Title:

A dedicated Prostate MRI teaching course improves the ability of the Urologist to interpret clinically significant prostate cancer on multiparametric MRI

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Multiparametric MRI plays an increasingly important role in the diagnosis and treatment of men with prostate cancer. It is important for urologists to be able to interpret prostate MRI to a high standard so that they can carry out accurate targeted prostate biopsy and prostate cancer treatments[1]. The objectives of this study were to assess whether the accuracy of urologists in identifying the presence of clinically significant cancer based on a standardised multiparametric MRI set could be improved by completion of a two-day training course.

A two-day national training course in Prostate MRI for urologists was delivered in September 2016. Twenty-five urologists (17 attendings, 8 residents) independently reported 32 Prostate MRI scans under test conditions. Attendees had some prior exposure to prostate MRI but this ranged from very limited exposure to more substantial exposure. Scans were chosen at random from men who had previously undergone pre-biopsy MRI, transperineal template and targeted prostate biopsies at our institution[2]. MRIs included T2-weighted, diffusion-weighted and dynamic contrast-enhanced sequences. A test was carried out at the start of the course, where participants, blinded to pathology findings, recorded the likelihood of 16 MRIs harbouring clinically significant cancer (defined as Gleason grade 3+4 or greater and/or maximum cancer core length ≥4mm) on a 1-5 Likert scale of suspicion. Teaching was then given over two days in the form of lectures, practical reporting sessions and case based discussions on prostate MRI interpretation. At the end of the course the participants assessed a different set of 16 randomly chosen scans.

The primary outcome was the cohort's change in average area under the curve(AUC) for detection of clinically significant cancer before and after teaching. Receiver operating curves(ROC) were based on Generalized Linear Mixed Models with random effects on readers and cases. This approach generalizes the Obuchowski–Rockette method[3] and is described by Liu[4]. For each ROC curve and AUC value, 95% confidence interval was computed by stratified Bootstrap (B=50,000 samples) and adjusted percentile.

MRIs were carried out in men with no prior biopsy (14/32, 44%) or men with a prior negative biopsy (18/32, 56%). Mean age (63 vs 63, respectively), PSA (7.0 vs 7.0, respectively) and baseline characteristics were similar for men in the baseline and post-teaching tests. There was a significant improvement in average urologist AUC for detection of clinically significant cancer from baseline (0.60 [95% CI 0.55-0.65]) to post-teaching (0.77 [95% CI 0.72-0.82] (Figure 1). This was an improvement of 0.17 [95% CI 0.10-0.24], p <0.0001. Improvement in performance in prostate MRI interpretation following exposure to training has been demonstrated before in radiologists, but this is the first time it has been demonstrated in urologists[5]. AUC for the expert radiologist for the baseline test was 0.87 [95% CI 0.77-0.98] and for the post-teaching test was 0.88 [95% CI 0.77-0.98]. Strengths of the work include the random selection of MRIs and the verification of disease status using detailed transperineal prostate biopsies. Limitations include that it is not known whether the benefits of this training persist.

Whilst we require expert radiologists to report prostate MRI, this study has demonstrated that identification of clinically significant cancer on prostate MRI by urologists is improved following exposure to a two-day teaching course. These results would support efforts to integrate Prostate MRI teaching courses into the training of urologists managing patients with prostate cancer.

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