Prostate Cancer Undetected by mpMRI: Tumour Conspicuity is Reliant Upon Optimal Scan Timing and Quality

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We commend Alanee and colleagues for their detailed description of prostate cancers not detected by multiparametric magnetic resonance imaging (mpMRI).[1] They analysed radical prostatectomy findings for 33 men lacking mpMRI-conspicuous prostate cancer (defined as Prostate Imaging Reporting and Data System [PI-RADS] scores 1–2) on pre-operative mpMRI. They found 27% (9/33) of men with negative mpMRI had Gleason Grade Group (GGG) 3–5 cancer at prostatectomy, including nine with extraprostatic extension, and one with Gleason grade 5 + 5 disease. Ostensibly, these findings are at odds with contemporary evidence in which mpMRI-invisible disease harbours reassuring molecular and histopathological features (i.e. overall GGG ≤ 2).[2,3] We believe that this discrepancy is attributable to certain methodological concerns, including quality of mpMRI acquisiton.[4]

Here, every included patient underwent post-biopsy mpMRI, despite guidelines now requiring mpMRI to precede biopsy.[1,2] In fact, the 14 men who underwent pre-biopsy mpMRI in this cohort were excluded from further analysis. The authors acknowledge post-biopsy haemorrhage contributed to disease inconspicuity in approximately one third of men (2–3/9) with high-grade disease, however, given this well-established phenomenon, this proportion may be higher.[5] As post-biopsy haemorrhage was accepted and incorporated into this study, it is possible that other radiological features (e.g. background patchy/diffuse patterns) may have contributed to reduced tumour conspicuity.

In addition to mpMRI quality, other aspects of this study warrant scrutiny. Of note, 45% (15/33) of men had grade reclassification from random 12-core transrectal ultrasound (TRUS)-guided biopsy to radical prostatectomy (18% downgraded, 27% upgraded). This effect may be attributable to an imperfect refence standard (random TRUS-guided biopsy) which demonstrably overlooks significant cancer approximately half the time.[2] Furthermore, whilst mpMRI were scored according to PI-RADSv2.1 guidelines, it seems unusual that men with ‘negative’ mpMRI had such high prostate specific antigen densities (PSAD; e.g. 1.08, 0.48 and 0.22 ng/mL/mL) which, in other settings, may have raised radiological suspicion. Unfortunately, a number of key details are missing to fully appraise this study including, biopsy core length, tumour size at prostatectomy, age of MRI machines, number of reporting radiologists and their experience in prostate mpMRI reporting (i.e. how many prostate MR scans per year), all of which impact upon tumour detection on mpMRI. Lastly, in their discussion, the authors cite the Prostate MRI Study (PROMIS), proposing that a 10% non-detection rate of significant disease by mpMRI is a “considerable risk,” however, they do not quote the false negative rate of systematic TRUS-guided biopsy (their own reference standard), which had a non-detection rate of over 50%, in the same study.[2]

Collectively, we should work toward optimal mpMRI-directed pathway delivery, at every juncture, including scan acquisition, reporting, and biopsy. In an attempt to standardise mpMRI quality, the Prostate Imaging Quality (PI-QUAL) score was developed, based on a 1-to-5 Likert scale derived from evaluation of each sequence, against objective quality

criteria in line with the PI-RADSv2 recommendations.[4] Work is currently underway to evaluate effects of PI-QUAL on tumour conspicuity, however, we hope that this scheme provides a starting point for centres to evaluate quality of mpMRI delivery. Alanee and colleagues should be congratulated for adding to the mpMRI literature, expounding links between histopathology and radiology, however, we believe their findings should be cautiously interpreted in light of the methodological issues highlighted here. We agree that long-term ramifications of mpMRI conspicuity remain pressing avenues for future research and we eagerly await results of ongoing work.

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