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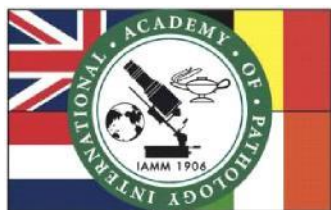
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Title

The MERCURY II Study: Prospective validation of a low rectal cancer assessment system using magnetic resonance imaging, and development of a local recurrence risk stratification model

Abstract Text

Purpose of the study: Surgery for low rectal cancer is associated with poorer oncological outcomes. There is a high rate of pathological circumferential resection margin (pCRM) involvement and unacceptable variations in permanent colostomies. This study aimed to validate a pre-operative magnetic resonance imaging (MRI) assessment system that determined the relationship between the tumour and the low rectal cancer surgical resection plane (mrLRP). Methods: MERCURY II was a prospective, observational, multicentre study that recruited 279 patients with adenocarcinoma 6  cm or less from the anal verge between 2008 and 2012. Patients underwent routine pre-operative MRI, and were assessed according to the following criteria: mrLRP "safe" or "unsafe," extramural venous invasion (mrEMVI), depth of spread, lymph node status, tumour height, and tumour quadrant. MRI-based treatment recommendations were compared against final management and pCRM outcomes. Summary of results: Overall pCRM involvement was 9.0% (95% CI 5.9 to 12.3). Patients with no adverse MRI features and a "safe" mrLRP underwent sphincter-preserving surgery without pre-operative radiotherapy with a pCRM rate of 1.6%. The pCRM rate increased for an "unsafe" compared with "safe" pre-operative mrLRP (OR 5.5; 95% CI 2.3 to 13.3). Post-treatment MRI reassessment indicated a "safe" ymrLRP in 33 of 113 (29.2%), none of whom had ypCRM involvement. In contrast, persistent "unsafe" ymrLRP resulted in 17.5% ypCRM involvement. Other independent MRI assessed risk factors were EMVI (OR 3.8; 1.5 to 9.6), tumors less than 4  cm from the anal verge (OR 3.4; 1.3 to 8.8), and anterior tumors (OR 2.8; 1.1 to 6.8). Conclusions: The study validated MRI low rectal plane assessment, significantly reduced pCRM involvement (previously 30%) and avoided overtreatment through selective preoperative therapy and rationalised use of permanent colostomy. Acknowledgements: NW is supported by a Pathsoc Career Development Fellowship.