ORIGINAL ARTICLE

Use of fecal occult blood testing in hospitalized patients: Results of an audit

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BACKGROUND: The fecal occult blood test (FOBT), widely used as a colorectal cancer screening tool, continues to be used in hospitalized patients. However, the utility of this test for hospitalized patients is unclear.
OBJECTIVE: To assess FOBT use in a large urban regional health authority.
METHODS: Reports of all FOBTs performed between April 1, 2011 and March 30, 2012 from two academic and four community hospitals in Winnipeg (Manitoba) were extracted. Of 650 hospitalizations with a positive FOBT result and 1254 with a negative FOBT result, random samples of 230 and 97 charts, respectively, were reviewed. Information including demographics, admission diagnos(es), indication(s) for ordering the FOBT and clinical management was extracted.
RESULTS: Thirty-four percent (650 of 1904) of hospitalizations with an FOBT had a positive FOBT result. Family medicine physicians ordered approximately one-half of the reviewed FOBTs. The most common indication for ordering an FOBT was anemia. Of those with a positive FOBT, 66% did not undergo further gastrointestinal investigations. Of those with a positive FOBT and overt gastrointestinal bleeding and/or melena who underwent endoscopy, 60% had their endoscopy performed before the FOBT result being reported while 38% underwent their endoscopy ≥3 days after the stool sample was collected. There were minimal differences in clinical practices between academic and community hospitals.
CONCLUSIONS: The present study suggests that FOBT results in hospitalized patients may have little beneficial impact on clinical management. Hospital laboratories may be better served in directing resources to other tests.

Key Words: *Inpatients; Occult blood; Utilization*

La recherche de sang occulte dans les selles chez les patients hospitalisés : les résultats d'une vérification

HISTORIQUE : La recherche de sang occulte dans les selles (RSOS), généralisée comme outil de dépistage du cancer colorectal, continue d'être utilisée chez les patients hospitalisés, même si sa pertinence n'est pas claire dans cette population.
OBJECTIF : Évaluer la RSOS dans une grande régie régionale de la santé en milieu urbain.
MÉTHODOLOGIE : Les chercheurs ont extrait les rapports de toutes les RSOS effectuées entre le 1er avril 2011 et le 30 mars 2012 dans deux hôpitaux universitaires et quatre hôpitaux généraux de Winnipeg, au Manitoba. Sur les 650 hospitalisations dont le résultat de la RSOS était positif et 1 254 dont le résultat était négatif, ils ont analysé un échantillon aléatoire de 230 et 97 dossiers, respectivement. Ils en ont tiré les données démographiques, les diagnostics à l'admission, les indications pour demander une RSOS et la prise en charge clinique.
RÉSULTATS : Au total, 34 % des hospitalisés (650 sur 1 904) ayant subi une RSOS avaient obtenu des résultats positifs. Les médecins de famille avaient demandé environ la moitié des RSOS analysées. L'anémie était la principale indication. Chez les patients dont la RSOS était positive, 66 % n'avaient pas subi d'autres examens gastro-intestinaux. Parmi ceux dont la RSOS était positive, qui avaient des saignements gastro-intestinaux ou un méléna manifestes et avaient subi une endoscopie, 60 % l'avaient subie avant l'obtention des résultats de la RSOS, et 38 % au moins trois jours après la coproculture. Les pratiques cliniques différaient très peu entre les hôpitaux universitaires et les hôpitaux généraux.
CONCLUSIONS : D'après la présente étude, les résultats de la RSOS chez les patients hospitalisés auraient peu d'effets bénéfiques sur la prise en charge clinique. Les laboratoires des hôpitaux auraient avantage à orienter leurs ressources vers d'autres tests.

Although the fecal occult blood test (FOBT) was developed for use in the outpatient setting for colorectal cancer (CRC) screening, it continues to be used in hospitalized patients to detect gastrointestinal (GI) bleeding (GIB). However, several studies suggest that FOBT may have limited positive impact in hospitalized patients because it may not change management (ie, patients will undergo an endoscopy regardless of test results, such as those with obvious bleeding) or delay investigations while waiting for the result of the test (1-3). Inappropriate use of the FOBT can lead to unnecessary additional investigations (eg, colonoscopy), which carry their own risks and can limit the availability of such investigations for more appropriate indications.

Our health care region, the Winnipeg Regional Health Authority (WRHA), uses Hemoccult II Sensa (Beckman Coulter Inc, USA), a more sensitive version of the guaiac test. The utility of this test among hospitalized patients was not evaluated before its introduction. Furthermore, data regarding FOBT use among hospitalized patients in Canada are also lacking.

The objectives of the present study were to assess indications for ordering FOBTs in hospitalized patients, determine the potential utility of its use in the hospital setting, and assess the current clinical practice and management of hospitalized patients with a positive FOBT according to Hemoccult II Sensa.

METHODS

Reports of all FOBTs performed between April 1, 2011 and March 30, 2012 from the laboratory databases of both the academic and all four community hospitals in Winnipeg, Manitoba (population 723,491 [4]) were extracted. A single regional health authority (WRHA) administers all hospitals in Winnipeg. All of the hospital laboratories in the WRHA exclusively use Hemoccult II Sensa.

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TABLE 1
Description of positive and negative fecal occult blood test patients

	Fecal occult blood test	
	Positive (n=230)	Negative (n=97)
Sex		
Male	111 (48)	47 (49)
Female	119 (52)	50 (51)
Age, years, median (interquartile range)	76 (67–85)	75 (65–85)
Admission site		
Academic hospitals	105 (46)	27 (28)
Community hospitals	125 (54)	70 (72)
Comorbidities*		
Heart disease	94 (41)	44 (45)
Chronic obstructive pulmonary disease	46 (20)	11 (11)
Dementia	40 (17)	13 (13)
Active malignancy	32 (14)	4 (4)
Liver disease	21 (9)	5 (5)
Documented family history of CRC	3 (1)	0 (0)
Documented digital rectal examination	46 (20)	5 (5)
Medications†		
Acetylsalicylic acid	78 (33)	36 (37)
Vitamin C	37 (16)	5 (5)
Warfarin	36 (16)	2 (1)
Clopidogrel	20 (9)	7 (7)
Selective serotonin reuptake inhibitor	15 (7)	10 (10)
Nonsteroidal anti-inflammatory drug(s)	13 (6)	5 (5)

*Data presented as n (%) unless otherwise indicated. *Some patients had more than one comorbidity; †Some patients were taking more than one medication. CRC Colorectal cancer*

Of the 650 admissions with at least one positive FOBT result in the study time period, a random sample of 230 (approximately 35%) was selected.

During the same time period, there were 1254 admissions with a negative FOBT (with no concomitant positive FOBT). For comparison with those with a positive FOBT, a random sample of 97 (approximately 8%) of the patients with negative FOBT was selected. The focus was on individuals with a positive FOBT. Of those with multiple positive FOBTs, information circa the first positive result was abstracted.

Information including demographics, admission service (eg, internal medicine [IM]), admission diagnos(es), indication(s) for ordering the FOBT, diet orders, medications that could affect FOBT and clinical management of the patients (including performance of rectal examination and/or GI endoscopy) was extracted by a trained experienced nurse auditor (LK) and/or an IM resident (SI). Laboratory data collected include hemoglobin (Hb) values, coagulation values and iron studies before stool specimen collection. The types of consultation service input (gastroenterology, surgery and hematology) sought were also gathered. If an endoscopy was performed, findings were recorded. The day on which the FOBT was reported (with respect to the day the stool specimen was collected) was recorded to determine the relative timing of initiating a consultation or investigations and the reporting of FOBT results.

Also assessed was whether investigations were delayed while potentially waiting for FOBT reporting (eg, ≥3 days after ordering of FOBT among individuals in whom investigations for overt GIB were indicated irrespective of FOBT results). The prevalence of significant findings on endoscopy (eg, mass, actively bleeding lesions, etc) were assessed among individuals with a positive FOBT result and determined whether there were other indications (eg, iron deficiency anemia [IDA]) that should have resulted in endoscopy in those with clinically significant findings irrespective of the FOBT results.

TABLE 2
Medical specialty of the physician ordering fecal occult blood test

	Fecal occult blood test	
Specialty	Positive (n=230)	Negative (n=97)
Family medicine	104 (45)	54 (56)
Internal medicine	43 (19)	19 (20)
Orthopedics	23 (10)	6 (6)
Intensive care	19 (8)	0 (0)
Psychiatry	8 (4)	5 (5)
General surgery	8 (4)	3 (3)
Nephrology	8 (4)	2 (2)
Cardiology	4 (2)	3 (3)
Neurosurgery	3 (1)	0 (0)
Cardiac surgery	2 (1)	1 (1)
Oncology	2 (1)	0 (0)
Gynecology	2 (1)	0 (0)
Respiratory medicine	2 (1)	0 (0)
Gastroenterology	1 (1)	1 (1)
Vascular surgery	1 (1)	0 (0)
Emergency medicine	0 (0)	1 (1)
Plastic surgery	0 (0)	1 (1)

Data presented as n (%)

Comparisons between the positive FOBT and negative FOBT groups were performed using Fisher's exact test using GraphPad Prism (GraphPad Inc, USA). Potential differences in FOBT ordering practices and clinical management among different admitting specialties, as well as differences between academic and community hospitals, were assessed. Statistical significance was set at $P<0.05$ (two-tailed).

The present study was approved by the Research Ethics Board of the University of Manitoba (Winnipeg, Manitoba).

RESULTS

Demographic characteristics

There were 1904 hospitalizations with ≥1 FOBT(s) performed; of these, 34% (n=650) had at least one positive FOBT result. Of 230 admitted patients with a positive FOBT whose charts were reviewed, approximately 50% were male and the median age was 76 years (interquartile range [IQR] 67 to 84 years) (Table 1). The negative FOBT group consisted of 97 patients (Table 1), of which 50% were male and the median age was 79 years (IQR 65 to 85 years). An equal proportion of positive FOBTs were from academic and community hospitals, but negative FOBTs were more commonly found in community hospitals (27% versus 78%). In both groups (positive and negative FOBTs), the most common documented comorbidities were heart disease, chronic obstructive pulmonary disease and dementia. One percent of those with a positive FOBT had a family history of CRC compared with none among those with a negative FOBT.

For both the positive and negative FOBT groups (Table 2), the most common subspecialty to order an FOBT was family medicine (FM) (45% versus 56%) followed by IM (19% versus 20%) and orthopedics (10% versus 6%), respectively (even though IM provide care for a higher proportion of admitted patients in the city than FM). The attending physicians themselves ordered the FOBTs for 44% of those with positive FOBT and 58% for those with negative FOBT; residents and physician extenders ordered the rest.

No patients received advice regarding dietary or medication restrictions before completing an FOBT.

Clinical features

The most common indication for ordering an FOBT was anemia (87% versus 85% for the positive and negative FOBT groups, respectively) (Table 3). A digital rectal examination was documented among only

TABLE 3
Indications* for ordering a fecal occult blood test (FOBT)

Indication	FOBT Positive† (n=226)	FOBT Negative‡ (n=87)	P
Anemia	196 (87)	74 (85)	0.72
Black stools	63 (28)	5 (6)	<0.01
Overt gastrointestinal bleeding	29 (13)	3 (4)	0.01
Upper gastrointestinal bleeding	15 (7)	1 (1)	0.05
Rectal bleeding	14 (6)	2 (2)	0.25
Gastrointestinal symptoms	39 (17)	12 (14)	0.86
Nonbloody diarrhea	23 (10)	6 (8)	0.51
Abdominal pain or distension	6 (4)	2 (2)	1.00
Weight loss or weakness	2 (1)	2 (2)	0.31
Nausea or vomiting	2 (1)	2 (2)	0.31
Dysphagia	2 (1)	0 (0)	1.00
Bloody diarrhea	3 (1)	1 (1)	1.00
Iron deficiency anemia	2 (1)	1 (1)	1.00
Colorectal cancer screening	1 (1)	1 (1)	0.46
Before initiating anticoagulation	1 (1)	1 (1)	0.46

*Data presented as n (%) unless otherwise indicted. *Some patients had more than one indication for ordering an FOBT; †Indication could not be determined in four cases; ‡Indication could not be determined in 10 cases*

TABLE 4
Percentage of documented and abnormal* laboratory values

	Positive FOBT (n=230)		Negative FOBT (n=97)	
	Documented	Abnormal	Documented	Abnormal
Hb	199 (87)	177/199 (90)†	76 (78)	72/76 (95)
INR	108 (47)	63/108 (58)	32 (33)	18/32 (56)
Ferritin	65 (28)	4/65 (12)	44 (45)	6/44 (14)
Fe	77 (34)	45/77 (58)	37 (38)	24/37 (65)
TIBC	77 (34)	56/77 (73)	37 (38)	18/37 (49)

*Data presented as n (%) or n/n (%). *Abnormal refers to values outside the lower limits of normal (for age and sex) for hemoglobin (Hb), ferritin and iron (Fe). For international normalized ratio (INR), abnormal refers to values outside the higher limits of normal; †Percentage of abnormal laboratory values was calculated according to the number of documented laboratory values. FOBT Fecal occult blood test; TIBC Total iron binding capacity*

20% with a positive FOBT compared with 5% among those with a negative FOBT (Table 1). Approximately one-half of patients were taking acetylsalicylic acid (Table 1).

Laboratory values

An Hb value was measured before ordering an FOBT in 87% of the positive FOBT group compared with 78% in the negative FOBT group (Table 4). An international normalized ratio was measured in 47% of positive FOBT group and in 33% of the negative FOBT group. A ferritin level was ordered in 28% of the positive FOBT group compared with 45% in the negative FOBT group. Iron saturation (ratio of serum iron to total iron binding capacity) was measured in 33% of the positive FOBT and 38% of the negative FOBT group. Approximately one-third (37%) of patients with a positive FOBT and 42% of patients with a negative FOBT had no iron studies (ferritin, iron or total iron binding capacity) ordered before stool specimen collection.

In both FOBT groups (Table 4), >90% of Hb values were lower than the normal range. International normalized ratio was elevated above the normal range in ≥50% in both groups. Ferritin level was abnormally low in approximately 15% of patients in both groups in whom it was measured.

FOBT reporting

Approximately 80% of FOBTs were reported three to four days after sample collection. Laboratory protocols dictate that any sample collected without adherence to test dietary requirements be incubated (on the inoculated card) at room temperature for three days to allow for degradation of nonheme peroxidase activity in the collected samples.

TABLE 5
Types and timeline of consultations sought

	Fecal occult blood test (FOBT) Positive (n=230)	Negative (n=97)	P
Any consult	165 (72)	28 (29)	<0.01
Gastroenterology	108 (47)	18 (19)	<0.01
General surgery	37 (16)	5 (5)	0.01
Hematology	20 (4)	5 (5)	0.36
No consult	65 (28)	71 (71)	<0.01
Gastroenterology consult			
Before FOBT reporting	34/108 (32)*	5/18 (28)	1.00
After FOBT reporting	61/108 (57)	11/18 (61)	0.80
Could not be determined	13/108 (12)	2/18 (11)	1.00
General surgery consult			
Before FOBT reporting	14/37 (38)	2/5 (40)	1.00
After FOBT reporting	18/37 (49)	2/5 (40)	1.00
Could not be determined	5/37 (14)	1/5 (20)	0.56
Hematology consult			
Before FOBT reporting	11/20 (55)	3/5 (60)	1.00
After FOBT reporting	8/20 (40)	2/5 (40)	1.00
Could not be determined	1/20 (5)	0/5 (0)	1.00

*Data presented as n(%) or n/n (%) unless otherwise indicated. *Percentage calculated according to the total number of consults*

TABLE 6
Gastrointestinal endoscopies performed during hospitalization

	Fecal occult blood test Positive (n=230)	Negative (n=97)	P
Endoscopy*	77 (33)	9 (9)	<0.01
Gastroscopy	68 (30)	6 (6)	<0.01
Colonoscopy	35 (15)	4 (4)	<0.01
Other†	1 (1)	1 (1)	0.51
No endoscopy	153 (67)	88 (91)	<0.01

*Data presented as n (%) unless otherwise indicated. *Patients may have undergone more than one endoscopy; †Includes capsule endoscopy and push enteroscopy*

Types and timing of consultations

Among individuals with a positive FOBT, a consultation request to gastroenterology, general surgery or hematology service was more likely to be initiated compared with those with a negative FOBT (72% versus 29%: P<0.01) (Table 5). Up to 60% of all consultations were sought before a FOBT result was reported (Table 5).

Endoscopy types and findings

As expected, patients with a positive FOBT were more likely to receive an inpatient endoscopy compared with those with a negative FOBT (34% versus 9%; P<0.01) (Table 6). Among individuals with a positive FOBT who underwent endoscopy, 88% had a gastroscopy while 45% underwent a colonoscopy. The most common findings on gastroscopy were ulcer(s) (38%), normal findings (18%) and esophagitis (15%) (Table 7). The most common findings on colonoscopy were diverticular disease (32%), polyp(s) (29%) and normal findings (13%) (Table 7). Eight (3%) patients in the positive FOBT group and three (3%) in the negative FOBT group had recommendations for an outpatient endoscopy.

There were five documented masses within the positive FOBT group: four found on colonoscopy and one found on upper endoscopy.

TABLE 7
Endoscopic findings* among individuals who underwent one or more endoscopic evaluation(s), stratified according to positive and negative fecal occult blood test (FOBT)

	Positive FOBT	Negative FOBT
Gastroscopy†	76 (100)	8 (100)
Ulcer	29 (38)	3 (38)
Normal	14 (18)	3 (38)
Esophagitis	11 (15)	3 (38)
Gastritis	7 (9)	0 (0)
Stricture	3 (4)	0 (0)
Arteriovenous malformation	2 (3)	1 (13)
Polyp	1 (1)	1 (13)
Mass	1 (1)	0 (0)
Colonoscopy†	38 (100)	4 (100)
Diverticular disease	12 (32)	1 (25)
Polyp	11 (29)	1 (25)
Normal	5 (13)	0 (0)
Ulcer	5 (13)	0 (0)
Mass	4 (11)	0 (0)
Hemorrhoids	4 (11)	2 (50)
Inflammatory bowel disease	1 (3)	0 (0)

*Data presented as n (%). *Some patients had more than one finding on endoscopy; †Some patients underwent more than one endoscopy during their admission*

TABLE 8
Comparison among subspecialties for admissions with positive fecal occult blood test (FOBT)

	Subspecialty			
	FM (n=103)	IM (n=42)	Other* (n=81)	P
Indication(s)†				
Anemia	91 (88)	37 (88)	68 (84)	0.66
Black stools	27 (26)	9 (21)	27 (33)	0.34
Overt GIB	5 (5)	7 (17)	17 (21)	<0.01
GI symptoms	19 (18)	8 (19)	12 (15)	0.80
Bloody diarrhea	1 (1)	1 (2)	1 (1)	0.76
Iron deficiency anemia	0 (0)	1 (2)	1 (1)	0.30
CRC screening	1 (1)	0 (0)	0 (0)	1.00
Before initiating anticoagulants	0 (0)	1 (2)	0 (0)	0.19
Consultations				
Gastroenterology	47 (45)	26 (61)	35 (42)	0.12
Surgery	6 (6)	3 (7)	28 (34)	<0.01
Consulting before reporting of FOBT result				
Gastroenterology	11/47 (23)	10/26 (39)	13/35 (37)	0.28
Surgery	1/6 (16)	1/3 (33)	12/28 (43)	0.61

*Data presented as n (%) or n/n (%) unless otherwise indicated. *Includes surgical subspecialties; †Some patients had more than one indication for ordering an FOBT. CRC Colorectal cancer; FM Family medicine; GI Gastrointestinal; GIB GI bleeding; IM Internal medicine*

All cases had IDA; one of these cases also had a family history of CRC. There were no other actively bleeding lesions.

Clinical management of the positive FOBT group

When the positive FOBT group was further examined, there were 86 patients with overt GIB and/or melena. Only 38 (44%) of these patients underwent endoscopy. Among this subgroup, nine (27%) had an endoscopy performed before the FOBT even being collected. All of these patients underwent gastroscopy while one patient had a colonoscopy as well. Of the remaining 29 patients, 14 (48%) underwent endoscopy before the reporting of FOBT results (11 gastroscopies, one colonoscopy and two both). Eleven patients (38%) underwent endoscopies ≥3 days after the FOBT had been collected (six gastroscopies, two colonoscopies and three both).

TABLE 9
Comparison between academic and community hospitals for admissions with positive fecal occult blood test (FOBT)

	Hospital		
	Academic (n=79)	Community (n=147)	P
Indication(s)*			
Anemia	62 (78)	134 (91)	0.01
Black stools	25 (32)	38 (26)	0.44
Overt gastrointestinal bleeding	17 (22)	13 (9)	0.01
Gastrointestinal symptoms	17 (22)	22 (15)	0.27
Bloody diarrhea	1 (1)	2 (1)	1.00
Iron deficiency anemia	2 (3)	0 (0)	0.12
Colorectal cancer screening	1 (1)	0 (0)	0.35
Before initiating anticoagulants	1 (1)	0 (0)	0.35
Consultations			
Gastroenterology	49 (62)	59 (40)	0.01
Surgery	9 (19)	28 (19)	0.20
Consulting before reporting of FOBT result			
Gastroenterology	15/29 (52)	19/59 (32)	0.10
Surgery	2/9 (22)	12/28 (43)	0.43

*Data presented as n (%) or n/n (%) unless otherwise indicated. *Some patients had more than one indication for ordering an FOBT*

Comparisons among subspecialties for admissions with positive FOBT

When the indications for ordering an FOBT were compared among FM, IM and remaining subspecialties, the remaining subspecialties (which included surgical subspecialties) were more likely to order a FOBT for overt GIB and initiate a surgery consultation compared with FM and IM physicians (P<0.01 for both) (Table 8). No differences were found among subspecialties in initiating consults before the reporting of FOBT results.

Comparisons between academic and community hospitals for admissions with positive FOBT

Among community hospitals, an FOBT was more likely ordered for anemia but less likely for overt GIB (P=0.01 for both) (Table 9). A gastroenterology consultation was more likely to be initiated at an academic hospital compared with a community hospital (P=0.01). No differences were found in the timing of initiating consultations.

DISCUSSION

In an assessment of a city-wide practice of hospitalized patients within a single health authority, we found that the FOBT (Hemoccult II Sensa) was positive in approximately one-third of the cases for whom it was ordered. FOBT was most commonly ordered by FM physicians followed by IM physicians. The most common indication for ordering an FOBT was anemia. Fifteen percent of those in whom serum ferritin was ordered were documented to have IDA, which would have been an indication for endoscopy regardless of FOBT result. Two-thirds of those with positive FOBTs had no further GI investigations. Investigations were frequently completed before the reporting of results or unnecessarily delayed. Overall, our findings suggest that FOBT has limited beneficial effect on clinical management among hospitalized patients.

The very high positivity rate of FOBT observed in our study has several potential explanations: use of Hemoccult II Sensa, lack of dietary restrictions and use of FOBT among those with reported overt GIB. Hemoccult II Sensa is a version of a guaiac test that was developed to be

more sensitive for blood but also has a higher false-positive rate (lower specificity) (5). As found in our study, dietary restrictions are usually not observed when FOBT is performed in the hospital setting. Although most of the traditional dietary restrictions are no longer considered necessary for the older guaiac FOBTs (6), the effect of disregarding dietary restrictions on Hemoccult II Sensa has not been well studied.

It is disappointing that a rectal examination, which could confirm the patient's history of overt GIB, was often not performed and, instead, an FOBT was ordered, presumably to corroborate the history of overt GIB. Furthermore, a standard policy within the WRHA is to not develop the FOBT for three days to ensure degradation of plant peroxidases in the collected specimens to decrease false-positive results (7). This test is, therefore, a poor choice to assess for overt GIB, for which results would be needed immediately. Even then, in our study, overt GIB was a common indication for ordering an FOBT. It was also surprising that an FOBT was often ordered for patients with anemia before obtaining other investigations such as serum iron or ferritin levels.

Anemia was the most common indication for ordering an FOBT in our study of hospitalized patients, which is similar to previous studies (1-3,8). There are often multiple causes of anemia among hospitalized patients including frequent blood draws and bone marrow suppression secondary to the active illness. Instead of delineating the etiology of a non-IDA, a positive FOBT could lead to colonoscopy even among individuals for whom CRC screening is not indicated due to their age or comorbidities and, thus, expose them unnecessarily to the low but definite risks of colonoscopy. Interestingly, all four patients in our study with CRC should have undergone a colonoscopy for IDA regardless of the FOBT result.

FM physicians accounted for >50% of FOBTs ordered for hospitalized patients in our study; however, we found minimal differences in clinical practices among other subspecialties as well as between academic and community hospitals. These findings corroborate our previous survey of WRHA physicians in which a higher proportion of FM physician respondents reported ordering FOBTs for hospitalized patients than other physicians (8). Further qualitative studies involving FM physicians are necessary. It is possible that a higher use of FOBT for symptomatic patients (regardless of whether hospitalized) by FM physicians may be due to perceived and/or real difficulties and delays in accessing GI endoscopy by FM physicians and resultant attempts to triage patients for timing of GI endoscopy with use of FOBT. However, use of FOBT for triaging symptomatic patients is controversial and, to the best of our knowledge, not recommended by any guidelines.

Although there are no previous reports of practices in Canadian hospitals, previous studies over the past decade from other jurisdictions have also shown limited benefits of FOBT use in hospitals. Sharma et al (1) conducted a retrospective chart review of 421 patients admitted to a medicine service across four teaching hospitals in the United States. They considered 70.5% of FOBTs to be ordered inappropriately including in patients with severe life-limiting comorbidities or while taking acetylsalicylic acid or nonsteroidal anti-inflammatory medications, and 17% had an FOBT performed despite active GIB. Moreover, even with a positive FOBT, only 41% were referred for endoscopy. In a second study, Friedman et al (2) examined the use of FOBT (both guaiac and immunochemical) among 330 admitted patients in three acute care hospitals in Australia. These investigators found that 62% of FOBTs were ordered for symptoms consistent with GIB and approximately 10% of FOBTs were ordered for anemia. They found that patient care was potentially adversely affected or delayed in 16% (54 patients) of all cases: 34 of these patients had endoscopy delayed despite overt GIB; and, because of a negative FOBT, another 10 patients did not undergo endoscopy even though they had clearly demonstrated overt GIB. In a more recent study, van Rijn et al (3) showed similar findings in 201 admitted patients across 15 hospitals in the Netherlands. Anemia (41%) was the most common reason for ordering an FOBT. Only 38% of those with a positive FOBT underwent further GI investigations.

Our study had several strengths. We were able to evaluate FOBT use in hospitalized patients in the entire city and evaluate potential differences among different admitting specialties as well as between academic and community hospitals. The diverse population allows for greater generalizability of our results. Furthermore, we were able to correlate the timing of FOBT reporting and clinical management, confirming a significant drawback of inpatient use of the FOBT with Hemoccult II Sensa.

A limitation of the present study was the retrospective collection of data. Some of the clinical data were incompletely recorded in the patient charts. We could not assess point-of-care (bedside) testing because there are no databases for such tests. Given the design of our study, we cannot generate any definitive conclusions whether limiting the use of FOBT or switching to a different FOBT, such as fecal immunochemical test would, in fact, alter clinical outcomes including length of stay, mortality or endoscopy utilization.

Future directions could include studies in which the availability of the current version of FOBT (Hemoccult II Sensa) in hospitals is restricted to predefined consensus indications or even altogether discontinued to determine whether clinically relevant outcomes are affected. Although the FOBT kit itself is inexpensive, there are associated costs with specimen collection, transportation, storage of the completed kit for three days and subjective visual reading of the test by a technician, as well as indirect costs of unnecessary consultations and/or endoscopies. Although some hospital laboratories in United Kingdom have reportedly stopped performing this test for hospitalized patients (9), to the best of our knowledge and, as suggested by our recent survey (8), FOBT continues to be widely available in North American hospitals. Continuing medical education of the appropriate use (primarily CRC screening) and numerous limitations of guaiac-based FOBT use in hospitalized patients is essential. Professional societies (gastroenterology, surgery, IM, clinical biochemistry and/or FM) should develop position statements/clinical practice guidelines on the use of FOBT for non-CRC screening indications. We believe, given the results of our study as well as other studies, hospitalized laboratory services may be better served in diverting resources for guaiac FOBTs to other, more useful services and tests.

CONCLUSIONS

In a study involving a large North American citywide practice of hospitalized patients, we found that the Hemoccult II Sensa FOBT was positive in a very high proportion of cases. FOBT was commonly ordered for patients with anemia. Investigations were frequently performed before the reporting of FOBTs or potentially unnecessarily delayed while waiting for test results. Two-thirds of positive FOBTs did not lead to GI investigations. The present study suggests that FOBT results in hospitalized patients may have little positive impact on clinical management and, therefore, hospital laboratory services should direct resources to other, more useful tests.

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