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3 | Evaluation of Fluorescent Confocal Microscopy for Intraoperative Analysis of Prostate Biopsy Cores

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ABSTRACT

Background: Diagnosis of prostate cancer is based on histopathological evaluation, which is time-consuming. Fluorescent confocal microscopy (FCM) is a novel technique that allows rapid tissue analysis.

Objective: To determine if FCM could be used for real-time diagnosis of prostate cancer and evaluate concordance with traditional analysis.

Design, setting, and participants: From January 2019 to March 2020, 182 magnetic resonance imaging-targeted prostate biopsy cores from 57 consecutive biopsy-naïve men with suspected prostate cancer were taken. These were intraoperatively stained with acridine orange for analysis using FCM (VivaScope; MAVIG, Munich, Germany) and subsequently sent for traditional haematoxylin-eosin histopathological (HEH) examination. Two expert uropathologists analysed the FCM and HEH cores blinded to the counterpart results in a single institution.

Outcome measurements and statistical analysis: Agreement between FCM and HEH analysis in terms of the presence of cancer was analysed at biopsy core and region of interest (ROI) levels, considering HEH as the reference test.

Results and limitations: FCM allowed intraoperative assessment of prostate biopsy cores with strong histopathological evaluation agreement: Cohen's ? for agreement was 0.81 at the biopsy core level and 0.69 for the ROI level. Positive predictive values (85% and 83.78%) and negative predictive values (95.1% and 85.71%) were high at the biopsy core and ROI levels. These initial results are encouraging, but given the single-centre and preliminary nature of the study, further confirmation is required.

Conclusions: FCM allowed rapid evaluation of prostate biopsy cores. This technique is feasible and achieves rapid closure with a reliable diagnosis, parallel to the gold standard analysis. Initial results are promising but further studies are needed to validate and define the role of this technique.

Patient summary: A novel microscopic technique reduces the time needed to obtain a prostate cancer diagnosis by speeding up biopsy processing. Although the initial results are promising; this development needs to be confirmed in further studies.

Keywords: Confocal microscopy; Prostate cancer; Prostate cancer diagnosis.

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