IMPERIAL

Chelsea and Westminster Hospital NHS Foundation Trust

Improving PIRADS staging to limit invasive Transperineal Biopsies

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Introduction

Before the use of multiparametric MRI (mpMRI), prostate MRIs were usually conducted after diagnosis of prostate carcinoma, and did not differentiate between benign or clinically insignificant carcinomas, and clinically significant carcinoma.

The European Society Urogenital Radiology (ESUR) devised a more comprehensive MRI grading which took into account the risk of carcinoma, called Prostate Imaging and Reporting Data System (PIRADS). It also sought to standardise reporting, interdisciplinary communication, and use MRIs to guide biopsy.

PIRADS	Implication
1	Clinically significant cancer highly unlikely to be present
2	Clinically significant cancer unlikely to be present
3	**The presence of clinically significant cancer is equivocal**
4	**Clinically significant cancer likely to be present**
5	Clinically significant cancer highly likely to be present

Needs Analysis

After numerous conversations with the lead consultant radiologist, we collectively identified through anecdotal evidence that there was a need to assess **whether the use of PIRADS score 3 or 4 is adversely impacting patient outcomes and wasting resources.**

The recent paradigm shift from transrectal to transperineal biopsies in light of increasing infection control has resulted in lengthier surgical procedures; this further contributes to the burden of NHS surgery waiting lists.

Aims

- Improve the classification of prostate MRI scans at a PIRADS grade 3/4.
- Reduce the number of unnecessary biopsies.

Methodology

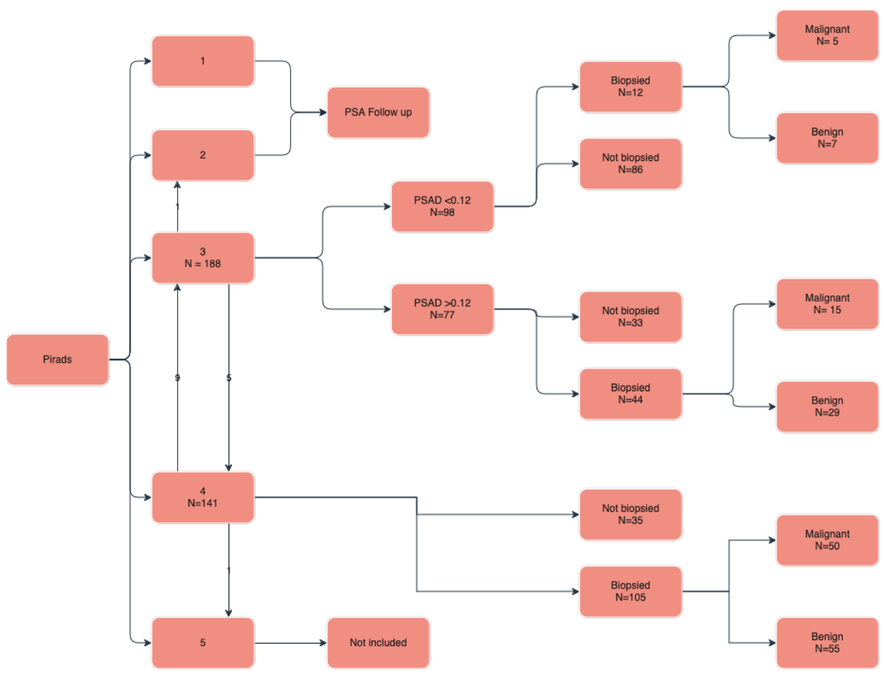
We conducted a retrospective cohort study on 717 male patients who were given prostate MRI scans between 1 July 2022 to 30 June 2023.

Exposures: PIRADS 3 or 4

Exclusion Criteria:
- Not PIRADS 3 or 4
- Prior prostate MRIs
- Previously diagnosed prostate cancer
- Previous prostate biopsies

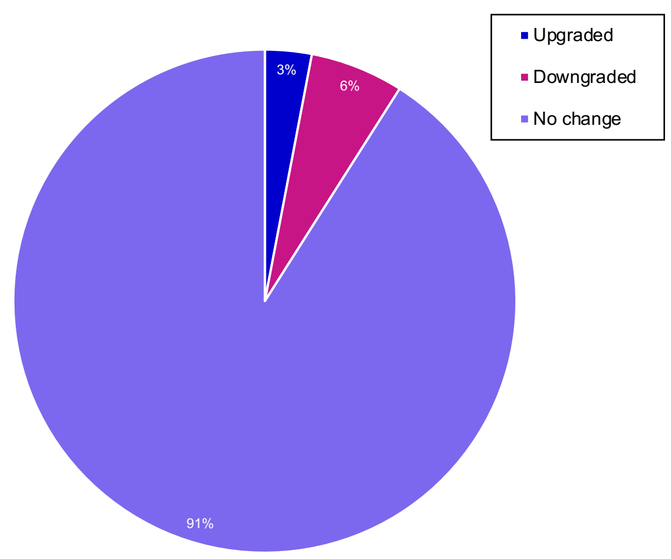
This left us with a total of 329 patients to include in our results. We collected the following data:
- PIRADS from initial MRI
- MDT PIRADS (if case was discussed)
- PSAD from initial MRI
- Gleason score upon initial biopsy
- All of the above metrics if MRI or biopsy was taken over a 12 month follow up period

Results



48% of PIRADS 4 lesions biopsied showed carcinoma.

36% of PIRADS 3 lesions biopsied showed carcinoma



A pie chart showing the proportion of prostate MRIs included in our audit which were discussed at radiology MDT (177), that were then either upgraded from PIRADS 3 to 4, downgraded from 4 to 3, or remained unchanged at either 3 or 4.

Discussion

Advantages	Disadvantages
• Our methodology involved a large sample size, increasing the validity of our audit. • Collecting data on the initial reporting radiologist allows us to deliver precision training to specific radiologists. • Feeding our data alongside mpMRI into AI copilot will aid with machine learning. • Teaching and MDT discussions can be held digitally which is ecologically beneficial. • The possibility of a radiology reporting template specifically for mpMRI scans could aid in standardising PIRADS grading. • Time, money, and resources would be spared by reducing the number of biopsies, thus reducing wastage too.	• The study is based on local guidelines for transperineal biopsies according to PIRADS score and PSAD combined; whether our audit can be generalised to other healthcare trusts is unexplored. • AI outcomes will fail to have a holistic approach towards patient-centred care; the co-pilot will only act as an adjunct to a radiologist's final decision making. • Teaching on ESUR PIRADS guidelines will have to be repeated due to staff turnover.

Conclusion

Our audit identified there could be an overuse of PIRADS 3 and 4 grading which led to unnecessary invasive transperineal biopsies. There is a need to standardise PIRADS grading to better conform to ESUR PIRADS guidelines.

References : https://www.nature.com/articles/s41391-022-00641-3, https://pubmed.ncbi.nlm.nih.gov/8281411/, https://www.acr.org/-/media/ACR/Files/RADS/PI-RADS/PIRADS-V2-1.pdf, https://www.drawio.com/