A diagnostic accuracy meta-analysis of endoanal ultrasound and MRI for perianal fistula assessment


CRD summary
This review concluded that magnetic resonance imaging (MRI) and endoanal ultrasound had comparable sensitivities for detecting perianal fistulas. Specificity for MRI was higher, but was poor for both technologies. Given some limitations of the review and the rapid advances in imaging technology since the included studies were published, the reliability and generalisability of the results is uncertain.

Authors' objectives
To compare endoanal ultrasound with magnetic resonance imaging (MRI) for the detection of perianal fistulas prior to undertaking an appropriate surgical intervention.

Searching
PubMed, EMBASE, CINAHL and The Cochrane Library were searched without language restrictions from 1970 to October 2010; search terms were reported.

Study selection
Studies that compared MRI with endoanal ultrasound in patients with suspected perianal fistula were eligible for inclusion, regardless of pathology. To be included, studies had to use both technologies, and use a reference standard in all patients. The primary outcome was fistula detection.

Most studies used examination under anaesthetic as the reference standard. The included studies used 0.5 or 1.0 Tesla MRI, and 7MHz or 10MHz transducer ultrasound. Most of the ultrasound were conducted with a rotating endoprobe. Participants age ranged from 17 to 76, 22% to 44% had primary fistulas and 4% to 100% had Crohn's disease.

The authors did not state how many reviewers performed the study selection.

Assessment of study quality
Study quality was assessed using the 14-point QUADAS tool. The authors did not state how many reviewers assessed study quality.

Data extraction
Data were extracted to produce 2x2 tables of test performance on a per fistula basis. Sensitivity and specificity with 95% confidence intervals (CI) were calculated.

Two independent reviewers extracted data which was checked by a third.

Methods of synthesis
Pooled estimates of sensitivity and specificity were calculated with 95% confidence intervals; the model used was not reported. At least four studies had to report an outcome before pooling was conducted. Heterogeneity was assessed using $I^2$.

Results of the review
Four studies were included in the review (481 fistulas). Of the four studies, all recruited a representative population, used an appropriate reference standard, avoided partial and differential verification bias, blinded interpreters of the index test and avoided clinical review bias. Three were prospective, three avoided progression bias, two avoided incorporation bias and one blinded interpreters of the reference standard. None of the studies reported uninterpretable results or explained withdrawals.

For MRI, the pooled sensitivity for fistula detection was 87% (95% CI 63 to 96; $I^2$ 93%) and specificity was 69% (95% CI...
CI 51 to 82; I² 0%). For endoanal ultrasound, the pooled sensitivity was 87% (95% CI 70 to 95; I² 92%) and specificity was 43% (95% CI 21 to 69; I² 49%). Results for subgroups of different types of fistula were also reported.

Authors' conclusions
MRI and endoanal ultrasound have comparable sensitivities for detecting perianal fistulas; specificity for MRI was higher, but was poor for both technologies.

CRD commentary
The review addressed a clear question with reproducible inclusion criteria. Several relevant sources were searched, but it appeared that unpublished studies were not specifically sought. Diagnostic filters did not appear to have been used in the search strategy, which ensured studies were not missed on this basis. Data extraction was conducted in duplicate, but it was unclear whether similar methods were used to reduce error and bias during study selection or the quality assessment. Study quality was assessed using appropriate criteria, and results were published in full. Data were analysed in a per fistula basis, rather than per patient basis, which may impact on the overall estimates of test accuracy.

The pooled estimates of sensitivity and specificity were derived from analyses that did not maintain the relationship between these measures, and the heterogeneity observed was not investigated. The included studies were published between 1999 and 2004, and used MRI with Tesla strength of 1.0 or below; this is much lower than is commonly used in current clinical practice. There have also been rapid advances in other imaging technology since these studies, including ultrasound, so the results may not be generalisable to current practice.

Implications of the review for practice and research
Practice: The authors stated that endoanal ultrasound may be acceptable when MRI is unavailable or when contraindicated.

Research: The authors suggested that the large heterogeneity of the current evidence warrants further research to characterise the best modality for imaging of perianal fistulation. The authors go on to suggest that further prospective studies focusing on complex fistula assessment of different origins were required, and that the QUADAS criteria should be considered when designing such studies.

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