Detection of secretory IgA antibodies against gliadin and human tissue transglutaminase in stool to screen for coeliac disease in children: validation study

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Abstract

Objective To evaluate two commercial stool tests for detection of secretory IgA antibodies against gliadin and human tissue transglutaminase for diagnosis of coeliac disease in children with symptoms.

Setting Tertiary care children’s hospital.

Participants Coded stool samples from 20 children with newly diagnosed coeliac disease and 64 controls. Six children with coeliac disease had stool tests every two weeks for three months after starting a gluten-free diet.

Main outcome measures Secretory IgA antibodies against gliadin and human tissue transglutaminase in stool samples, determined in duplicate by using recommended cut-off limits.

Results Sensitivity of faecal antibodies against human tissue transglutaminase was 10% (95% confidence interval 1% to 32%), and specificity was 98% (91% to 100%). For antibodies against gliadin, sensitivity was 6% (0% to 29%) and specificity was 97% (89% to 100%). Optimisation of cut-off limits by receiver operating characteristic analysis and use of results of both tests increased sensitivity to 82%, but specificity decreased to 58%. All follow-up stool tests remained negative, except for two positive anti-gliadin results in one patient, six and 10 weeks after the gluten-free diet was started.

Conclusions Neither stool test was suitable for screening for coeliac disease in children with symptoms.

Introduction

Serological screening for antibodies against gliadin, endomysium, or tissue transglutaminase before the diagnostic biopsy is done is well established practice in patients with suspected coeliac disease. These antibodies can be detected in faecal supernatants, and commercial stool tests have been developed and offered by many laboratories. However, no validation data on these tests have been published. We evaluated two stool tests (Immundiagnostik GmbH, Bensheim, Germany) in comparison with serological results and duodenal histology as “gold standard” in children who had had upper endoscopy for different abdominal conditions.

Methods

The study cohort consisted of 20 children with newly diagnosed coeliac disease (median age 5.4 (range 0.9-14.1) years), all with duodenal villous atrophy (Marsh III) plus positive endomysium antibodies in serum, and 64 control children (5.6 (0.9-17.5) years) with normal histology (Marsh 0) and negative endomy-
New commercial stool tests are promoted for non-invasive screening of patients suspected of having coeliac disease, but these tests have not been validated.

**What this study adds**

Determination of faecal IgA antibodies against gliadin and human tissue transglutaminase failed to detect symptomatic coeliac disease in children.

only adequately validated diagnostic tests should be reimbursed by health insurance.

Contributors: MK designed the study, did statistical analysis, and wrote the manuscript with SK. SK-E helped with the study design and supervised the test procedures in the laboratories. VD helped HZ to do the stool tests, collected clinical data from CRF, helped with the statistical analysis, and recruited the coeliac patients for the follow-up part of the study. HZ did the stool tests. SK is the study coordinator and guarantor, designed the study protocol, and wrote the final manuscript with MK.

Funding: Immundiagnostik, Bensheim, Germany provided test kits for antibody determinations in stool samples. Otherwise, the company gave no financial support for the study, except for reimbursement of travel costs to MK, who reported the results at two scientific meetings. Immundiagnostik was not involved in the study design, the collection and interpretation of data, the writing of the report, or the decision to submit the paper for publication.

Competing interests: MK has been reimbursed by Immundiagnostik, the manufacturer of the test system, for attending two conferences. All other authors: none declared.

Ethical approval: The ethical committee of the Ludwig Maximilians University approved the use of anonymised frozen stool and serum samples for the purpose of this study.


(Accepted 8 November 2005)
doi 10.1136/bmj.38688.654028.AE.

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Results of individual stool samples: (A) secretory IgA antibodies against gliadin from 17 patients with coeliac disease and 61 control children with gastrointestinal diseases other than coeliac disease but normal duodenal histology; (B) secretory IgA antibodies against human tissue transglutaminase from 20 patients with coeliac disease and 62 controls. Marked cut-off value of 100 U/l suggested by manufacturer. Values <1 U/l plotted as 1 U/l.