Role of magnetic resonance imaging in the detection of local prostate cancer recurrence after external beam radiotherapy and radical prostatectomy.

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Abstract

AIMS: To carry out a meta-analysis to assess the effectiveness of magnetic resonance imaging (MRI) during the follow-up of patients with prostate cancer after undergoing external beam radiotherapy (EBRT) or radical prostatectomy.

MATERIALS AND METHODS: MEDLINE, EMBASE and other databases were searched for relevant original articles published from January 1995 to October 2011. Methodological quality was assessed using the Quality Assessment of Diagnostic Accuracy Studies (QUADAS) tool. Pooled estimation and subgroup analysis data were obtained by statistical analysis.

RESULTS: Fourteen of 768 initially identified studies were included in the meta-analysis. Seven studies examining patient after radical prostatectomy had a pooled sensitivity and specificity on the patient level of 82% (95% confidence interval 78-86%) and 87% (95% confidence interval 81-92%), respectively. In the subgroup analysis, compared with T2-weighted imaging (T2WI), dynamic contrast-enhanced (DCE) MRI showed higher pooled sensitivity (85%, 95% confidence interval 78-90%) and specificity (95%, 95% confidence interval 88-99%). DCE MRI combined with magnetic resonance spectroscopic imaging (1H-MRSI) had the highest pooled sensitivity (92%, 95% confidence interval 83-97%). Nine studies examining men after EBRT had a pooled sensitivity and specificity on the patient level of 82% (95% confidence interval 75-88%) and 74% (95% confidence interval 64-82%), respectively. Compared with T2WI, DCE MRI showed higher pooled sensitivity (90%, 95% confidence interval 77-97%) and specificity (81%, 95% confidence interval 64-93%). DCE combined with 1H-MRSI had the highest pooled specificity (90%, 95% confidence interval 56-100%). The pooled sensitivity and specificity on sextant analysis was 58% (95% confidence interval 53-64%) and 85% (95% confidence interval 82-88%), respectively. DCE MRI showed the highest pooled sensitivity: 71% (95% confidence interval 60-80%).

CONCLUSION: A limited number of small studies suggest that MRI can accurately detect local recurrences after EBRT and radical prostatectomy. DCE MRI is particularly accurate. The addition of MRSI to DCE MRI can significantly improve the diagnostic accuracy of local prostate cancer recurrence. The eventual role of 1H-MRSI alone remains controversial and needs to be defined further.

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