Fecal calprotectin in pediatric inflammatory bowel disease: a systematic review
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CRD summary
This review concluded that fecal calprotectin could be used for supporting diagnosis or confirming relapse of inflammatory bowel disease in children. There were several limitations of this review and uncertainties about data reliability from the included studies. The value of the often-wide ranges of accuracy estimates reported in terms of reliability and generalisability is not clear.

Authors’ objectives
To assess the accuracy of faecal calprotectin for identifying and monitoring children with inflammatory bowel disease (IBD).

Searching
MEDLINE and EMBASE were searched without diagnostic filters for studies published in English to October 2011; search terms were reported.

Study selection
Studies that evaluated the accuracy of faecal calprotectin in children (up to 18 years old) with IBD were eligible for inclusion. Case reports were excluded. Most of the studies were in children receiving treatment for IBD. The most commonly used cutoffs for faecal calprotectin were 50 and 100μg/g. Where reported, the mean/median faecal calprotectin level ranged from 214 to 32,450μg/g. No further population details were reported.

The authors did not state how many reviewers selected studies for the review.

Assessment of study quality
It appeared that there was no systematic assessment of study quality.

Data extraction
Data were extracted to produce 2x2 tables of test performance. Sensitivity, specificity and positive and negative likelihood ratios (LR+/-) were calculated. Where faecal calprotectin was measured more than once, only data from the beginning of the study were extracted.

The authors did not state how many reviewers extracted data.

Methods of synthesis
Studies were combined in a narrative synthesis organised by type of IBD. Study details and results were tabulated.

Results of the review
Thirty-four studies were included in the review. Most of the included studies were case-control studies. Thirty-eight of the 78 datasets had no control children; it was unclear whether these studies were unselected cohorts or restricted to children with IBD.

In children with any type of IBD (2,570 children, range 17 to 626), sensitivity of faecal calprotectin ranged from 12.5% to 100%, specificity ranged from 58.3% to 100%, positive likelihood ratio ranged from 1.1 to 34.9 and negative likelihood ratio ranged from 0 to 1. In children with newly diagnosed IBD, sensitivity ranged from 73.5% to 100%, specificity ranged from 65.9% to 100%, positive likelihood ratio ranged from 2.8 to 34.9 and negative likelihood ratio ranged from 0 to 3. In children with established IBD and being treated, sensitivity ranged from 12.5% to 100%, specificity ranged from 58.3% to 100%, positive likelihood ratio ranged from 1.1 to 5 and negative likelihood ratio ranged from 0 to 1.

In children with ulcerative colitis (857 children, range 10 to 128), sensitivity of faecal calprotectin ranged from 30% to 100%, specificity from 65.9% to 93.5%, positive likelihood ratio ranged from 1 to 14, and negative likelihood ratio
ranged from 0 to 1. In children with newly diagnosed IBD, sensitivity ranged from 75% to 100%, specificity from 65.9% to 92.9%, positive likelihood ratio from 2.4 to 14, and negative likelihood ratio from 0 to 0.4. In children with established IBD and being treated, sensitivity ranged from 30% to 100%, specificity from 69.2% to 80%, positive likelihood ratio ranged from 1 to 5 and negative likelihood ratio ranged from 0 to 1.

In children with Crohn's disease (956 children, range 12 to 86), sensitivity of faecal calprotectin ranged from 50% to 100%, specificity ranged from 58.3% to 100%, positive likelihood ratio ranged from 1.6 to 14 and negative likelihood ratio ranged from 0 to 0.7. In children with newly diagnosed IBD, sensitivity ranged from 93.3% to 100%, specificity ranged from 65.9% to 92.9%, positive likelihood ratio ranged from 2.9 to 14 and negative likelihood ratio ranged from 0 to 0.1. In children with established IBD and being treated, sensitivity ranged from 50% to 100%, specificity ranged from 58.3% to 100%, positive likelihood ratio ranged from 1.6 to 5 and negative likelihood ratio ranged from 0 to 0.7.

Results were given for patients with active or inactive IBD. Results were reported for 50 and 100μg/g cutoffs for faecal calprotectin separately; where there was a difference in the estimates of accuracy, these tended to favour the 50μg/g cutoff.

Authors' conclusions
Faecal calprotectin could be used for supporting diagnosis or confirming relapse of inflammatory bowel disease in children. Although high sensitivity meant a positive result could be confirmatory of a diagnosis of or relapse in inflammatory bowel disease, specificity was moderate and a negative result should not exclude inflammatory bowel disease.

CRD commentary
The review addressed a clear question supported by reproducible inclusion criteria. Relevant databases were searched. Diagnostic filters were not used during the electronic search. The search strategy appeared to include only North American versions of several terms, there was no search for unpublished studies and only studies in English were included so it was likely that some studies were missed. It was unclear whether any efforts were made to reduce the risk of error and bias during the review process. The quality of the included studies was not assessed so the reliability of results from these studies could not be determined; poor study design (such as lack of blinding of interpreters of test results) can lead to over-estimations of test accuracy.

Many of the included studies were very small and it was unclear whether any matched cases and controls where this design was used. There appeared to be substantial clinical heterogeneity across the included studies. Methods are available to produce summary estimates of sensitivity and specificity using such data, allowing covariates to be included in the analyses. The impact of heterogeneity was not explored except for types of IBD and cutoffs for the faecal calprotectin. Few study details and population characteristics were reported so the full extent of methodological and clinical heterogeneity could not be determined. Therefore, the value of the ranges of accuracy estimates (which were often extremely wide) in terms of both reliability and generalisability is unclear.

Implications of the review for practice and research
Practice: The authors stated that the faecal calprotectin test could be used complementarily to other methods before paediatric patients underwent gastrointestinal endoscopy. They also stated that faecal calprotectin could be used in cases of suspected IBD for supporting diagnosis and in cases of already known IBD for confirming relapse and that the proper cut-off point seemed to be 50μg/g.

Research: The authors did not state implications for research.

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None reported.

Bibliographic details

PubMedID
Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.