INPLASY

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Predictive value of multiparametric magnetic resonance imaging (T2-weighted imaging and apparent diffusion coefficient) for pathological grading of prostate cancer: a meta-analysis

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ADMINISTRATIVE INFORMATION

INTRODUCTION

Review question / Objective This meta-analysis aimed to evaluate the predictive value of multiparametric magnetic resonance imaging (mpMRI), specifically T2-weighted imaging (T2WI) and apparent diffusion coefficient (ADC) maps, in the pathological grading of prostate cancer.

Condition being studied Eligible studies evaluated the use of mpMRI (including T2WI and ADC) for prostate cancer detection or grading, included a comparison group, reported outcomes in terms of areas under the curve (AUC), sensitivity, specificity or prostate cancer detection rates, involved human subjects and were published in English or Chinese.

METHODS

Search strategy The search strategy employed a combination of Medical Subject Headings terms and keywords related to magnetic resonance imaging and prostate cancer. The specific search terms included variations of 'Magnetic Resonance Imaging', 'NMR Imaging', 'Zeugmatography', 'fMRI', 'Functional Magnetic Resonance Imaging', 'MRI Scans', 'Spin Echo Imaging' and 'Magnetic Resonance Image' for the imaging modality. These were combined with terms related to prostate cancer, including 'Neoplasms, Prostatic', 'Prostate Cancer' and 'Cancer of Prostate'.

Participant or population Patients who are waiting to be diagnosed with Prostate Cancer.

Intervention Magnetic Resonance Imaging (mpMRI).

Comparator Not applicable.

Study designs to be included Controlled trial.

Eligibility criteria This systematic review employed specific inclusion and exclusion criteria to ensure the relevance and quality of the included studies. Eligible studies evaluated the use of mpMRI (including T2WI and ADC) for prostate cancer detection or grading, included a comparison group, reported outcomes in terms of areas under the curve (AUC), sensitivity, specificity or prostate cancer detection rates, involved human subjects and were published in English or Chinese. Studies were excluded if they were case reports, reviews or conference abstracts, focused solely on other imaging modalities or MRI sequences, lacked a clear comparison group or provided insufficient data for quantitative analysis.

Information sources PubMed, the China National Knowledge Infrastructure (CNKI), Web of Science, Springer Link and Cochrane Library.

Main outcome(s) The included studies utilised various MRI parameters, with all studies incorporating T2WI and ADC maps. Some studies also included additional parameters, such as DCE imaging and DWI. a significant improvement in diagnostic performance with mpMRI. mpMRI significantly improved the detection rate of prostate cancer.

Quality assessment / Risk of bias analysis The risk of bias in the included studies was assessed using the Cochrane Collaboration's tool for assessing risk of bias in randomised trials. This tool evaluates seven domains: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting and other biases. Each domain was categorised as low risk, unclear risk or high risk of bias.

Strategy of data synthesis Meta-analyses were performed using Review Manager 5.3 software. For continuous outcomes (AUC), the mean difference with 95% confidence interval (CI) was calculated. For dichotomous outcomes (prostate cancer detection rates), odds ratios (ORs) with 95% CI were computed.
The inverse variance method with random-effects models was used to account for potential heterogeneity among studies. Heterogeneity was assessed using the I^2 statistic, with I^2 values of 25%, 50% and 75% considered as low, moderate and high heterogeneity, respectively. Forest plots were generated to represent the results of the meta-analyses visually. Funnel plots were created to assess potential publication bias. All statistical tests were two-sided, with a p-value of <0.05 considered statistically significant.

Subgroup analysis The limited number of studies meeting our inclusion criteria precluded subgroup analysis.

Sensitivity analysis Not applicable.

Country(ies) involved China - The Second People's Hospital of Lianyungang.

Keywords Prostate cancer; multiparametric magnetic resonance imaging; T2-weighted imaging; apparent diffusion coefficient; pathological grading.

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