Title: Diagnostic Potential of Radiological Apical Tumour Involvement

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We commend Veerman et al. for investigating the diagnostic performance of radiological apical tumour involvement (radATI) in preoperative prostate MRI and its impact on clinical outcomes in patients with localized prostate cancer (1). This retrospective study evaluated the diagnostic accuracy of MRI to detect pathological ATI (pathATI) in robot-assisted radical prostatectomy specimens. They found 2/56 (4%) of patients without radATI developed a biochemical recurrence (BCR) compared to 25/120 (21%) patients with radATI ($p = 0.003$). Multivariate analysis found patients with radATI more likely to have apical positive surgical margins (APSM) ($p = 0.004$). These findings have implications in predicting prostate cancer outcomes and further investigation of certain areas in this field would be valuable.

Firstly, we believe the author's acknowledgement of tumour location is an important step in the classification of prostate cancer. Tumour location has already been widely recognised in the study of breast and lung cancer, with increasing evidence indicating a similar presentation in the prostate (2). An important question that is under addressed is, what is it about apical tumours that carry additional risk? Variation in biology and morphology throughout the tumour may play a role in these differences. Additionally, higher rates of PSM due to incomplete surgical excision may contribute to increased recurrence risk in the apex. If this is the case, surgical management must be tailored by tumour location. RadATI detection of APSM, together with modifications in surgical techniques to reduce APSM may be necessary, as well as deploying adjuvant treatments to eliminate APSM. In addition, taxonomy may be warranted in categorising apical tumours based on morphology, volume, and grade. We are excited to see further progress in understanding the significance of prostate tumour location.

Secondly, literature suggests that a single APSM may be clinically insignificant on long-term outcomes (3,4). A study by Wadhwa et al. finds that APSMs lead to less BCR than PSM in other areas (5). On the contrary, the authors recommend radATI be treated with reduced apical nerve sparing to avoid APSM. We believe this approach may lead to overtreatment of radATI in the presence of an otherwise good prognosis. However, it is important to acknowledge the psychological distress PSM may have on patients, warranting the need for further treatment. In addition, Wadhwa's study has several limitations, such as the dataset details including any surgical technique, rather than focusing on specimens from robot-assisted surgery. Wadhwa also lacked important prognostic factors, such as tumour grade and amount of tumour at the margin.

We believe the extent of APSMs is a key prognostic factor and is found to be an independent predictor of BCR (6). Only extensive PSMs seem to significantly increase the risk of BCR, while focal APSMs have little effect. Most tumours in Veerman's study were clinically suspicious (63% with a PI-RADS 5) but the extensiveness was unknown. Consideration of the extent of PSM upon diagnosis would be an interesting topic for investigation. The authors may also wish to perform multivariable analysis for the effect of radATI on BCR.

The potential of MRI to predict ATI is exciting, however, future study may benefit from focus on the points highlighted here. We believe MRI may play a critical diagnostic and prognostic role for prostate cancer. Integrating MRI with other diagnostic techniques such as PSMA PET-CT, micro-ultrasound and PCA3 biomarkers could form a powerful toolkit in enhancing prognostication.

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