INPLASY

The diagnostic performance of tumor stage on MRI for predicting prostate cancer–positive surgical margins: A systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 04 July 2023 and was last updated on 04 July 2023.

INTRODUCTION

Review question / Objective We aimed to conduct a meta-analysis of the diagnostic value of high clinical tumor stage (≥3) determined from magnetic resonance imaging (MRI) for predicting PSMs in men undergoing RP.

Condition being studied According to the latest data for 2021, prostate cancer is the most prevalent cancer among men, making it the second leading cause of death . Although radical prostatectomy (RP) is the recommended treatment for prostate cancer,20% of individuals who have RP surgery experience positive surgical margins (PSMs) that are detected by pathology. This is a recognized negative prognostic indicator for PCa. PSMs are generally defined as tumor cells reaching the inked surgical margin of the prostatectomy specimen. PSMs are associated with local disease recurrence and distant metastasis, which may necessitate secondary treatment. Therefore, a preoperativetest for predicting clinically meaningful PSMs would be important in optimizing patients who require intraoperative frozen analysis or adjuvant treatment for obtaining better tumor control and avoiding unfavorable functional outcomes.

METHODS

Participant or population 3924 patients after radical prostate cancer surgery.

Intervention Tumor staging on preoperative magnetic resonance.

Comparator pathological positive surgical margins.

Study designs to be included Diagnostic tests.

Eligibility criteria (1) accuracy was as- 80sessed for PSMs using non-organ–localized diseases observed on MRI as the index test among PCa patients, (2) Histopathology of RP specimens served as the reference standard, (3) studies with enough information to develop a 2×2 table to evaluate the diagnostic accuracy, and (4) the article type was "original article" or equivalent.

Information sources PubMed, the Cochrane Library, and Embase.

Main outcome(s) The pooled sensitivity and specificity values were 0.40 (95% CI, 0.32–0.49) and 0.75 (95% CI, 0.69–0.80), respectively, with an area under the receiver operating characteristic curve of 0.63 (95% CI, 0.59–0.67). The Higgins I2 statistics indicated moderate heterogeneity in sensitivity (I2=75.59%) and substantial heterogeneity in specificity (I2=86.77%). Area, prevalence of high Gleason scores ($\geq$7), laparoscopic or robot assisted techniques, field strength, functional technology, endorectal coil usage and number of radiologists were significant factors responsible for heterogeneity ($p \leq 0.01$).

Quality assessment / Risk of bias analysis Quality Assessment of Diagnostic Accuracy Studies 2 tool.

Strategy of data synthesis All analyses using Stata 17.0 (StataCorp, College Station, TX, USA), with $p < 0.05$ denoting statistical significance.

Subgroup analysis The covariates included: (1)study design (retrospective vs prospective), (2) area (Asia vs non-Asia), (3) use of minimally invasive techniques (laparoscopic vs non-laparoscopic) and robot assistance (robot assisted vs not robot assisted), (4) prevalence of high Gleason scores ($\geq$7) on biopsy ($\geq$50% 112vs <50%), (5) magnetic field strength (3 T vs not 3 T), (6) use of endorectal coils (ERCs), (7)functional MRI technology (MRI sequences using apparent diffusion coefficients and dynamic contrast enhancement [DCE] vs not), and (8) the number of radiologists (multiple vs single).

Sensitivity analysis Sensitivity analysis was not used.

Country(ies) involved China.

Keywords Prostate cancer; Magnetic resonance imaging; positive surgical margin; Meta-analysis; Systematic review.

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