# Screening for occult gastrointestinal bleeding in hospital patients[1]

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**Summary:** Stools have been tested for occult gastrointestinal bleeding in 278 outpatients and 170 hospital inpatients using the Haemoccult and Haemastix methods. Seventeen outpatients (6.1%) and 42 inpatients (24.7%) were positive with the Haemoccult technique. Thirty-three outpatients (11.9%) and 93 inpatients (54.7%) were positive with the Haemastix test. Following investigation of the Haemoccult-positive patients, only 2 cases (3.4%) were considered false positives. However, the false positive rate with Haemastix was 22.9% which is unacceptable in a screening test. Haemoccult may be useful as a screening test for asymptomatic general practice patients, but a test of greater sensitivity is needed for hospital patients.

## Introduction

Methods of screening for asymptomatic cancers of the colon and rectum are now under intensive investigation in many parts of the world (Winawer 1980, Winawer *et al.* 1976, 1977, Songster *et al.* 1980, Jaffe & Zierdt 1979). Screening for occult blood in the stool with laboratory-based occult blood tests is impractical, but in the last decade a number of simple slide tests have become available which utilize the pseudoperoxidase activity of haem, liberated from red cells in the stool. This enzyme reacts with a peroxide developer and oxidizes a chromogenic indicator, either guiac or orthotolodine, to a blue colour. Patients collect their own stool specimens and a doctor or nurse without special laboratory experience can perform the test (Adlercreutz *et al.* 1978).

There is considerable controversy about the value of these tests in the diagnosis of cancers of the colon and rectum (Ribet *et al.* 1980, Gnauck 1980, Heinrich 1980). Experience with these techniques in hospital practice in the United Kingdom is limited. We have carried out a preliminary study in hospital patients using two tests with different sensitivities: the orthotolidine based Haemastix (Ames Ltd, Stoke Poges, Slough, Buckinghamshire) which is thought to detect 1.0–2.5 ml blood lost into the gastrointestinal tract /24 hours (Ross & Gray 1964); and a more recent guaiac product Haemoccult (Eaton Laboratories, Woking, Surrey), which is claimed to detect 10–30 ml blood loss/day (Fruhmorgen 1978). The aim of the study was to assess the value of these techniques in a hospital population where gastrointestinal bleeding is being sought.

## Patients and methods

*Inpatients*

Ninety-seven men and 73 women, with a mean age of 55 years (range 21–92 years),were studied. These were routine and emergency admissions to one ward with a general medical and gastrointestinal interest.

Stool was obtained on three consecutive days and tested by two house physicians in the following manner: two separate portions of each stool were taken and smeared on the 'windows' of the Haemoccult slide; from one of these portions a piece was smeared onto a

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Haemastix. If any blue colour appeared on the Haemastix, the test was considered positive. The Haemoccult slides were kept for 24 hours and 2 drops of peroxide developer were added to each window (without pre-wetting), and again the appearance of any blue colour was taken to indicate a positive result.

*Outpatients*

This group comprised 141 men and 137 women, with a mean age of 53 years (range 18–87 years), attending a general medical and gastrointestinal clinic.

At the first visit, stool obtained by rectal examination or at sigmoidoscopy was tested with Haemastix and Haemoccult as described above. The patients were given a pack containing three Haemoccult slides and were asked to use the slides on the three days prior to their next clinic visit, when the slides were read in exactly the same manner as for the inpatients by the physicians conducting the clinic. No dietary advice was given to either group and a high fibre intake was not prescribed. Specific enquiries were made about the ingestion of drugs known to cause gastrointestinal bleeding. Patients who failed to produce three completed slides, those with frank colonic bleeding, or those known to be hepatitis B surface antigen positive were excluded.

## Results

*Inpatients*

There were no significant differences between observers in the rates of positive results obtained.

Ninety-three patients (54.7%) were positive with Haemastix testing. Of these 49 (52.7%) could be considered false positives (Table 1). These were patients with mainly cardiac or neurological disease; they have been followed up for one year after discharge and have developed no gastrointestinal disease. Forty-two patients (24.7%) were positive to testing with Haemoccult (Table 1). A gastrointestinal bleeding source was found in all but one patient. Haemoccult failed to detect 3 patients with upper gastrointestinal bleeding who were Haemastix positive. Patients in whom upper gastrointestinal lesions were found did not have further colonic investigations performed.

*Outpatients*

Only 9 of these patients (3.2%) failed to return complete Haemoccult packs. Thirty-three subjects gave one or more positive tests with Haemastix (11.9%), although this group usually had only one test performed at the clinic, as the stool in the Haemoccult packs was unsuitable for testing with Haemastix. There was no overt gastrointestinal disease in 7 (21.2%) of the Haemastix-positive cases and none has developed a gastrointestinal lesion after one year of follow up. These must be considered false positives. The final diagnoses are shown in Table 2.

*Table 1. Diagnoses of inpatients with positive tests.*

| | Haemoccult positive | Haemastix positive |
|---|---|---|
| Carcinoma of the colon | 7 | 8 |
| Carcinoma of the stomach | 2 | 2 |
| Inflammatory bowel disease | 7 | 8 |
| Peptic ulcer and erosions | 12 | 12 |
| Bleeding varices | 2 | 3 |
| Ileal ulceration | 1 | — |
| Carcinoma of the oesophagus | — | 1 |
| Hepatic angiomata | 1 | — |
| Recurrent epistaxis | — | 1 |
| Cirrhosis | 4 | 4 |
| Alcoholic | 5 | 5 |
| False positive | 1 | 49 |
| Total | 42 | 93 |

*Table 2. Diagnoses of outpatients with positive tests*

| | Haemoccult positive | Haemastix positive |
|---|---|---|
| Carcinoma of the colon | 5 | 5 |
| Ulcerative colitis | 3 | 4 |
| Haemorrhoids | 3 | 3 |
| Carcinoma of the stomach | 1 | 2 |
| Peptic ulcer | 2 | 3 |
| Bleeding varices | 1 | 1 |
| Hepatitis A | 1 | 1 |
| Diverticular disease | — | 2 |
| Ileal ulcer | — | 1 |
| Hepatic angiomata | — | 1 |
| Alcoholic | — | 3 |
| False positive | 1 | 7 |
| Total | 17 | 33 |

Seventeen patients (6.1%) were positive with Haemoccult and all but one had a recognizable gastrointestinal lesion. Each patient with proven carcinoma of the colon or rectum was positive with Haemoccult, but one patient with an adenocarcinoma of the stomach was negative on Haemoccult testing but positive with Haemastix. Those patients with tumours of the colon were all diagnosed clinically, and following surgical excision each was classified as Duke's Stage C.

## Discussion

Extensive studies carried out in North America and Europe indicate that Haemoccult and similar tests may have a place in screening asymptomatic patients for colonic cancer (Fruhmorgen 1978, Greegor 1971, Glober & Peskoe 1974), although few controlled studies have been carried out. We have shown that these methods will also detect bleeding which appears to be from lesions higher in the gastrointestinal tract – a useful aid in hospital practice. False positive rates reported with Haemoccult vary from 0.5%–30% (Bassett & Goulstonk 1980, Hardcastle *et al.* 1980, Gnauck 1977, Bond & Gilbertsen 1977) depending on whether patients take a high fibre meat-free diet. Our false positive rate was only 2.3% even though no dietary advice was given, a factor which we think lowers compliance significantly. In our experience a positive test with Haemoccult indicates the need for intensive investigation of the gastrointestinal tract to identify the bleeding source. One patient with a carcinoma of the caecum gave repeated negative results with Haemoccult, emphasizing that a negative test does not exclude a colonic neoplasm. Colonic tumours may bleed intermittently or not at all and the distribution of blood in the stool may not be homogenous. Sampling errors may thus occur and underlie the importance of collecting at least two samples from three separate stools on consecutive days.

The Haemastix test is too sensitive to be of value as a screening instrument because of an unacceptably high false positive rate. This is in agreement with previous experience (Ross & Gray 1964). In our experience a vigorous rectal examination may provoke enough bleeding to produce a weakly positive result. Nevertheless, a repeatedly strongly positive Haemastix should be viewed with suspicion.

Haemoccult may be too insensitive to detect colonic lesions bleeding slowly or intermittently (Winawer 1980), and we are currently comparing it with a test of intermediate sensitivity in hospital patients where occult bleeding is suspected. However, Haemoccult's relative insensitivity may make it a more suitable test for screening asymptomatic patients for occult gastrointestinal bleeding in general practice, where it is essential to avoid too many false positive results (Hardcastle *et al.* 1980). Carefully performed, such tests should enable earlier diagnosis of gastrointestinal lesions. Long-term studies are needed to see if a significant improvement in prognosis results.

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