proposed for neoadjuvant chemotherapy in order to achieve a dimensional regression of the lesion, with subsequent surgical resection.

**Conclusions:** Recent refinements in **multidisciplinary** regimens combining chemotherapy, radiation therapy and surgery have dramatically improved outcome for children with genitourinary rhabdomyosarcoma. The **radiological** features of botryoid rhabdomyosarcoma are typical and should be recognized, in order to allow prompt clinical staging and treatment planning.

## Posters III - MRI and Functional imaging

### **PIII.01**

#### **Dynamic Contrast-Enhanced Subtraction MR Imaging in Characterizing Intratesticular Mass Lesions**

*Athina Tsili*<sup>[1]</sup>, *Maria Argyropoulou*<sup>[1]</sup>, *Astrakas Loukas*<sup>[2]</sup>, *Nikolaos Sofikitis*<sup>[3]</sup>, *Konstantinos Tsampoulas*<sup>[1]</sup>  
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**Objective:** To analyze the enhancement patterns of various intratesticular mass lesions at dynamic contrast-enhanced (DCE) subtraction MR imaging and assess the value of the technique in characterizing their nature.

**Materials and Methods:** We retrospectively evaluated 44 men referred for a variety of scrotal symptoms. Subtraction DCE MR imaging was performed using a three dimensional fast-field echo sequence after administration of paramagnetic contrast medium. Patients were divided into three groups according to the final diagnosis, including malignant, benign intratesticular lesions and normal testis. The patterns of contrast enhancement of both the normal testis and the intratesticular lesions were evaluated. Time-signal intensity plots were created and classified according to the shapes: type I, presented an initial upstroke, followed by gradual wash-out of the contrast medium; type II, showed an initial upstroke, followed by either a plateau or gradual increase in the late post-contrast phase; type III, showed a linear increase of enhancement throughout the examination; and type IV, with absence of enhancement. The relative percentages of peak height, maximum time and mean slope were also calculated.

**Results:** Testicular cancers showed heterogeneous contrast enhancement, with a type I curve. Benign lesions presented either with absence of enhancement (type IV curve) or inhomogeneous/homogeneous contrast enhancement and a type II curve. Normal testes enhanced homogeneously, with a type III curve. The relative percentages of maximum time to peak proved the most important discriminating factor in differentiating intratesticular masses.

**Conclusions:** DCE-MR imaging may be used to differentiate between malignant and benign intratesticular mass lesions.

### **PIII.02**

#### **MR Urography at 3 T**

*Takehiko Gokan*<sup>[1]</sup>, *Yoshimitsu Ohgiya*<sup>[1]</sup>, *Yoshio Ogawa*<sup>[2]</sup>, *Kouzou Fuji*<sup>[2]</sup>, *Yongjin Kang*<sup>[3]</sup>  
*<sup>1</sup>Radiology, <sup>2</sup>Urology, Showa University Hospital, Tokyo, <sup>3</sup>Radiology, Ootaatami Hospital, Tokyo, JP.*

**Purpose:** To show clinical cases of MR urography at 3T with discussion of the potential benefits and disadvantages

#### **Content organization:**

- discussion of MR urographic technique
- static-fluid MR urography and excretory MR urography
- negative oral contrast to reduce bowel signals
- imaging sequences
- presentation of clinical cases with discussion of usefulness of additional diffusion-weighted images

#### **Conclusion:**

MR urography can be performed at 3 T successfully.

**The entire urinary system can be imaged with satisfactory SNR**, which offers radiologists advantages for the detection of lesiona.

Additional diffusion-weighted images can help detect urothelial carcinoma.

Although some artefacts such as susceptibility artefact may degrade image quality, these arteacts can be reduced by appropriate examination.

**PIII.03****Method of Magnetic Resonance Urethrography using “Cathegel” in Men with Urethral Strictures**Azam Khasanov, Farkhad Akilov, Djalol Mirkhamidov*Specialized Center of Urology, Tashkent, UZ*

**Background:** In recent years there was insufficient data about use of magnetic resonance imaging (MRI) using retrograde instillation of sterile gel for examining the urethra: MR urethrography (MRUG). We suggested modifying the technique by using “Cathegel” with lidocaine (anaesthetic and antiseptic gel) instead of sterile gel.

**Aim:** To study the opportunity to apply MRUG method using “Cathegel” in men with urethral stricture disease.

**Materials and methods:** All patients underwent RUG combined with MCUG and MRUG using “Cathegel”. Retrograde instillation of “Cathegel” with lidocaine (“Montavit” Austria) into urethra was performed before scanning. Then MR scanning in axial, sagittal sections using T1 and T2 was performed. MRUG was performed on GE (USA) 1.5T. Presence of stricture, periurethral fibrosis, its localization and length were evaluated on MR images of urethra. Obtained data was further compared with results of conventional urethrography and data described in surgery protocols after surgical intervention.

**Results:** Using this technique we revealed strictures in all 12 patients. In 9 (75%) cases the stricture was located in the bulbar urethra and 3 (25%) patients had multiple strictures. Stricture length ranged from 10 mm to 110 mm (29±12 mm). In 10 (83.3%) patients MRUG was more informative than conventional urethrography.

MRUG results coincided with data obtained during surgery. No manifestations of post-procedure urinary tract infections were observed.

**Conclusion:** MR-urethrography using “Cathegel” can be used to diagnose urethral stricture disease, allowing good tissue visualization, absence of radiation and prevention of manifestation of UTIs.

**PIII.04****The Role of Magnetic Resonance Imaging (MRI) of the Penis in Clinical Practice**Jim Zhong<sup>[1]</sup>, Jonathan Smith<sup>[2]</sup>, Tze Wah<sup>[2]</sup><sup>1</sup>University of Edinburgh, <sup>2</sup>St James University Hospital Leeds, UK.

**Purpose/Aim:** To highlight the role of MRI in the evaluation of penile abnormalities and illustrate the disease processes encountered in clinical practice.

**Content Organization:** This pictorial review will discuss the optimal MRI imaging techniques (pearls and pitfalls); illustrate the normal penile anatomy and pathology; as well as demonstrating the imaging findings related to various penile abnormalities (benign and malignant). Benign penile diseases include urethral and periurethral abnormalities, erectile dysfunction, assessment of implanted artificial urethral sphincters or penile prostheses, priapism, penile fractures and Peyronie’s disease. Malignant penile diseases include primary (local staging of the penile cancer), recurrent penile cancer, penile lymphomas and metastatic deposits to penis from germ cell tumours.

**Summary:** MRI is a useful tool and is increasingly performed in routine clinical practice in the assessment of penile abnormalities to aid diagnosis and treatment planning. We discuss its role in the diagnosis and treatment planning of such conditions and illustrate various disease entities encountered in our clinical practice.

## Posters IV - Renal and Upper Tract imaging

### PIV.01

#### Gallbladder Wall Thickening and Periportal Tracking Associated with Acute Pyelonephritis

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**Objective:** To assess gallbladder (GB) wall thickening and periportal tracking in CT in patients with acute pyelonephritis (APN) according to the involvement of each kidney.

**Method:** A total of 117 patients who were diagnosed with APN by clinical examination and CT were included in this retrospective study. The patients were divided into three groups based on kidney involvement seen on CT: right APN, left APN, and bilateral APN. Two radiologists reviewed the CT images in consensus for the presence of diffuse GB wall thickening and periportal tracking. The incidence of GB wall thickening and periportal tracking was compared among the three groups.

**Results:** The incidence of GB wall thickening in patients with right APN [26.4% (14/53)] and bilateral APN [19% (6/31)] was significantly higher than in patients with left APN [0% (0/33)] ( $P < 0.016$ ). The incidence of periportal tracking in patients with right APN [15.1% (8/53)] and bilateral APN [26% (8/31)] was higher than in patients with left APN [3% (1/33)], with a significant difference between the patients with bilateral APN and left APN ( $P < 0.016$ ).

**Conclusion:** GB wall thickening and periportal tracking are predominantly encountered on CT in patients with APN involving the right kidney (right and bilateral APN), which should be considered in the differential diagnosis of diseases associated with GB wall thickening and periportal tracking.

### PIV.02

#### Follow-Up of Cryoablated Renal Cell Carcinoma With Residual Contrast Enhancement on CT and MRI

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*Department of Radiology, Anam Hospital, Korea University, College of Medicine, KR*

**Objective:** To describe the characteristics of residual contrast enhancement in cryoablated renal cell carcinoma (RCC) with regard to eventual resolution and the presence of residual tumour on follow-up CT and MRI.

**Method:** Twenty two patients with 24 RCCs underwent laparoscopic renal cryoablation and were followed up with CT (n=19) and MRI (n=3) for a mean of 28 months. Two radiologists retrospectively assessed in consensus the CT and MR images for change in tumour size and the characteristics of residual contrast enhancement in the cryolesions: peripheral rim enhancement (thickness, less than 10% of the maximum cryolesion diameter), focal eccentric enhancement (between 10% and 25%), and thick internal enhancement (more than 25%).

**Results:** Residual contrast enhancement was seen in 13 cryolesions (54%) at 3-month follow-up. Peripheral rim and focal eccentric enhancement were seen in six (25%) and four (16.7%) cryolesions, respectively, and the enhancement persisted for a mean follow-up of 4.5 months and 6 months, and disappeared completely at a mean follow-up of 10.5 months and 12 months, respectively. Three cryolesions (12.5%), showing persistent thick internal enhancement at 6-month follow-up, were treated with radiofrequency ablation or chemotherapy. The cryolesions had decreased in size by an average of 20.2% at 6 months and 39.7% at 12 months after cryoablation.

**Conclusion:** Follow-up CT or MRI for more than 12 months is needed to assess treatment outcomes in patients with peripheral rim or focal eccentric contrast enhancement of cryoablated RCCs, which may persist until 12 months postoperatively without remnant viable tumour.

**PIV.03****Renal Leiomyoma on CT and Pathology**Jongchul Kim*Chungnam National University Hospital, KR*

**Objective:** To demonstrate the computed tomographic (CT) findings of renal leiomyoma, a rare benign renal tumour, with pathological correlation.

**Method:** CT findings of five cases of the pathologically proven renal leiomyoma were retrospectively analyzed in terms of the size, location, margin, CT attenuation, homogeneity, contrast enhancement pattern, haemorrhage, cystic portions, calcification, etc.

**Results:** There were one male and four female patients. Their age ranged from 40 to 55 (mean: 45) years. A single leiomyoma in one kidney (right:left = 2:3) was found in all patients. The largest diameter of the renal leiomyoma ranged from 2.5 cm to 10.2 cm (mean: 4.2 cm). Of all five tumours, three were at the lower pole. Well-circumscribed peripherally located hyperattenuating solid mass on nonenhanced CT, with relatively homogeneous enhancement on contrast-enhanced CT, was found in three small tumours. Fine calcification was found at one small tumour. Two large tumours showed areas of haemorrhage and cystic or myxoid degeneration.

**Conclusion:** Although the correct diagnosis of the rare renal leiomyoma is made only at the time of pathological examination, a combination of the above CT findings (a sharply marginated, peripherally located, homogeneously-enhancing hyperattenuating solid mass with or without haemorrhage/cystic areas, especially at the lower pole and in women) may prompt the inclusion of a renal leiomyoma in the differential diagnosis of various renal tumours.

**PIV.04****Multiphase MDCT with Multiplanar Reformations in Detecting Pseudocapsule in RCC**Athina Tsili<sup>[1]</sup>, Maria Argyropoulou<sup>[1]</sup>, Anna Gousia<sup>[2]</sup>, Vasiliki Malamou-Mitsi<sup>[2]</sup>, Konstantinos Tsampoulas<sup>[1]</sup>*Departments of: <sup>1</sup>Clinical Radiology, <sup>2</sup>Pathology, University Hospital Of Ioannina, GR.*

**Objective:** To assess the diagnostic performance of four-phase (unenhanced, arterial, portal and nephrographic-excretory phase) multidetector CT (MDCT) with multiplanar reformations in the detection of pseudocapsule in RCC.

**Materials and Methods:** This was a retrospective study of 29 histologically-proven RCCs, including 17 men and 12 women, with a mean age of 59 years. The examinations were performed on a 16-row CT scanner. The protocol included unenhanced and three-phase (arterial, portal and nephrographic-excretory phase) contrast-enhanced CT scanning. The data were analyzed by two reviewers, blinded to histopathological results. Any discrepancy was resolved by consensus.

The presence of a regular, hyperdense or hypodense halo surrounding a renal neoplasm was considered to represent renal pseudocapsule. The accuracy of MDCT in the detection of pseudocapsule using the histopathologic results as the standard of reference was evaluated. Unenhanced transverse images and multiplanar reformations in the transverse, coronal and sagittal planes of each post-contrast phase were separately analyzed. The Chi-square 2-way test was used to compare each CT phase and multiplanar reformation with histology.

**Results:** The mean diameter of RCCs at CT was 5.6 cm (size range: 2.8-15 cm), in accordance with pathology. MDCT enabled the detection of renal pseudocapsule in 20 out of 29 RCCs, with 83% sensitivity, 80% specificity, 95% PVV, 50% NPV, and 83% overall accuracy. Portal and nephrographic phase with coronal and sagittal reformations proved more accurate in the detection of pseudocapsule ( $p < 0.05$ ).

**Conclusions:** Multiphase multidetector CT with multiplanar reformations provided satisfactory results in the detection of renal pseudocapsule in RCC.

**PIV.05****Combined MR sequences help to differentiate oncocytomas from RCC**

Francois Cornelis, Anne-Sophie Lasserre, Colette Deminière, Jean-Marie Ferrière, Nicolas Grenier  
CHU Bordeaux, FR

**Objective:** To evaluate the combination of dynamic contrast-enhanced T1-weighted and double-echo gradient-echo MR images, to distinguish renal oncocytoma with high T2 signal intensity centrally from renal cell carcinoma (RCC).

**Methods:** This retrospective study was institutional review board approved; informed consent was waived. Based on thesaurus of our institutional Radiological Information System, between 2006 and 2011, 63 tumours in 59 patients, presenting with a high signal intensity (SI) central area on T2w sequences were imaged with dynamic contrast-enhanced sequence, including phases later than 5 min after injection, and double echo chemical shift sequence. Two experienced radiologists visually assessed presence and distribution of signal enhancement after injection, SI changes on opposed phase images were measured for calculation of SI index (SII) and tumour-to-spleen ratio (TSR). Cut-off values were derived from Receiver Operating Characteristic Curve.

**Results:** Renal tumours were 19 oncocytomas (16 patients), 43 RCCs (42 patients) and 1 leiomyoma. Complete late enhancement of central area was observed in 14 oncocytomas (74%) and in 5 RCCs (12%) ( $p=0.05$ ). Combination of complete enhancement and SII lower than 2% ( $p=0.02$ ) or TSR higher than -6% ( $p=0.001$ ), provided sensitivity of 36% and 55%, specificity of 95% and 97%, positive predictive value of 67% and 86% and negative predictive value of 84% and 88% respectively, for diagnosis of oncocytomas.

**Conclusion:** Absence of chemical shift SI variation associated with a complete central enhancement on late Gd-enhanced images is highly evocative of oncocytoma.

**PIV.06****Differentiation of Subtypes of Renal Cell Carcinoma: DCE vs DWI**

Akira Yamamoto, Tsutomu Tamada, Akihiko Kanki, Yasufumi Noda, Katsuyoshi Ito  
Kawasaki Medical School, JP

**Purpose:** The purpose of this study is to compare the differentiation performance in subtypes of RCC between DCE MR imaging and DW MR imaging.

**Materials and methods:** This study included a total of 29 renal masses with pathological diagnosis of clear cell ( $n=23$ ) and non-clear cell ( $n=6$ ) RCC in 29 patients who underwent both DCE MR imaging (pre-contrast, corticomedullary and nephrographic phase) and DW MR imaging (b values = 0 and 800). The contrast enhancement ratio { $CER\% = (SI\ post - SI\ pre) / SI\ pre \times 100$ } were calculated in each phase of DCE MR imaging. Apparent diffusion coefficients (ADCs) were measured on DW MR images. CER of corticomedullary and nephrographic phase and ADC were compared between clear cell and non-clear cell RCC groups.

**Results:** There was a significant difference in CER of corticomedullary phase between clear cell and non-clear cell RCC (260% vs. 40%;  $p < 0.001$ ). The difference was also significant in ADC between clear cell and non-clear cell RCC ( $1.8 \times 10^{-3} \text{ mm}^2/\text{sec}$  vs.  $1.2 \times 10^{-3} \text{ mm}^2/\text{sec}$ ;  $P = 0.02$ ). In the comparison of diagnostic performance between DCE MR imaging and DW MR imaging, area under the curve (AUC) to distinguish clear cell and non-clear cell RCC were 0.96 in CER of CP and 0.81 in ADC.

**Conclusion:** CER of corticomedullary phase was more reliable than ADC in distinguishing clear cell from non-clear cell RCC.

**PIV.07****Medullary Nephrocalcinosis: Ultrasound and Multidetector Computerized Tomography Appearance**

João Palas, António Matos, Isabel Noia, Maria João Furtado, Cecília Bagulho  
Garcia de Orta Hospital, PT

Our purpose is to illustrate the spectrum of ultrasound and multidetector computerized tomography (MDCT) appearances of medullary nephrocalcinosis and to recognize the role of imaging studies in the evaluation of medullary nephrocalcinosis.

Nephrocalcinosis can be divided in to medullary and cortical, **the first being** much more common, accounting for 95% of the cases. Medullary nephrocalcinosis is an abnormality caused by the deposition of calcium salts into the renal medulla, specifically the distal convoluted tubules. The most common cause is primary hyperparathyroidism, followed by renal tubular acidosis, medullary sponge kidney, tuberculosis, sarcoidosis, HIV, renal papillary necrosis and other causes of **hypercalcaemia** (hypercalciuria). Most conditions that cause medullary nephrocalcinosis can also result in nephrolithiasis.

Ultrasonography is **non-invasive**, ideal for use in young children, quick to perform, and accurate. Medullary nephrocalcinosis can be seen as hyperechogenic pyramids, sometimes with acoustic shadowing.

Nephrocalcinosis is best visualized, however, by non-enhanced MDCT scans, which can easily depict small, poorly defined to larger, coarse granular densities in the region of the renal pyramids.

MDCT is the imaging modality of choice in the assessment of patients with nephrocalcinosis. CT scans depict nephrocalcinosis at an early stage of the disease, provide a better picture of the density and extent of the nephrocalcinosis, and may show other changes, such as renal cysts or nephroliths.

**PIV.08****Non-lithiasic Acute Renal Pain: Computerized Tomography Evaluation**

Lara Rodrigues<sup>[1]</sup>, Ricardo Patrão<sup>[2]</sup>, Pedro Eufrásio<sup>[2]</sup>, Vítor Carvalheira<sup>[1]</sup>, Filipe Caseiro Alves<sup>[1]</sup>

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**Objectives:** To identify some renal pathologies not related to urinary stone disease which **lead** to acute flank pain and show images of their most important characteristics on CT evaluation.

**Methods/Discussion:** Clinically, it is often not possible to distinguish lithiasic from non-lithiasic renal colic. Computed tomography (CT) may be useful to make an accurate diagnosis and to define the best treatment. It has been shown that **stones** may be responsible for less than 50% of cases of flank pain.

**Results:** The authors show CT images of some non-lithiasic renal diseases which present clinically with acute flank pain. The aetiology includes cases of acute pyelonephritis, retroperitoneal abscess, **haemorrhagic** tumour, renal infarction, thrombosis of the renal vein, complicated cysts, **polyarteritis** nodosa and renal **trauma**.

**Conclusions:** CT can be used as a first-line examination for patients who present with acute flank pain, to distinguish lithiasic from non-lithiasic renal colic.

**PIV.09****Renal PEComa: A Case Report**

Lara Rodrigues<sup>[1]</sup>, Ricardo Patrão<sup>[2]</sup>, Hugo Correia<sup>[3]</sup>, Vítor Carvalheira<sup>[1]</sup>, Filipe Caseiro Alves<sup>[1]</sup>

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**Objectives:** To present a case of renal PEComa in order to learn its most important features on CT evaluation.

**Methods/Discussion:** Perivascular epithelioid cell tumours (PEComas) are a family of tumours including classic angiomyolipoma (AML), lymphangioliomyomatosis (LAM) and clear cell sugar tumours (CCST). PEComa, other than these three types – PEComa not otherwise specified (PEComa-NOS) - is a very rare mesenchymal tumour of histologically and immuno-histochemically distinctive perivascular epithelioid cells, with an unpredictable natural history that has been described only recently. The gastrointestinal and genitourinary tracts are the most prevalent reported sites of involvement of PEComa-NOS; however, any somatic or visceral location is possible. PEComa-NOS are usually benign, but cases have been reported with an unfavourable outcome and metastasis. To date, most malignant cases have been chemo-resistant.

**Results:** The authors report a 61-year-old man who presented with persistent microscopic haematuria and hypertension. CT images revealed a bulky bilobed mass on the left kidney, with regular contours, showing marked structural heterogeneity with confluent hypodense areas suggestive of necro-haemorrhagic changes and inhomogeneous enhancement (mainly in parenchymal phase). There was associated subtotal thrombosis of the left renal vein.

The patient underwent surgical resection and the pathological examination revealed it to be a PEComa, more specifically of the epithelioid angiomyolipoma type.

**Conclusions:** The findings indicate that despite the small number of reported cases, PEComas-NOS should be considered tumours of uncertain malignant potential, and metastases to other organs might become evident even several years after the primary diagnosis.

**PIV.10****Traumatic and Iatrogenic Changes of the Genitourinary Tract - CT Evaluation**

Lara Rodrigues<sup>[1]</sup>, Ricardo Patrão<sup>[2]</sup>, Gustavo Gomes<sup>[2]</sup>, Vítor Carvalheira<sup>[1]</sup>, Filipe Caseiro Alves<sup>[1]</sup>

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**Objectives:** To identify and characterize some traumatic and iatrogenic changes of the genitourinary tract and show images of their most important features on CT evaluation.

**Methods/Discussion:** Blunt trauma is responsible for 80% of renal injuries and is frequently caused by car accidents, falls or fights. The principal types of renal injury are contusion, hematoma, laceration and rupture. Accurate grading has therapeutic consequences and is related to the patient outcome.

The most frequent iatrogenic injuries of the genitourinary tract are fistulas that can involve the upper urinary tract (kidney, ureter), the lower urinary tract (bladder, urethra) or the female reproductive tract (vagina, uterus). Diagnosis of genitourinary tract fistulas usually requires radiology studies performed with fluoroscopy (when feasible) or cross-sectional modalities (in particular CT, which is increasingly useful and considered the primary test in some cases). Radiologists' accurate diagnosis allows prompt and appropriate treatment planning.

**Results:** The authors demonstrate CT images of trauma and iatrogenic injury of the genitourinary tract in which treatment planning was controversial, and how the radiological approach helped in management.

**Conclusions:** CT can be used as a first-line examination for patients in genitourinary tract trauma and in an iatrogenic context, to allow proper planning guidance.

**PIV.11****Calyceal Diverticulum Mimicking Different Pathologies on Multiple Imaging Modalities**Rebecca Mullett, Jane Belfield, Sobhan Vinjamuri*Royal Liverpool University Hospital, UK*

**Objective:** Calyceal diverticula are outpouchings of a renal calyx. Often found incidentally on radiological imaging, they are generally benign and asymptomatic, although complications include infection and stone formation. Perhaps more importantly, they may mimic more significant pathology, potentially causing unnecessary imaging, patient anxiety and even surgical intervention.

We aim to demonstrate the multimodality appearances of calyceal diverticula, and discuss the important differential diagnoses of this condition.

**Methods:** We present a case-based pictorial review whereby a calyceal diverticulum was found incidentally on imaging. We demonstrate the multimodality imaging findings which confirm the diagnosis. Using a literature review, we discuss the important diagnoses which a calyceal diverticulum may mimic.

**Results:** Calyceal diverticula are usually round, well-defined, contain urine and communicate with a renal calyx via a thin neck. As in our case, many contain calcification. Features differentiating them from other pathology include internal mobile calcifications. Calyceal diverticula opacify via retrograde filling and may demonstrate prolonged contrast opacification (as in our case), the contrast becoming obstructed behind the thin neck.

In our case, the calyceal diverticulum mimicked renal tumour and complex renal cyst on ultrasound and CT. Bone scan demonstrated a focal area of increased uptake, mimicking a rib metastasis. The definitive diagnosis was made using intravenous urogram, demonstrating opacification following contrast administration and communication with the calyx.

**Conclusion:** Through our case-based review we hope to enable the reporting radiologist to consider the diagnosis of calyceal diverticula, and to recognize classical findings in order to differentiate this from more serious pathology.

**PIV.12****Nutcracker Syndrome: Needs Diagnostic Clues on Non-invasive Imaging**Seung Hyup Kim, Jeong Yeon Cho, Sang Youn Kim, Jung-Eun Cheon*Seoul National University Hospital, KR*

Nutcracker syndrome is one of the common causes of haematuria in young patients, **and** refers to left renal vein (LRV) hypertension caused by compression between the aorta and superior mesenteric artery (SMA). A wide spectrum of clinical presentations and unestablished diagnostic criteria make correct diagnosis difficult. Since LRV catheterization with demonstration of pressure gradient (PG) more than 3mmHg is needed to confirm the diagnosis, clues at non-invasive imaging need to be developed. This exhibition **presents the** clues we developed.

LRV compression at aortomesenteric (AM) portion is easily shown at US, CT or MRI. Doppler US shows abnormal high velocity at this portion. Peak velocity (PV) at AM-LRV in Nutcracker patients was higher than 80 cm/sec in adults and 93 cm/sec in children. PV ratio between hilar and AM portion of LRV was higher than 5 in adults and 4.7 in children with Nutcracker syndrome. Theoretically, PG can be calculated by Bernoulli's principle. We can estimate PG roughly from PV values if collateral vessels are not prominent.

CT scan is commonly used in evaluation of haematuria. Beak shape of compressed AM-LRV with a beak angle larger than 32° was a suggestive finding of Nutcracker syndrome. Jetting of contrast across AM-LRV in arterial-phase CT is also a clue to the correct diagnosis. AM angle is another index we can measure on sagittal images. This angle is known to be acute in Nutcracker patients in contrast to normal rectangular configuration. Variations of Nutcracker syndrome include posterior Nutcracker and Nutcracker in vena caval anomalies.

**PIV.13****CT Assessment of Indeterminate Renal Masses: How Accurate Are We?**Karim Samji<sup>[1]</sup>, Rajesh Ramaswamy<sup>[1]</sup>, Julian Keanie<sup>[2]</sup>, John Brush<sup>[2]</sup><sup>1</sup>Radiology Specialty Registrar, <sup>2</sup>Consultant Uroradiologist, Western General Hospital, Edinburgh, UK

**Objective:** We aim to correlate the preliminary diagnosis of indeterminate renal masses, as determined by CT, with histology from CT-guided core needle biopsy.

**Methods:** 28 patients (average age 64.6 years) with indeterminate renal masses on CT (average size 3.3cm; range 1.4 - 5.8cm), and with histology from CT-guided core biopsy, were retrospectively analysed. The preliminary diagnosis of the renal masses, as determined by the reporting radiologist, was correlated with the histological findings. A subgroup analysis was also performed, to determine if there was a difference in the accuracy of the preliminary diagnosis for both general radiologists and specialist uroradiologists.

**Results:** A preliminary diagnosis was stated by the reporting radiologist in 82% of the cases (23 patients). 19 masses were classified as likely malignant on CT, with histology confirming this in 15 cases (79%). 4 masses were classified as likely benign on CT, with histology confirming this in only 1 case (25%). Subgroup analysis revealed that uroradiologists classified 5 masses as likely malignant, with histology confirming this in 100%, and 3 masses as likely benign, with histology confirming this in 1 patient (33%). General radiologists classified 14 masses as likely malignant, with histology confirming this in 10 patients (71.4%), and one lesion as likely benign, which was not confirmed on histology (0%).

**Conclusion:** Preliminary diagnosis with CT for indeterminate renal masses is more accurate for malignant lesions. Uroradiologists are more accurate at classifying indeterminate renal lesions. Preliminary diagnosis with CT can be unreliable, and histological proof should be sought whenever possible.

**PIV.14****Differential Imaging Diagnosis of Small Benign Renal Tumours from RCC**Jeong Yeon Cho<sup>[1]</sup>, Seung Hyup Kim<sup>[1]</sup>, Sang Youn Kim<sup>[1]</sup>, Min Hoan Moon<sup>[2]</sup>, Chang Kyu Sung<sup>[2]</sup><sup>1</sup>Seoul National University Hospital, <sup>2</sup>Seoul Metropolitan Boramae Medical Center, KR

**Objective:** To illustrate and compare the differential MDCT findings of small benign renal tumours compared with variable subtypes of small renal cell carcinomas (RCC).

**Methods:** We reviewed clinical and MDCT findings of 72 cases of pathologically proven small (smaller than 3cm) benign renal tumours. CT findings were compared with pathological findings in each case. Benign lesions included 24 angiomyolipomas with minimal fat, 21 oncocytomas, 5 mixed epithelial and stromal tumors (MEST), 5 leninomas, 5 leiomyomas, 4 metanephric adenomas, 4 haemangiomas, 2 solitary fibrous tumors, 1 renal schwannoma, and 1 lymphangioma. We compared CT findings with those of small RCCs including clear cell, chromophobe and papillary subtypes.

**Results:** AMLs with minimal fat showed ovoid or polygonal shape with ill-defined margin, while many small RCCs showed spherical shape with well-defined margin. The pixel analysis was helpful to detect invisible fat. Segmental inversion of enhancement was a specific finding of small oncocytoma. Leninomas occurred in young hypertensive adults and showed delayed enhancement. Haemangioma, lymphangioma, and MEST show mainly cystic nature. Other benign tumours have no specific MDCT findings differentiating from chromophobe or papillary RCCs. However almost all clear cell RCCs were easily distinguished from other tumours by early heterogeneous enhancement and wash-out.

**Conclusion:** Many small benign renal tumours have their own suggestive MDCT findings and may be differentiated from small RCCs.

**PIV.15****Ruptured Asymptomatic and Undetected Pelviureteric Junction Obstruction After Abdominal Trauma**

Abdussamet Batur, Karakose Serdar, Pashaliev Makhamat, Ozcan Irfan Firat  
*Necmettin Erbakan University, Meram School of Medicine, Konya, TR*

Acute abdomen following blunt renal trauma is one of the rare presentations of occult renal anomalies in children. Kidneys that are abnormal by virtue of congenital anomaly or **ureteric** obstruction are more susceptible to traumatic injury than normal kidneys, even in the setting of relatively minor trauma. We report a case with previously asymptomatic and undetected congenital pelviureteric junction obstruction who first presented with acute abdomen following trauma.

A previously-well 17-year-old boy presented with acute abdominal pain after his friend's knee hit his belly while playing football. Clinically, he was stable except tenderness and guarding over his entire abdomen. Haematological and biochemical analysis showed a leucocytosis and the rest of laboratory findings were normal. Ultrasonographic examination showed a large perinephric collection with internal echoes. Computed tomography (CT) showed severe right pelvicalyceal dilatation and a thinned cortex suggestive of right chronic hydronephrosis with rupture of the pelvis. On observation, there was no deterioration of vital signs or haemoglobin value.

The kidney is affected in 10% of all blunt abdominal trauma. It is the most frequent urinary organ to suffer injury in blunt trauma. The presence of an abnormality further predisposes the kidney to severe injury following even minor trauma. CT is recommended for detection and characterisation of the grade of injury and to rule out associated intra-abdominal injury that may warrant immediate surgery. The finding of a dilated pelvis and cortical thinning is suggestive of a pre-existing pelviureteric junction obstruction.

**PIV.16****F-10 CT Diuresis Urography**

Alfred Pollard, Niall Lynch, Maryna Lewinski  
*Stepping Hill Hospital Stockport Cheshire, UK*

We have developed F-10 CT Diuresis Urography as a simple technique for performing CT Urography, which involves giving intravenous furosemide 10 minutes before IV contrast. This technique is adapted from the principles of diuresis renography. Contrast is administered at peak diuresis resulting in optimal opacification, good distension and full demonstration of the urinary tract. We have used this technique for 4 years and have found it to be successful with no disadvantages. Furthermore, examination time is predictable, an advantage for appointment planning.

The technique will be described in detail with reasons and explanations for each step, including methods of stone assessment with illustrative examples. The F-10 technique can be combined with standard tumour staging and trauma protocols.

Compared with with our previous protocol (furosemide just before contrast); there was no difference in density measurement of the renal cortex or renal pelvis but there was an observed improvement with the F-10 protocol with better distension, uniform opacification and improved detail of the collecting system. In addition, hyperconcentration of contrast in the calyceal fornices, which can simulate stones, was avoided.

We recommend this technique for CT Urography.

**PIV.17****Permanent Urinary Incontinence: A Case Report**Lara Rodrigues<sup>[1]</sup>, Ricardo Patrão<sup>[2]</sup>, António Patrício<sup>[3]</sup>, Vítor Carvalheira<sup>[1]</sup>, Filipe Caseiro Alves<sup>[1]</sup><sup>1</sup>Department of Imagiology, University Hospital Center of Coimbra, PT, <sup>2</sup>Department of Urology and Renal Transplantation, University Hospital Center of Coimbra, PT, <sup>3</sup>Department of Urology, Hospital of Aveiro, PT

**Objectives:** To present the clinical and imaging aspects of an unusual case of ectopic ureter with implantation in to the vagina.

**Methods/Discussion:** The term ectopic ureter usually refers to a ureter that is implanted in to the bladder neck or below, merging with any structure of the urogenital tract. Thus, the urethra is usually the most frequent site of ectopic implantation in females (35%), followed by the vulva (25%), vagina (20%), bladder neck (15%), uterus (5%) and rarely the rectum (<1%). Its incidence is uncertain, being 2 to 12 times more common in females and bilateral in 7-17% of cases.

Among females, 80% of ectopic ureters are associated with ureteric duplication, whereas in males, most ectopic ureters drain a single system, often implanted in the prostatic urethra (associated with UTIs, but rarely with incontinence).

**Results:** The authors report a 17-year-old girl who presented with mild incontinence since childhood. The pelvic examination showed leakage at the vaginal vault, yet with no recognizable cause. CT urography demonstrated a left pyeloureteric duplication, with a second ureter draining a hypofunctioning upper renal pole and implanted in to the vagina. The patient underwent surgical ureteric reimplantation with an anti-reflux technique.

**Conclusions:** The clinical history is suggestive of an ectopic ureter when permanent urinary incontinence coexists with normally preserved urination. Incontinence is only present if implantation occurs below the sphincter mechanism.

The clinical history and careful physical examination were highly suspicious of this malformation. Imaging confirmed it, helping to decide the best treatment planning.

**PIV.18****Bosniak Classification System: Usefulness of Contrast Enhanced Ultrasonography**Ole Graumann<sup>[1,2]</sup>, Susanne Osther<sup>[1,2]</sup>, Arne Hørlyck<sup>[4]</sup>, Palle Osther<sup>[1,2]</sup><sup>1</sup>Urological Research Center, Fredericia Hospital - A part of Hospital Littlebelt, DK, <sup>2</sup>Institute of Regional Health Services Research, University of Southern Denmark, Fredericia, DK, <sup>3</sup>Institute of Regional Health Services Research, University of Southern Denmark, Fredericia, DK, <sup>4</sup>Department of Radiology, Århus University Hospital, Skejby, DK, <sup>5</sup>Institute of Regional Health Services Research, University of Southern Denmark, Fredericia, DK

**Introduction:** The Bosniak classification is a diagnostic system for the differentiation of cystic changes in the kidney using CT. The classification system is based on a multitude of morphological changes: septa formation, wall thickening including nodal components, calcification of the wall and/or septa, hyperdense cystic contents and contrast enhancement following intravenous contrast injection. The process of categorizing such cysts, thus, may be challenging, involving a series of decisions that potentially may affect the final diagnosis.

**Purpose:** The aim of this study was to investigate the interobserver agreement between three radiologists when categorizing complex renal cysts according to the Bosniak Classification system.

**Materials and Methods:** From a database, 100 complex renal cysts were selected randomly with approximately twenty lesions in each of the Bosniak categories (I, II, IIF, III and IV). The three radiologists were blinded from the previous CT reports. Reader a and b were senior urologists with over 20 years of experience. Reader c was a senior resident who had worked intensively for 4 years with the Bosniak classification system. Weighted kappa statistics were calculated to assess agreement between the readers, defined as: fair: 0.21-0.40, moderate: 0.41-0.60, good: 0.61-0.80 and very good: 0.81-1.00.

**Results:** Weighted kappa with 95% CI; Reader a: 0.85 (0.85-0.89), reader b: 0.95 (0.92-0.98) and reader c: 0.98 (0.97-0.99).

**Conclusion:** According to the calculated weighted kappa, all reader performances were found to be “very good”. These results show that the Bosniak classification may be applied reproducibly by radiologists who evaluate complex renal cysts routinely.

**PIV.19****Novel Kidney Segmentation to Describe Renal Tumors Eligible for Nephron-Sparing**

Valeria Panebianco<sup>[1]</sup>, Rocco Papalia<sup>[2]</sup>, Alessandro Cannavale<sup>[1]</sup>, Flavio Barchetti<sup>[1]</sup>, Michele Gallucci<sup>[2]</sup>, Carlo Catalano<sup>[1]</sup>  
<sup>1</sup>Dept. of Radiological Sciences Sapienza University of Rome, <sup>2</sup>I.F.O Hospital, Rome, IT

**Purpose:** To evaluate the role of a novel segmental anatomy model of the kidney with 64-MDCT in the optimization of nephron-sparing surgery technique.

**Materials and Methods:** We enrolled fifty patients who underwent multiphase (pre-contrast, arterial, **parenchymal** and **excretory** phase) MDCT scan with 1 mm acquisitions. In all patients who subsequently underwent nephron-sparing surgery, the following lesion features were evaluated: **tumour** size (TD, LD, APD), location in kidney's segment/s, **exophytic** growth pattern, collecting system's relationship and **tumour**-feeding arteries following a novel anatomic kidney segmentation model in 12-segments. Accordance with the surgical findings was assessed with k-statistic test.

**Results:** Fifty-two **tumours** were detected: accordance in regard of the **tumour** size, **tumour** location and **exophytic** percentage was 100% (k=0.98). The evaluation of the collecting system's relationship and **tumour**-feeding arteries were in accordance with the surgical findings in 90% of the cases. Mean time of the surgical operation was 130 minutes, with a technical success of 98% and obtaining a R0 margin resection in all cases. No complications were encountered, nevertheless in one case (1/52; 1.9%) a urinoma developed, which was detected at the CT performed after the surgical operation.

**Conclusion:** The use of a novel kidney segmentation model with MDCT, which allows the precise localization of the **tumour** and identifies its relationship with **adjacent** structures, may improve nephron-sparing surgery performance.

**PIV.20****CT Urography: Evaluation of an Established Investigation in a Large Urology Centre**

Jim Zhong<sup>[1]</sup>, Julian Keanie<sup>[2]</sup>  
<sup>1</sup>University of Edinburgh, <sup>2</sup>Western General Hospital, Edinburgh, UK

**Objective:** CT urography (CTU) is proven to be an accurate non-invasive investigation for detecting abnormalities of the urinary tract and is therefore the preferred imaging modality for frank haematuria. We retrospectively reviewed all CTUs performed over a 1 year period in a single centre.

**Methods:** Between 1<sup>st</sup> March 2011 and February 27<sup>th</sup> 2012 we collected data prospectively for 1027 consecutive patients who underwent CTU (697 men, mean age of 67 years, range 18-94 years; 330 women, mean age of 64 years, range of 26-92 years). We recorded their main indications for CTU, their imaging findings and subsequent histology.

**Results:**

- Frank haematuria was by far the most common indication for CTU (65%) followed by microscopic haematuria. CTU was also used as an adjunct to tumour staging or in planning management for other urogenital tract abnormalities.
- CTU was negative in the majority of haematuria cases (81%)
- Final and more in-depth results will be displayed on the poster

**Conclusion:** CTU is usually negative, and most cancers would be diagnosed on cystoscopy, so techniques to limit patient dose are important. Upper tract TCC was encountered more commonly than in large published studies. Comparison will be made with a previous audit, conducted when the CTU service was started, to determine trends in indication and positive rate.

## Posters V - Prostate Imaging

### PV.01

#### **Congenital Seminal Vesicle Cyst Accompanying Ipsilateral Renal and Ureteral Agenesis**

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**Objective:** Seminal vesicle cysts (SVC) are seen in the population in a ratio of less than 0.005%. Patients usually present with irritative or obstructive voiding symptoms. They are usually detected in patients between 18 and 41 years of age, the period of maximal sexual and reproductive activity. In about two-thirds of the patients with SVC, ipsilateral renal agenesis was also found. In this case, we report a congenital seminal vesicle cyst accompanying ipsilateral renal and ureteral agenesis.

**Method:** A 22-year-old male patient was admitted to a clinic abroad with pelvic pain and **haematospermia**. An ultrasonographic examination was reported to show marked hydronephrosis and ectopia of the left kidney, and compensatory hypertrophy of the right kidney. He was told his kidney should be resected. The patient was then admitted to our centre. A left seminal vesicle cyst and accompanying agenesis of the left kidney was observed on transabdominal ultrasound, computed tomography (CT) and magnetic resonance imaging (MRI).

**Conclusion:** Seminal vesicle cyst should be considered in the differential diagnosis in male patients of reproductive age who are admitted with symptoms such as pelvic pain, **haematospermia**, dysuria, urinary retention and recurrent epididymitis. SVCs are usually small in size and asymptomatic. SVCs may be acquired as well as congenital in origin. Congenital cysts are associated with genitourinary anomalies: therefore, whether symptomatic or not, cross-sectional (CT or MRI) examination should be performed to detail all the anomalies, although transrectal ultrasound is the most appropriate investigation for initial diagnostic purposes.

## Posters VI - Stones and PCNL

### **PVI.01**

#### **Urinary Tract Diseases Related to Urolithiasis: MDCT findings**

Seong Kuk Yoon, Jin Han Cho, Jin Hwa Lee, Jong Young Oh, Kyung Jin Nam  
*Dong-A Medical Center, KR*

Urolithiasis is a common source of acute **colicky** pain associated with significant morbidity attributable to kidney obstruction, which may lead to severe urinary tract or kidney infection and septic shock, or to hydronephrosis and renal failure in some cases. There are many conditions associated with urolithiasis. Urinary tract obstruction—congenital (ureteropelvic junction obstruction or horseshoe kidney) or acquired (benign prostatic hypertrophy, urethral stricture)—causes urinary stasis and stone formation. Non-obstructive collecting system dilatation also leads to urolithiasis. Pelvicalyceal diverticulum and ureterocele can cause formation of stones. Medullary sponge kidney is the most common renal structural abnormality seen in patients with calcium-containing stones. CT has gained widespread acceptance as the initial investigation of choice for the evaluation of patients with suspected urinary tract calculi. MDCT also allows the detection of other unsuspected extra-urinary and urinary tract abnormalities. We illustrate various urinary tract diseases related to urolithiasis on MDCT.

### **PVI.02**

#### **Simultaneous Endoscopic Removal of Bilateral Upper Urinary Tract Stones**

Furkat Nasirov, Farkhad Akilov, Shukhrat Mukhtarov, Hayot Zakirov, Jakhongir Alidjanov  
*Republican Specialized Center of Urology, UZ*

**Objective:** To assess the efficacy and safety of simultaneous PCNL in patients with bilateral upper urinary tract stones.

**Method:** Thirty one patients underwent simultaneous bilateral endoscopic removal of stones located in the upper urinary tract. Indications for intervention were as follows: bilateral single stones of upper urinary tract, non-compromised renal function, absence of UTIs.

Procedure was performed in two steps: first, removal of the smaller stone; and second, removal of the stone from the **contralateral side, assuming the first side was completed without complications**. In 23 patients (74.2%), all stones were located in renal pelves, and in 8 (25.8%) stones were located in the renal pelvis in one side and in the ureter on the other side. Ureteric stones were preliminarily relocated into the renal pelvis using a ureteric stent or ureteroscope.

Size of pelvic and ureteric stones ranged from 20 to 28 mm (24±6 mm) and from 8 to 14 mm (10±5 mm) respectively.

Results of surgery were assessed in terms of complete stone-free rates, duration of procedure, length of hospital stay, necessity of additional interventions.

**Results:** All patients were completely free of stones. Duration of surgery was (mean±SD) 76.3±6.5 minutes. Length of hospital stay was (mean±SD) 2.1±0.8 days. Post-operative gross haematuria was observed in 6.4% of cases. In both cases, blood loss was less than 100 cc. There was no need **for** additional interventions.

**Conclusions:** Simultaneous bilateral PCNL is an accessible, effective and safe procedure which can also be useful in avoiding repeated anaesthesia and psychological stress associated with repeated interventions.

**PVI.03****Complications of PCNL: A Pictorial Review**

Cherian George, Pavan Najran, David Wells, Samson Liu, Mark Saxby  
University Hospital of North Staffordshire, UK

Percutaneous nephrolithotomy (PCNL) is indicated in single or multiple large calculi, including staghorn and inferior pole calculi, and obstructive calculus within the pelvicalyceal system. Furthermore, PCNL is also indicated in the management of renal calculi that are not amenable to extracorporeal shockwave lithotripsy or retrograde ureteroscopic intervention. Since its introduction in the 1970s, it has made treatment of such calculi a relatively minimally-invasive procedure when compared to open renal surgery for urolithiasis. The majority of PCNLs are free from complications; however, given the invasive nature of the technique, the occurrence of complications is inevitable. This pictorial review demonstrates PCNL-related complications encountered during peri- or post-operative imaging, with a brief discussion on their subsequent management. We also highlight the importance of patient selection and operative techniques that may influence such complications.

**PVI.04****CTKUB – Does Side Matter? Re-audit May 2012**

Flavius Parvulescu, Tek Chin, Jane Belfield  
Royal Liverpool University Hospital, UK

**Objective:** An audit was performed in 2011 to ascertain what proportion of patients with acute renal colic who had CTKUB (CT kidneys ureters bladder) had the side of symptoms documented on the request card. A target was set at 100%.

This re-audit aims to verify if improvements have been made in the proportion of CTKUB request cards that mention the side of pain and to complete the audit cycle.

**Methods:** All CTKUB examinations performed at our institution from September 2011 were identified and the first 200 were examined. Patients presenting with acute renal colic were included in the study. We checked if the request card mentions the side of pain. The findings were compared to those from the initial audit with the target remaining at 100%.

**Results:** In the initial audit in 2011, 102 CTKUB requests for acute renal colic were analysed, 12% of which did not mention the side of pain.

In this re-audit, 200 CTKUB requests were analysed, of which 151 were performed for a clinical suspicion of acute renal colic. In 140/151 (93%) cases the clinical information provided the side of pain while in 11/151 (7%) cases it was not documented.

**Conclusion:** An improvement of 5% compared to the initial audit has been achieved but the target has still not been met and further steps need to be taken to improve compliance.

We suggest introducing additional, mandatory questions in the electronic requesting system prompting the user to supply all the required clinical information, including side of pain.

## Posters VII - Interventional Radiology

### PVII.01

#### **Retrograde Warm Pyelo-Perfusion for Protection of the Ureter During Cryoablation of Central Renal Cell Carcinoma**

Stephen Chapman, Richard Khafagy, Jon Cartledge, Tze Wah  
*St. James's University Hospital, UK*

**Aims and objectives:** With the growing acceptance of cryoablation as a treatment of small renal tumours, methods of avoiding complications have sparked interest. The aim of this study was to assess the feasibility of retrograde warm pyelo-perfusion for protection of the ureter during cryoablation of centrally-located renal cell carcinoma (RCC).

**Materials and methods:** We prospectively evaluated 5 patients undergoing this procedure between Sept 2009 and Jan 2012. Warm pyelo-perfusion was performed in all cases.

**Results:** Mean maximum tumour diameter was 24.6mm (range: 21-30mm) and mean minimum distance between the ureter and proximal margin of the tumour was 1.28mm (range: 0-2.8mm). Procedural success was achieved in all patients with no associated complications at most recent follow up. All patients remained free of RCC recurrence. Mean follow up period was 14.4 months.

**Discussion:** Methods of protecting the ureter during cryoablation of central RCC have been described but are currently underexplored. Warm pyelo-perfusion may offer a feasible method of protection and our initial experiences have yielded promising results.

**Conclusions:** Warm pyelo-perfusion may offer a safe and effective approach for ureteric protection. Further investigation is required to confirm the feasibility of this technique.

### PVII.02

#### **Percutaneous Varicocele Embolization: Minimally Invasive Treatment of Male Infertility**

Lara Rodrigues<sup>[1]</sup>, Ricardo Patrão<sup>[2]</sup>, Vítor Carnevalheira<sup>[1]</sup>, Filipe Caseiro Alves<sup>[1]</sup>

<sup>1</sup>Department of Imagiology, <sup>2</sup>Department of Urology and Renal Transplantation, University Hospital Center of Coimbra, PT

**Objectives:** Brief thematic review on the subject of percutaneous embolization of varicocele grade II to IV, with illustration of the technique, enumeration of the complications and analysis of the obtained therapeutic effects.

**Methods/Discussion:** Varicoceles consist of varicose dilation of pampiniform plexus and spermatic vein and may present with pain, testicular atrophy and male infertility. It affects 15% of men, being present in 40% of the infertile male population. Usually unilateral and more frequent on the left side, it may be bilateral (9%) or present on the right (1-2%). The indications for treatment are symptomatic varicoceles, adolescents with a decrease in testicular volume and infertile adults with multiple alterations in semen.

**Results:** The authors retrospectively assessed 50 cases of percutaneous embolization of clinically detectable varicoceles, performed at the CHUC, in the period between January 2010 and January 2012.

Through the clinical evaluation and semen analysis, when available, the authors demonstrate good results in terms of efficacy and safety.

**Conclusions:** Percutaneous varicocele embolization is a minimally-invasive technique of interventional radiology without the need for general anaesthesia or stitches / scars, providing a rapid recovery of the patient, with a short hospital stay and therapeutic results similar to surgery.

**PVII.03****Evaluation of Protective Hydrodissection and Pneumodissection During CT-Guided Renal Cryoablation**Jim Zhong<sup>[1]</sup>, Tze Wah<sup>[2]</sup><sup>1</sup>University of Edinburgh, <sup>2</sup>St James University Hospital Leeds, UK

**Objective:** To evaluate the clinical experience of using hydrodissection and pneumodissection techniques in protecting surrounding organs from ablative injury during percutaneous renal cryoablation.

**Method:** From June 2008 to May 2012, data was collected prospectively for 59 consecutive patients undergoing percutaneous cryoablation for pathologically confirmed RCC in a single institution. All radiofrequency ablation treatments were performed using image-guidance (CT) and under general anaesthesia. Hydrodissection with 5% dextrose or pneumodissection with a sterile air technique was used accordingly to protect the surrounding organs which lie in close proximity to the iceball. The treatment outcomes were followed up with contrast enhanced CT or MRI. Any complication was prospectively documented.

**Results:** 59 patients (36 male and 23 female) with 65 renal tumours were treated with percutaneous cryoablation. The age range was 22-86 years (mean= 68) and the mean tumour size 2.5cm. A total of 11 hydrodissection and 6 pneumodissection techniques were performed to protect a surrounding organ in close proximity (<1cm): colon (n=14), small bowel (n=1) and duodenum (n=1). One patient had both hydrodissection and pneumodissection in order to mobilize the colon from the treatment margin. There was no colonic injury in this cohort of patients using this protective measure.

**Conclusion:** Hydrodissection and / or pneumodissection techniques can be utilised during percutaneous cryoablation as both are effective in protecting the surrounding organs from ablative injury.

**PVII.04****Retrospective Observational Review of Consecutive Percutaneous Nephrostomies Performed in 2010**

Max Osborne, Fiona Fuerstenberg, Alec Wolinski, Sherif Latif

Russell's Hall Hospital, Dudley, UK

**Objective:** Since 2008 the numbers of percutaneous nephrostomies (PN) performed in the Dudley group of Hospitals (DGH) has increased by 103%; in this time 201 procedures have been performed. This study aims to assess the indication for PN in DGH and its service provision during 2010. Currently procedures are performed out of hours if required.

**Method:** Data was collected on all PN procedures during 2010 using the CRIS database and combined with figures from the DGH system.

**Results:** In 2010, 80 procedures were performed on 53 patients.

Average age was 71, M:F ratio - 1.6:1.

35% of requests were performed on the same day.

Indications included urosepsis and acute renal failure.

The overall mean interval was 44 hours.

No procedure was performed "out of hours".

Overall, 16% of all procedures had urine samples sent.

Of these, 54% showed no growth at 5 days.

Positive samples grew E.coli, streptococcus and candida.

Only 5% showed purulent urine at the time of procedure.

9% were performed with an indication of acute renal failure.

5 (6%) procedures were performed with a working clinical diagnosis of urosepsis, only 2 showed frank pus of which 1 had positive growth.

**Conclusion:** Few (6%) PN requests are for urosepsis. Of these, less than half actually have pus.

Procedures are not performed late evening or overnight as patients can and often do need resuscitation prior to intervention.

We conclude that there is very little demand for PN and that IR on call should largely focus on vascular emergencies.

#### **PVII.05**

##### **Interventional Radiology & Urology: Integrated Care**

Lisa Henderson, Rebecca Powell, Sachin Agrawal, Altaf Shamsuddin  
*Imperial College, London, UK*

**Introduction:** Interventional radiology forms an integral part of modern urological and oncological practice. Patients with forgotten indwelling JJ stents or long-term nephrostomies present both a management challenge and potential legal dilemma. We therefore performed a retrospective audit to establish whether the current system ensures adequate follow up of these patients.

**Material & Methods:** Patients undergoing nephrostomy or stent insertion across three Imperial sites, Charing Cross, St. Mary's and Hammersmith hospitals, were identified retrospectively over a six month period using paper and electronic databases. The Patient Archiving System (PACS), clinic letters and medical notes were used to determine clinical indication for intervention, the requesting team, and to review follow up.

**Results:** Between January and July 2011, 88 nephrostomies (13 bilateral) and 30 JJ stents (3 bilateral) were inserted. Indications were oncological 57% (gynaecological 27%, urological 25%, colorectal 4%), stones 21%, renal transplant-related 6%, iatrogenic 5% and other 11%.

Currently, 8 nephrostomies and 14 JJ stents remain in situ, with ongoing changes. All patients with nephrostomies are being appropriately followed up and their nephrostomies changed; however, 3 patients (10%) with JJ stents have been lost to follow up and have not had their stents changed to date.

**Conclusions:** Our data suggests that an integrated radiological and urological database is required to ensure all patients undergo appropriate nephrostomy/stent changes. Electronic ordering and an intranet-based database may help to improve patient care.

#### **PVII.06**

##### **Radiofrequency ablation in germ cell cancer. A Case Report**

Lisa Bashford, Callum Colquhoun, David Kay, Jeff White  
*Beatson West of Scotland Cancer Centre, UK*

Metastatic malignant germ cell cancer is potentially curable, even disease with less favourable histology or recurrent. Therefore, an aggressive multi-modality treatment approach is adopted typically including surgery, chemotherapy and/ or radiotherapy. This case describes a 45-year-old male, who was diagnosed with metastatic germ cell cancer with multiple pulmonary and intra-abdominal lymph node metastases. This, together with pathology from orchidectomy performed at presentation, confirmed intermediate prognosis undifferentiated teratoma. Despite almost a complete response to standard BEP chemotherapy, imaging revealed residual lymphadenopathy and pulmonary disease, which is not uncommon in this setting. A retroperitoneal lymph node dissection and left lung metastectomy was therefore performed. Follow-up imaging revealed two residual pulmonary lesions. An enlarging posterior lesion was excised and pathology showed a fully differentiated teratoma. Although initially static, the residual anterior lesion was later seen to enlarge. Differentiated teratoma is typically indolent and chemoresistant. Where intervention is indicated, surgical management is preferred. However, surgical resection was considered challenging in this case with a history of bilateral thoracotomies and resection of a lung abscess prior to diagnosis. Therefore, radiofrequency ablation (RFA) to the lesion was considered a reasonable, although novel, alternative and was subsequently performed. Where surgery is not feasible for metastatic teratoma, there is limited evidence on the next best treatment. RFA has been used successfully in metastatic pulmonary disease in other malignancies, including colorectal cancer. However, there is limited experience in metastatic germ cell cancer. This case provides insight into the potential benefit of RFA.

**PVII.07****Role of Twinkling Artefact in a Paediatric PCNL Population**

David Hughes, Ashok Raghavan, Prasad Godbole

*Sheffield Children's Hospital, UK*

Stone characterisation is important in the planning of treatment for renal calculi, to inform approach and method of fragmentation.

Studies in the adult population have reported that the ultrasound twinkle artefact may be useful in the detection and characterisation of renal calculi and have shown correlation with the chemical composition of calculi.

Since ultrasound is the main imaging modality for calculi in children, gaining the maximum amount of information from the study is essential. Stone size and position, strength of posterior acoustic shadowing and degree of twinkle artefact can all be evaluated.

We will describe the experience of imaging evaluation, including the utility of the twinkle artefact, in patients presenting to our tertiary Children's Hospital for PCNL.

We will also present ongoing work attempting to correlate imaging features such as degree of twinkle artefact with stone surface appearance and biochemical composition, something as yet unreported in the paediatric literature.

## Posters VIII – Ultrasound

### **PVIII.01**

#### **US and Colour-Doppler Findings in Testicular Lymphoma and Their Mimics**

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**Objectives:** To describe US and colour-Doppler findings in testicular lymphoma and their mimics.

**Methods:** We reviewed the US and colour-Doppler findings in 6 patients with pathology-proven lymphoma of the testis, and compared them with two patients in whom lymphoproliferative disease was suspected on clinical and US grounds **but** in whom pathology showed only chronic inflammatory changes.

**Results:** Lymphoma patients age range was 43 – 76 years. Four had testicular involvement in **systemic** disease or recurrence; two had primary disease. One had bilateral involvement. Four testes were diffusely involved (two homogeneously; two heterogeneously, with infiltration of spermatic cords); three had nodular hypoechoic lesions which, in one testis, were multiple. Colour-Doppler findings were reviewed in 5 cases: all lesions, either focal or diffuse, were hypervascular, with vessels of normal rectilinear shape. In patients with nodular lesions, there was no distortion of vascular course at the point where vessels entered the mass. Findings suggested an infiltrative process, and were confirmed at pathology. Two patients had a history suggesting testicular lymphoproliferative disease (painless enlargement of left testis in 55 yo; scrotal discomfort in 17 yo with plasmocytic leukemia). Both had hypoechoic focal hypervascular lesions containing vessels with rectilinear course that, at surgical biopsy, showed inflammatory changes only.

**Conclusions:** In patients over 60 and/or with known lymphoproliferative disease, presence of hypoechoic, hypervascular testicular lesion with absence of vascular distortion must suggest lymphoma. Care must be taken since, albeit rarely, inflammatory lesions may present the same imaging pattern in absence of clinical signs and symptoms of inflammation.

### **PVIII.02**

#### **Testicular Assessment, The Ultrasound Way – A Pictorial Review**

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**Objective:** This poster aims to provide an educational review of common and less common testicular pathologies as seen on ultrasound imaging. These will be demonstrated by means of a pictorial review with teaching points for each case.

**Method:** Ultrasound is an effective method for assessment of the testes due to the lack of ionising radiation, particularly in radiation-sensitive tissue. Many of the patients investigated are young patients and some may require repeat examinations. High frequency linear transducers produce high-resolution images and the diagnostic value of ultrasound imaging is known to be superior to other modes of imaging when assessing the testes.

During the past two years we have collected cases demonstrating intra-testicular abnormalities on ultrasound and have selected examples of different types of pathology for this poster.

**Results:** The poster illustrates a range of congenital, benign, malignant, infective, post-operative and vascular intra-testicular pathologies. Congenital pathologies include a case of congenital adrenal rests in the testes; benign lesions include microlithiasis, cysts and an epidermoid cyst. Cases of testicular seminoma, teratoma and lymphoma are demonstrated together with orchitis and a testicular abscess. Images of a normal testicular prosthesis and a case of a ruptured prosthesis are also included. Relevant clinical history is given and teaching points included for educational purposes.

**Conclusion:** Ultrasonography is the gold-standard imaging modality for testicular assessment. It is widely available and provides a safe, swift and thorough real-time assessment of the testes whilst clearly demonstrating normal anatomy as well as pathology.

## Posters IX – Others

### PIX.01

#### **Does Size Matter in Uroradiology?**

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**Objective:** We present a series of cases with various urological conditions, interesting not necessarily because of the conditions themselves, but rather due to the large size of the pathology.

This poster aims to be an educational exhibit as it shows unique radiological images as well as some unusual complications and management difficulties that otherwise trivial conditions can cause at extreme dimensions.

**Methods:** Cases were individually and subjectively selected based solely on the criterion of unusually large urological pathology. They were chosen from the large pool of cases encountered by the authors at our institution. All available imaging methods were used, including plain radiographs, ultrasound scans, CT and MR imaging. The most relevant images are included in this poster, along with a brief clinical history and, where applicable, notable complications and treatment outcome.

**Results:** Among the cases presented, the reader will find: CT images of renal cysts with diameters of up to 18cm, a large obstructing tumour causing severe ureterohydronephrosis with the ureter reaching 15.7cm in diameter, plain radiographs and ultrasound images demonstrating a bladder calculus of 10.1 x 6.8cm, a 4.8cm ureterocele causing hydroureter and polycystic kidneys reaching 27cm in length.

**Conclusion:** Size can matter in uroradiology where extreme dimensions can make management challenging and can lead to unusual complications.

### PIX.02

#### **Atypical Radiological Manifestations of Common Genitourinary Diseases**

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**Objective:** To know atypical radiological manifestations and complications in the diagnosis and follow-up of benign and malignant genitourinary pathology.

**Method:** We retrospectively selected cases (March 2011-March 2012) with atypical features on US, CT or MRI at diagnosis or during follow-up. For patients under treatment for cancer, we looked for radiologic manifestations of chemotherapy toxicity.

**Results:** Both benign and malignant disease can be atypical and present a diagnostic dilemma.

We present atypical findings in urinary stone disease, atypical ovarian torsion, unusual renal infections, rare genitourinary tumours, unusual fistula, and manifestations of chemotherapy toxicity in patients treated with antineoplastic drugs.

During cancer treatment, the therapy itself can produce unreported organic changes, especially those newly approved drugs for high-prevalent cancers such as ovarian cancer. These alterations are not yet well known by the radiology community.

**Conclusion:** It is important to know all atypical features in both the initial diagnosis of benign and malignant disease, or during **treatment and surveillance of cancer cases**.

**PIX.03****A-Z of Adrenal Lesions : The Radiologist's Roadmap!**

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**Objective:** The aim of this poster is to produce a “roadmap” to assist the radiologist in being able to follow a diagnostic pathway that allows a reliable and efficient way of diagnosing adrenal lesions from initial cross-sectional imaging.

**Method:** The ever-increasing utilisation of cross-sectional imaging in patients presenting with abdominal pain has also led to an increase in detection of adrenal lesions.

There are several imaging modalities available at the radiologist's disposal in diagnosing adrenal lesions, the commonest being computed tomography (CT), magnetic resonance imaging (MRI), and nuclear medicine (NM). Lesional characteristics vary and the important parameters to consider are size, washout features, the presence or absence of calcification, fat and haemorrhage, and finally distribution i.e. unilateral v bilateral adrenal gland involvement.

**Results:** The most common benign lesion is the incidental adrenal adenoma. Other benign lesions to discriminate include adrenal hyperplasia, haematoma and cysts, myelolipomas and pheochromocytomas (although 10-15% can be malignant). The commonest malignant lesions are metastases. Other discriminating malignant lesions include adrenocortical carcinoma, leiomyosarcoma, and lymphoma. Finally, one should consider pseudolesions that can mimic true adrenal lesions.

**Conclusion:** There are many pathological processes that can affect the adrenal gland and it is crucial for the radiologist to categorise these lesions into benign or malignant entities. Once this distinction has been made, further methods to evaluate lesional characteristics can be performed to obtain a definitive diagnosis, which ultimately leads to a timely and appropriate management plan for the patient.

**PIX.04****Hereditary Renal Tumours: A Pictorial Review**

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**Key Learning Objectives:** To review the characteristics and imaging appearances of hereditary renal tumours. To understand the significant role imaging can play in identifying these tumours and the impact it can have on the future clinical management of the patient and their relatives.

**Description:** Approximately 4% of all renal cell carcinomas (RCCs) are hereditary. With recent advances in molecular genetics, several hereditary renal cancers have been isolated; including von Hippel-Lindau disease, hereditary papillary renal cancer, hereditary leiomyomatosis renal cell carcinoma and Birt-Hogg-Dubé syndrome. This allows the identification of at-risk individuals and the possibility of offering genetic testing to at-risk family members. Inherited RCCs are more likely to be multiple, bilateral and to occur at a younger age. Pre-symptomatic surveillance offered to at-risk patients aids the detection of smaller sized tumours which, once detected, can be monitored radiologically / growth assessed and then surgically removed with nephron-sparing surgery where possible. It is important that radiologists are aware of these tumours and their syndromes so that an underlying hereditary cause may be considered and conveyed to the clinicians. Such a diagnosis will then have significant impact on the patient and their relatives with subsequent follow-up, treatment and screening.

**Conclusion:** Although a small proportion of RCCs are hereditary, such a diagnosis not only impacts on the patient but also on their relatives. Hereditary RCCs involve a younger population with long-term consequences. Increasing radiologists' awareness in this area should help to improve diagnosis and follow-up of at-risk patients and their relatives, with pre-symptomatic surveillance shown to improve outcome.

**PIX.05****Role of Multidetector CT Urography (MD-CTU) in Evaluation of Urothelial System**

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**Purpose:** To assess the efficiency of MD-CTU in evaluation of the urothelium and its diagnostic accuracy for detecting, characterizing or ruling out urothelial abnormalities.

**Materials and methods:** 145 patients underwent CTU (2-3 phases) after I.V. injection of 1.2 ml / kg BW of non-ionic contrast media and low dose diuretic. Axial cuts and coronal reformatted images were evaluated. Three-dimensional reformations of the excretory phase data were performed using MIP and AIP. The standard of reference included endoscopic, surgical and histopathological findings; clinical and imaging follow-up.

**Results:** MD-CTU demonstrated a sensitivity of 100% in the identification of urinary stones. In 5 patients with ureteropelvic junction obstruction (UPJO), MD-CTU demonstrated 3 patients with a crossing vessel during the arterial-phase images, causing extrinsic impression on the UPJ. The sensitivity of our CT protocol for detection of urothelial tumour was 98.48% with 92.86% positive predictive value. MDCT urography diagnosed 7 vascular anomalies. In 10 patients with ureteric narrowing, MD-CTU allows visualization of narrowing of the ureteric lumen due to stricture in 4 patients and periureteric abnormalities in 8 patients.

**Conclusion:** CTU with MIP reconstruction is a useful technique for evaluating the urinary system. It accurately detects small urinary calculi, uroepithelial lesions, and extraurinary disease. MD-CTU can demonstrate a wide spectrum of urinary diseases in a single study.

**PIX.06****Imaging of Adrenal Masses**

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**Introduction:** Most adrenal gland lesions are detected by CT; however, some patients are referred for MRI and PET and even PET-CT, with percutaneous biopsy as the last resort.

**Aim of Study:** To provide the role of various imaging modalities in optimal assessment of adrenal masses and tumours. Furthermore we would like to recommend a diagnostic algorithm.

**Patient & Methods:** A total of 28 patients with 28 adrenal masses (11 adenomas, 5 myelolipomas, 6 metastases, 2 adrenocortical carcinomas, 1 cyst & 1 neuroblastoma) were studied.

CT scan was done with a dedicated adrenal CT protocol including precontrast, dynamic enhanced and 10 min delayed images. Washout characteristics were then assessed.

MRI was done in 19 patients, including axial T1, axial and coronal T2, fat saturation sequences in 4 patients and chemical shift protocol in 11 patients. Qualitative assessment of the chemical shift images was done.

Five patients underwent PET and PET-CT investigations.

**Results and Conclusions:** Our results confirm the evolving role of CT in detection and characterization of an adrenal mass. Further assessment by MRI and localization with MIBG can be done in the setting of pheochromocytoma or neuroblastoma.

A mean absolute percentage washout of 83% and 41.4% was found in adenomas and metastases respectively while a mean relative percentage washout of 57.4% and 17.95% was found for adenomas and metastases respectively, indicating that adenomas wash out contrast more rapidly.

**PIX.07****US and MRI Imaging Correlation in Scrotal Tumours and Pseudotumours**

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**Objective:** The aim of this study was to assess the role of ultrasound and MRI in the characterization and evaluation of scrotal masses.

**Subjects and methods:** Ultrasound and MRI were performed on 18 patients referred because a testicular mass had been detected clinically. Both T1- and T2-weighted sequences were performed with a 1.5T MRI unit. Gadolinium chelate was administered IV in all cases. We recorded the presence of a lesion and whether the histologic diagnosis of testicular malignancy could have been predicted on the basis of ultrasound and MRI features. Both ultrasound and MR imaging allow characterization of scrotal masses as intratesticular or extratesticular and can demonstrate various types of lesions and tissue, including cysts or fluid, solid masses, fat, and fibrosis. For testicular neoplasms, local extension of disease was studied. The ultrasound and MRI findings were correlated with the surgical and histopathologic results.

**Results:** Histologic examination revealed 18 intratesticular lesions, 14 (78%) of which were malignant and 4 (22%) benign. 8 malignant testicular tumors (57%) were confined within the testis, 4 (29%) had invaded the testicular tunicae or epididymis, and 2 (14%) had invaded the spermatic cord. MR imaging may be of value when the location of a scrotal mass is uncertain or when US does not allow differentiation between a solid mass and an inflammatory or vascular abnormality.

**Conclusion:** Although US is a good diagnostic tool for the evaluation of the scrotal masses, US findings may occasionally be inconclusive. MR can be useful as a problem-solving tool when sonographic findings are equivocal and may provide additional information in these cases, often affecting patient management.

**PIX.08****Manual Squeezing Management with Small Stab Incision in a Large Volume of Subcutaneous CME**

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**Objective:** To evaluate the efficacy of manual squeezing management with small stab incision on the skin in patients **suffering** from a large amount of subcutaneous contrast media extravasation (CME) during dynamic MDCT.

**Method:** We evaluated the results of manual squeezing management with small skin incision for subcutaneous large CME in 12 patients aged 50-84 years (M:F=5:8) performed for one year. Indication for this management was a large induration accompanied with sensory/motor change and/or skin blister formation.

Extravasation site, induration size, skin **colour** change, existence of skin blister, and change of sensation/motion had been recorded with photographs and radiographs taken at the time of detection, immediately after management, and one day after. We evaluated late complications or sequelae by reviewing the clinical follow-up records.

**Results:** The site of extravasation was the dorsum of hand (n=4), wrist (n=1), forearm (n=5), and arm (n=3). The mean size of induration was 12.3x4.7 cm<sup>2</sup> approximately.

There were skin **colour** change in 5 patients, blister in 3, sensory change in 7, and motor change in 7.

Discomfort and sensory/motion change were relieved immediately after management in all patients except for one. Skin **colour** and induration recovered one day after the management except for 2 patients. There was no clinical record about late complications or sequelae during their clinical follow-up.

**Conclusion:** In patients with large CME, manual squeezing management with small stab incision on the skin might be effective and could prevent a late complication **requiring surgery** or late sequelae.

**PIX.09****Role of MRI in Follow-up of Post Radical Cystectomy Patients**

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**Purpose:** To evaluate the role of MRI study in follow-up of the patients after radical cystectomy.

**Patients & Methods:** 236 patients underwent radical cystectomy and urinary diversion. Postoperatively, every 6 months they underwent MR imaging in the form of T2wi of the abdomen, high resolution T2wi (HR-T2wi) of the pelvis and MRU (heavy T2wi, coronal sequences) at 1.5T as follow-up; searching for postoperative complications, pelvic local recurrence, kidney changes or other conditions that may have developed postoperatively. The **standard** in pelvic recurrence was biopsy, and in other conditions the **standard** was another radiological modality.

**Results:** 12/236 cases (5%) had early post-operative complications in the form of local fluid collection, 40/236 (16.9%) cases had pelvic local recurrence in the form of soft tissue mass; 3 cases were diagnosed by histopathology as inflammatory conditions, 19/236 (8%) cases had lymph node enlargement, 39/236 (15.7%) cases had hydronephrosis [10/236 (4.2%) unilateral, 29/236 (12.3%) bilateral], 37/236 cases (15.7%) had pyelonephritic changes, 9/236 cases had bone metastasis, 3/236 (7%) cases had liver metastasis, 5/236 (2%) cases had a pouch stone, 4/236 (1.7%) cases had pelvic/lyceal masses and 83/236 (35.2%) cases had no abnormality detected at all follow-up examinations. The accuracy of MRI in detection of the complication was 98.7%.

**Conclusion:** MRI is an accurate primary method for evaluation of radical cystectomy patients as it is a simple technique with no intravenous contrast media.

**PIX.10****Role of Imaging in Male Infertility**

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The evaluation of infertile men begins with a detailed clinical history and physical examination and then proceeds to laboratory test including semen analysis, hormonal assays, sperm function test, and genetic testing. Imaging studies can be used selectively as part of the comprehensive evaluation of male infertility. In this presentation, we review the spectrum of diseases responsible for male infertility, discuss appropriate imaging **modalities** for specific clinical settings, and illustrate characteristic imaging findings that permit specific diagnosis. We also discuss how imaging studies may be used to distinguish defects of sperm production from obstruction of sperm passage. The discussion is divided into three main categories: obstruction of sperm passage, impairment of sperm function, and defects in spermatogenesis.

**PIX.11****Bladder Cancer – Tumour Attenuation in Multiphase CT Urography**

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**Purpose:** Proper evaluation of the bladder with CT Urography requires a distended bladder.

Bladder **tumours** can not only be detected in the excretory phase but also in the other scan phases of CTU.

The aim of the study was to investigate the contrast enhancement of bladder cancer in unenhanced (UE), corticomedullary (CMP), nephrographic (NP) and excretory phases (EP).

**Methods and materials:** Ethical review board approval was obtained for this prospective study. Five-hundred and sixty-eight patients presenting with gross haematuria were referred for CT urography. Patient records and

histopathological data were collected. Sixty patients, aged 69±13 (22 - 93) years, with bladder cancer detectable at CT urography were included in the study.

CT examinations were performed on a Siemens Sensation 16 or a 64-slice Definition.

**Results:** Tumour enhancement was ≥15 HU in 59/60 tumours. The highest mean tumour enhancement, 37±14 HU (0-75), was measured in the corticomedullary phase, followed by 25±7 HU (10-40) in the nephrographic phase and in the excretory phase it was 18±9 HU (5-38).

**Conclusion:** Bladder cancer is the most common urinary tract malignancy and has traditionally been diagnosed with cystoscopy. CTU now challenges cystoscopy and this study show that bladder cancer enhances with contrast during CTU and is best seen in the corticomedullary phase.

### **PIX.12**

#### **Imaging of Persistent Müllerian Duct Syndrome: Report of 4 Cases and Review of the Literature**

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**Objective:** To report 4 cases of persistent Müllerian duct syndrome (PMDS).

**Patients and methods:** 4 adults with PMDS (age 19-58) were evaluated using physical examination, imaging, surgical exploration and chromosomal analysis. The initial investigation undertaken was ultrasound followed by magnetic resonance imaging (MRI). A T2 weighted (T2W) balance waveform sequence was used as an overview. We utilised the short tau inversion recovery (STIR) sequence to identify cryptorchidism which was not seen on conventional MRI. Imaging appearance was compared with laparoscopy findings.

**Results:** All patients were diagnosed on imaging of PMDS after intra-abdominal testes were found. MRI identified clear residual Müllerian structures in 3 patients. Computed tomography (CT) was performed for one of our patients as the abnormality seen on initial ultrasound was unusual. This revealed a bi-lobed cystic structure on the bladder dome and a tail of tissue which extended into the right inguinal canal. The diagnosis of PMDS was confirmed by laparoscopy. All the cases have 46XY karyotype with normal male phenotype.

**Conclusion:** Imaging is a useful adjunct in the diagnosis of PMDS. MRI has the best image resolution for defining anatomy and it is essential to utilise it as part of the pre-operative work-up along with karyotyping and counselling.

### **PIX.13**

#### **Testicular Multi-Disciplinary Team Meeting: The Radiologist's Role**

Jane Belfield

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**Objective:** Before 2011, imaging at the testicular MDT was not reviewed by a radiologist. Following weekly attendance by a consultant radiologist, cases discussed at MDT have been evaluated to assess the radiologist's role.

**Method:** All cases discussed from February 2011 to January 2012 in this regional testicular MDT covering 3.5 million people were identified. The following were analysed: number of cases and patients, histological diagnosis, staging CT, nodal surgery.

**Results:** 48 MDT meetings took place; 222 cases were discussed (range 1-10, mean 4.6) on 143 patients. Age range 15 – 73, mean 37.7 years.

121/222 (54.5%) were new patients; 106/121 (87.6%) had testicular malignancy, of which 74/106 (69.8%) stage 1, 12/106 (11.3%) stage 2, 11/106 (10.3%) stage 3, 9/106 (8.5%) likely stage 1. 9/121 (7.4%) were benign and did not require a CT. 6/121 (5%) had other diagnoses including lymphoma, mediastinal tumour, epidermoid cyst and adrenal rests.

Site of primary tumour: 73/143 (51%) right, 61/143 (42.6%) left, 4/143 (2.8%) bilateral, 5/143 (3.6%) other.

18 patients with previous malignancy were discussed with relapse on follow-up imaging, of which 6/18 (33.3%) had previous retroperitoneal lymph node dissection and radiology was vital for assessing disease progression.

10/143 (7%) patients had lymph node surgery during 2011 with surgical planning guided by CT.

Other interesting findings include: 9/143 (6.3%) microlithiasis, 4/143 (2.8%) undescended testes, 4/143 (2.8%) bleomycin-lung.

**Conclusion:** Some rare disorders would not have been diagnosed without a radiologist. The presence of a radiologist was also vital in surgical planning and follow-up of retroperitoneal lymph node dissection.