COLONOSCOPY: EVALUATING INDICATIONS AND DIAGNOSTIC YIELD

Mohammed A. Al-Shamali, MD, FACP, FRCPC; Maher Kalaoui, MRCP;
Fuad Hasan, MD, FACP; Abdulkareem Khajah, MD;
Iqbal Siddiqe, MD, FACP; Basil Al-Nakeeb, MD, FACP

Background: Colonoscopic procedure is an accepted modality for the evaluation of colonic disease. Open-access versus restricted-access colonoscopy has been argued over in the recent literature. The aim of this retrospective analysis is to identify the yield of the major indications for the procedure, and the pattern of colon pathology in our community.

Patients and Methods: We retrospectively analyzed our experience in 3000 colonoscopies over a five-year period. The patients comprised 1145 females (38%) and 1855 males (62%), and their ages ranged from 9 months to 95 years (mean 39.2). There were 2283 patients (76%) who were aged less than 55 years. Complete examination to the cecum was possible in 2850 cases (95%).

Results: Pathological findings were identified in 640 patients (21%). The diagnostic yield of patients referred for lower abdominal pain and surveillance was low, at 7% and 17%, respectively. The yield was high for those with lower gastrointestinal bleeding (47%), non-bloody diarrhea (35%), iron deficiency anemia (30%), mass lesions identified by radiology (53%), and polyps identified by radiology (70%). Inflammatory bowel disease was diagnosed in 220 patients, carcinoma in 64 patients, and colonic polyps in 139 patients.

Conclusion: Colonic diseases are not uncommon in our part of the world. Colonoscopy is a rewarding procedure in those patients referred with lower gastrointestinal bleeding, mass lesions, polyps and diarrhea. The procedure is less rewarding in patients with lower abdominal pain and in those undergoing surveillance colonoscopy. Patient selection on the basis of the presenting complaint may help to utilize the limited resources available to gastroenterologists. About 63% of the procedures were done for indications found to have a low yield. Inflammatory bowel disease is seen with increasing frequency in our population.

Ann Saudi Med 2001;21(5-6):304-307.

Key Words: Colonoscopy, diagnostic yield, abdominal pain, lower gastrointestinal bleeding, diarrhea, iron deficiency anemia, polyps, mass lesions, inflammatory bowel disease.

Colonoscopy is an established procedure in the workup and screening of patients with lower gastrointestinal symptoms. It remains a current practice in many parts of the world to refer such patients for sigmoidoscopic examination and double-contrast barium enema.[1,2] The demand for colonoscopy has been increasing over the years, given the relative safety and the low complication rate associated with the procedure.[1-11] Data has been reported from our part of the world documenting the value of colonoscopy in the diagnosis of colonic disease,[4,5] however, few studies have analyzed the diagnostic yield of the various indications.[1] Colonoscopy has both diagnostic and therapeutic potential. It has been argued that colonoscopic screening is dangerous, expensive, and requires specialized skills. It has, therefore, been suggested that it should only be undertaken in those patients who will derive the most benefit, and that stricter selection criteria should be used to optimize a colonoscopic service.[6] Despite these observations, colonoscopy remains an accurate, reliable, and safe procedure to investigate patients with colonic disease. Some form of patient selection based on the indications is advisable, since the available resources are always limited. The purpose of this paper was to investigate the diagnostic yield of the various indications as seen in our unit, and also to identify the pattern of colonic disease in our community as compared with those in Western countries.

Patients and Methods

A total of 3000 colonoscopic examinations were done between January 1995 and December 1999 at the Al-Amiri Hospital in Kuwait City, a tertiary referral center for more than half the population of Kuwait. The age range of the patients was from 9 months to 95 years (mean 39.2) (Figure 1). There were 1145 female (38%) and 1855 male (62%) patients, and a total of 2283 patients (76%) who were aged less than 55 years. Also, 2580 patients (86%) were from the

From the Faculty of Medicine (Drs. Al-Shamali, Hasan, Siddiqe and Al-Nakeeb), Kuwait University, and the Department of Medicine (Drs. Kalaoui and Khajah), Al-Amiri Hospital, Ministry of Health, Kuwait.

Address reprint requests and correspondence to Dr. Al-Shamali: P.O. Box 35308, Al-Shaab 36054, Kuwait.

Accepted for publication 15 July 2001. Received 20 February 2001.

TABLE 1. *Diagnostic yield of the main indications.*

Indication	No. of patients	No. of abnormalities	Diagnostic yield (%)
Lower abdominal pain	1609	118	7
Lower GI bleeding	553	261	47
Diarrhea	342	122	36
Surveillance	290	49	17
Iron deficiency anemia	119	36	30
Mass lesions	40	21	53
Polyps	47	33	70
Total	3000	640	21

TABLE 2. *Diagnostic pattern in study population.*

Diagnosis	No. of patients	Abnormal (%)
Ulcerative colitis	162	26
Crohn's disease	60	9
Nonspecific colitis	45	7
Colon cancer	64	10
Diverticular disease	62	10
Colonic polyps of various types	139	22
Solitary rectal ulcer	34	5
Hemorrhoids with active bleeding	54	9
Others	15	2

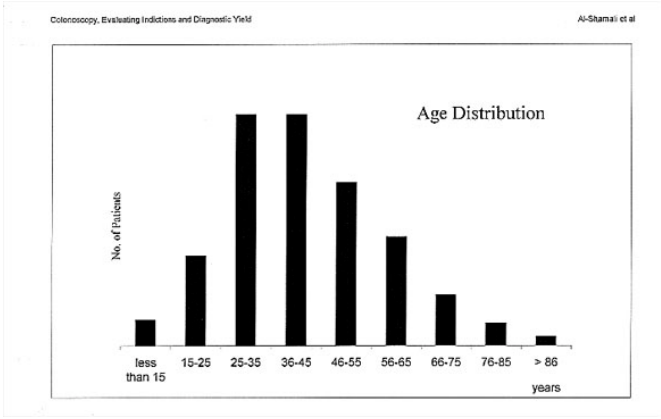

FIGURE 1. Age range of the patients.

outpatients department and only 420 cases (14%) were from the inpatient services. Kuwaiti nationals comprised 1605 (53%), while 1395 patients (47%) were from other countries, including Egypt, Syria, Jordan, and the Indian subcontinent.

Patients were prepared for the examination with either two days of fluid diet and sodium picosulphate (Picolax) cleansing enema, or by polyethylene glycol lavage solution (Braintree Laboratory Inc.). Medazolam was used intravenously for conscious sedation. Patients with pulmonary or cardiac disease were hemodynamically monitored during the procedure. Procedures on pediatric patients were done under general anesthesia. The Olympus Colonoscope (CF-20HL, CF-IT20L) and Olympus Video-Colonoscope (Evis 200 HL) were used. When an abnormality was detected, biopsies were taken for pathological evaluation. The final diagnosis was made after endoscopic and histopathologic assessment.

Seven main indications and their diagnostic yields were reviewed. These included lower abdominal pain, lower gastrointestinal bleeding, diarrhea, surveillance colonoscopy, iron deficiency anemia, mass lesions, and polyps. Surveillance colonoscopy was carried out in asymptomatic patients with previously resected colon carcinoma, previously removed colonic adenomatous polyp, patients with premalignant colonic condition, and in patients with long-standing inflammatory bowel disease.

Results

Complete examination to the cecum or the terminal ileum was possible in 2850 cases (95%). Pathological findings were seen in 640 patients (21%). Table 1 shows the seven studied indications for colonoscopy, the number of patients, and the diagnostic yield of each indication. Of 1609 patients presenting with lower abdominal pain, polyps and cancer were found in 39 patients. There were five cases of cancer, and the majority of polyps were adenomatous in type. The second most common finding was inflammatory bowel disease with 33 cases (ulcerative colitis [UC] in 20, and Crohn's disease [CD] in 13 patients). Diverticular disease was identified in 23 patients and solitary rectal ulcer was found in four patients. Other rare findings in five patients were tuberculosis, idiopathic stricture, vasculitis, and volvulus. Other types of colitis were found in 15 cases.

Minor and major lower gastrointestinal bleeding were identified in 553 patients. Inflammatory bowel disease was found in 103 patients, hemorrhoids was diagnosed in 53 patients, colon cancer and polyps of various types were seen in 44 patients, solitary rectal ulcer in 30 patients, and diverticular disease was seen in 24 patients. Other rare findings such as ischemic colitis, familial polyposis coli, angioma, and radiation colitis were seen in seven patients.

Non-bloody diarrhea was the main indication in 342 patients. Inflammatory bowel disease was diagnosed in 77 patients (UC in 44 patients, and CD in 33 patients). Other types of colitis were seen in 31 patients. Polyps were seen in 11 patients. Diverticular disease was seen in one patient, angioma in one, and radiation colitis in one patient.

Surveillance was carried out in 290 patients for those who had previous polyps, previously resected carcinoma, or as a follow-up for inflammatory bowel disease. The diagnostic yield for polyps was 0.1% and 0.04% for carcinoma.

Iron deficiency anemia was the main indication in 119 patients. Polyps and carcinoma were identified in 16, and diverticular disease in 10 patients. Colonic angioma, hemorrhoids, ischemic colitis, and ulcerative colitis were seen in 10 patients.

Forty patients underwent colonoscopy for mass lesions, which were identified clinically or radiologically. This

yielded 15 patients with carcinoma (38%), diverticular disease in four patients, and two patients with inflammatory bowel disease.

Forty-seven patients were referred for evaluation of polypoid lesions found on barium studies. Thirty-three patients were found to have a polypoid lesion (70%). Snare and cautery were used to remove all these lesions.

Discussion

There is still some controversy regarding open-access endoscopic service versus a strict criteria for doing the procedure.[1,3,12] Certainly, strict selection criteria for the procedure are bound to miss patients with significant and potentially treatable colonic pathology.[13] Clearly, the answer lies in a better selection of patients for the procedure based on the diagnostic yield.

Neither strict criteria nor double-contrast barium enema were used in our study for the selection of patients before the procedure. For a unit with relatively open access, and in an area where colonic disease, such as diverticulosis, polyps, and inflammatory bowel disease is thought to be uncommon, colonoscopy proved to be rewarding, as abnormal findings (21%) were identified (Table 2).

The seven major indications evaluated for their diagnostic yields in our study are similar to those used in previous studies.[1-7] In this study, we have shown that the diagnostic yields of lower abdominal pain and surveillance colonoscopy were low, at 7% and 17%, respectively. This is in contrast to lower gastrointestinal bleeding, diarrhea and mass lesions found on radiological assessment of the colon, which produced a yield of 47%, 35% and 53%, respectively.

Lower abdominal pain was the primary indication for colonoscopy in 1609 patients (53%). This produced a diagnostic yield of 7%. Of these patients, only five colonic adenocarcinoma were diagnosed (0.3%). Several studies have looked at the incidence of colon cancer among patients presenting with abdominal pain. In a recent study by Neugut et al.,[15] abdominal pain as the primary indication for colonoscopy revealed carcinoma in 27.3% of cases. The low yield in our study may be explained by the fact that our patient population is generally younger, with 76% below 55 years of age, compared with that seen in Western countries. In a study by Berkowitz and Kaplan,[1] the general yield of abdominal pain with significant neoplasia (cancer or adenoma >1 cm) was 7.1%. In a study by Kasser, the yield of colonoscopy in abdominal pain was 26.3%, however, clinically significant pathology, particularly cancer of the colon, was very rare.[16] Elevated ESR greater than 17, a history of blood in the stool, leukocytosis greater than 10,000 cm^3, age greater than 45 years, fever, and the presence of neoplastic disease in first-degree relatives were found to be more common in patients with organic colonic disease.[17,18]

In our study the yield of lower gastrointestinal bleeding showed 47% abnormality. The most common diagnosis made was inflammatory bowel disease, hemorrhoids, diverticular disease, polyps, colon cancer and solitary rectal ulcer. Less common causes included infective colitis, ischemic colitis, and angiodysplasia. Berkowitz et al. identified a cause for rectal bleeding in 70% of the cases undergoing colonoscopy, with findings of diverticulosis, polyps, hemorrhoids, and cancer.[1] A study from the Indian subcontinent identified several causes for lower GI bleeding in 85% of the cases, with the major findings being inflammatory bowel disease, acute colitis, polyps, radiation colitis, solitary rectal ulcer, and colon carcinoma.[19]

In developing countries where infective diarrhea is still common, selecting patients for colonoscopy is more difficult. In this study, diarrhea produced a diagnostic yield of 35%. The most common finding was inflammatory bowel disease, and nonspecific colitis. This observation of the increasing incidence of inflammatory bowel disease in developing countries has been made in the study by Goenka et al.,[19] and in another study of Indian immigrants to the United Kingdom.[20] Other studies from the Middle East have reported similar findings. Various speculations have been made for this increase, among which are the Western lifestyle, variations in dietary intake, including refined sugar and chocolate, as well as environmental factors. In our study, ulcerative colitis was the most frequently reported diagnosis (163 patients), and was followed by Crohn's disease (60 patients).

Surveillance was carried out for 290 patients, with a yield of 17%. Patients with inflammatory bowel disease underwent yearly colonoscopic examination after the 10th year of their disease. It is of interest that none of these patients were found to have colonic carcinoma or high-grade dysplasia during the period of the study. This is probably related to the severity and the extent of the disease. Inflammatory bowel disease patients are of mild-to-moderate severity.[4,5,20] Only a few patients had severe disease from the beginning, requiring occasional surgical intervention. Recurrence of colonic carcinoma was seen in 13 patients sent for surveillance. These patients had colonic resection for carcinoma, and then underwent surveillance colonoscopy. This recurrence was related to the advanced stage of colorectal cancer when they presented for medical attention.

Iron deficiency anemia produced a diagnostic yield of 30%, and colon cancer was found in 8%. This result is similar to recently published reports where the incidence of colonic carcinoma among patients presenting with iron deficiency anemia was 11% and 6%, respectively.[21,22] Fireman et al. identified a source of bleeding in 14.4% of those patients with iron deficiency anemia. They also found a sensitivity of 30.7% for fecal occult blood to detect colonic lesion.[23]

Colon cancer remains endemic in certain parts of the world but unfortunately, a large number of patients are diagnosed late in the course of the disease. Compared with our local experience from a decade ago,[4,5] the incidence of inflammatory bowel disease is on the rise, colonic carcinoma is steady, and diverticular disease has tripled over the period.

An open access to colonoscopic evaluation is ideal to rule out colonic disease. It is also of value to reassure the patient on more definitive grounds, but this requires specialized facilities and expertise. The diagnostic yield of colonoscopic procedure depends on the indication for the procedure. Indications with high diagnostic yield included lower gastrointestinal bleeding, mass lesion, and polyps identified on radiological assessment. Lower abdominal pain and surveillance identified only a few patients with pathological findings. Some form of patient selection is necessary, based on the criteria used for performing the procedure. Patients with indications of high yield should be given priority for colonoscopic assessment. Double-contrast barium enema is still of value in patients with indications with low yield. Inflammatory bowel disease is being seen in our community with increasing incidence, particularly that of Crohn's disease.

References

1. Berkowitz I, Kaplan M. Indications for colonoscopy. An analysis based on indications and diagnostic yield. S Afr Med J 1993;83:245-8.
2. Endoscopic Selection Committee of the British Society of Gastroenterology. Future requirements for colonoscopy in Britain. Gut 1987;28:772-5.
3. Rex DK. Colonoscopy. Gastrointest Endosc Clin North Am 2000;10: 135-60.
4. Al-Nakeeb B, Jacob G, Liddawi H, et al. Fiberoptic colonoscopy: a report of findings in 481 patients from Kuwait. Dis Col Rect 1983; 26:236-8.
5. Al-Nakeeb B, Radhakrishnan S, Jacob GS, et al. Inflammatory bowel disease in Kuwait. Am J Gastroenterol 1984;79:191-4.
6. Isbister WM. Colonoscopy: a ten-year Wellington experience. N Z Med J 1987;100:74-7.
7. Tate JJ, Royle GT. Open-access colonoscopy for suspected colonic neoplasia. Gut 1988;29:1322-5.
8. Wolf WI. Colonoscopy: history and development. Am J Gastro-enterol 1989;84:1017-25.
9. Byrid RL, Boggs HW, Slagle GW, et al. Reliability of colonoscopy. Dis Col Rect 1989;32:1023-5.
10. Church JM. Complete colonoscopy: how often, and if not, why not? Am J Gastroenterol 1994;89:556-9.
11. Gane EJ, Lane MR. Colonoscopy in the unexplained gastrointestinal bleeding. N Z Med J 1992;105:31-3.
12. Wayne JD, Bashkoff E. Total colonoscopy: is it always possible (abstract)? Gastrointest Endosc 1991;37:264.
13. Vader JP, Pache I, Burnard B, et al. Overuse and underuse of colonoscopy in European primary care setting. Gastrointest Endosc 2000;52:593-9.
14. Parry BR, Williams SM. Competency and the colonoscopist: a learning curve. Aust N Z J Surg 1991;61:419-22.
15. Neugut AI, Garbowski GC, Wayne JD. Diagnostic yield of colorectal neoplasia with colonoscopy for abdominal pain, change in bowel habits, and rectal bleeding. Am J Gastroenterol 1993;88:1154-6.
16. Kassa E. Colonoscopy in the investigation of colonic disease. East Afr Med J;73:741-5.
17. Bellentani S, Baldoni P, Petrella S, et. al. A simple score for the identification of patients at high risk of organic diseases of the colon in the family doctor consulting room. The Local IBS Study Group. Fam Pract 1990;7:307-12.
18. Delco F, Sonnenberg A. At what age should a one-time only colonoscopy for screening of colorectal cancer be performed? Eur J Gastroenterol Hepatol 1999;11:1319-20.
19. Goenka MK, Kochhar R, Mehta SK. Spectrum of lower gastrointestinal hemorrhage: an endoscopic study of 166 patients. Indian J Gastroenterol 1993;12:129-31.
20. Probert CS, Jayanthi V, Pinder D, Mayberry JF. Epidemiological study of ulcerative proctocolitis in Indian migrants and indigenous population of Leicestershire. Gut 1992;33:687-93.
21. Rockey DC, Cello JP. Evaluation of the gastrointestinal tract in patients with iron-deficiency anemia. N Engl J Med 1993;329:1691-5.
22. Zuckerman G, Benitez J. A prospective study of bidirectional endoscopy (colonoscopy and upper endoscopy) in the evaluation of patients with occult gastrointestinal bleeding. Am J Gastroenterol 1992;87:62-6.
23. Fireman Z, Gurevich V, Coscas D, et al. Results of gastrointestinal evaluation in 90 hospitalized iron-deficiency anemia patients. Isr Med Assoc J 1999;1:232-5.
24. Minoli G, Meucci G, Bortolli A, Garripoli, Leo P, Pera A, et al. The ASGE guidelines for the appropriate use of colonoscopy in an open-access system. Gastrointest Endosc 2000;52:39-44.