Henok Teshome, Berhane Redae, Henok Teklesilassie. *Ethiop Med J, 2020, Vol. 58, No. 1*

ORIGINAL ARTICLE

EXPERIENCE OF COLONOSCOPY AT A TERTIARY HOSPITAL, ADISS ABABA, ETHIOPIA

Henok Teshome, MD[1*], Berhane Redae, MD[1], Henok Teklesilassie, MD[2]

ABSTRACT

Introduction*: Colonoscopy has become one of the gold standard investigation modalities for many colon and distal ileum pathologies. Its accuracy and success is highly dependent on many amendable factors such as bowel preparation and patient sedation. The quality of colonoscopy services should be measured in any institute regularly. So, this study aims to measure this quality in a tertiary hospital.*

Objective: The objective was to assess the clinical indications and colonoscopy outcomes among patients seen at St. Paul's Hospital Millennium Medical College.

Method*: Institution-based cross-sectional study was conducted among 608 patients. Data of patients who were investigated with colonoscopy at St. Paul's hospital endoscopy unit from February 1, 2016 – January 31, 2017 was analyzed.*

Results*: The mean (±SD) age of patients in the study was 45.8 (±14.6) years. Analgesia and sedation were not given for 6.1% of the patients. Inadequate bowel preparation (22%) was the sole reason for all completely abandoned colonoscopies and it was the single most preventable cause of incomplete colonoscopies. Colonoscopy completion rate was 76%. The commonest colonoscopy finding in this study was haemorrhoidal diseases (29.8%). The diagnostic yield was 72.5%. The only documented complication was post-procedure intraluminal bleeding in 2 (0.3%) patients.*

Conclusion*: There was low polypectomy, colonoscopy completion and bowel preparation rates compared to the standard. The colonoscopy completion rate was lowest for those with inadequate/poor bowel preparation with significant statistical association. The technique of bowel preparation should be revised.*

Keywords: *Colonoscopy, cecal intubation, complete colonoscopy, bowel preparation, colonic polyp*

INTRODUCTION

Colonoscopy is a safe and effective means of visual inspection of the large bowel and distal ileum from the distal rectum. It is a valuable tool for diagnosing various colonic pathologies and can be carried out for diagnostic and or therapeutic reasons (1). The colonoscope is 1.2 meters long, flexible tube, which is about the thickness of a finger with a camera and light at the tip. The tip of the scope is inserted into the anus and then is advanced slowly, under visual control, into the rectum, and through the colon usually as far as the distal ilium (2).

Colonoscopy has become the most commonly performed endoscopic procedure. The annual number of colonoscopies performed for both diagnostic and screening indications has increased rapidly as the population has grown older (3).

Colonoscopy may be done for a variety of reasons. Most often it is done to investigate the cause of blood in the stool, abdominal pain, diarrhea, and change in bowel habit or when an abnormality is found on other investigations or for screening purposes in high-risk individuals.

If the procedure is to be complete and accurate, the colon must be completely cleaned, and there are several preparation methods. Unsatisfactory bowel preparation is one of the commonest reasons for failure and inadequate visualization (3). In most institutes, colonoscopy can be performed safely with rare complications. Potential complications include bleeding, reactions to sedations used, bowel perforation, and discomfort.

The accuracy and success of colonoscopy is highly dependent on many amendable factors such as bowel preparation and patient sedation. The quality of colonoscopy service should be measured in any institute according to a standard. American Society of Gastrointestinal Endoscopy (ASGE)/American College of Gastroenterology (ACG) and European Society of Gastrointestinal Endoscopy (ESGE)/ United European Gastroenterology (UEG) task force guide line can be used as a standard.

[1] St. Paul Hospital Millennium Medical College
[2] Addis Abeba university
*Corresponding Author E-mail: henokteshome2@gmail.com

In Ethiopia, many studies have not done on colonoscopy outcome. Therefore, the aim of this study was to assess clinical indications, colonoscopy findings, failure rates and factors contributing to it and complications at St. Paul's Hospital Millennium Medical College (SPHMMC) over a period of one year. This will thus help to improve the success rate, decrease complications, and improve the quality of colonoscopy. It will also provide us with information about the burden of some gastrointestinal (GI) pathologies and lay the ground for further studies.

PATIENTS AND METHODS

This cross-sectional study was conducted at SPHMMC endoscopy unit, which is located in Addis Ababa, Ethiopia. At the time of the study, at St. Paul's Hospital endoscopy unit there were two functional endoscopy machines. On average 35-40, colonoscopies were performed per month. The study was conducted among patients who underwent colonoscopy examination at SPHMMC endoscopy unit from February 1, 2016 – January 31, 2017.

Data was collected by evaluating electronically documented colonoscopy results using a structured data collection format to assess the sociodemographic characteristics, clinical indications, colonoscopy findings, completion rates, pre-procedural preparation and complications. The success rate was evaluated based on polyp detection rate, cecum, and distal ilium evaluation.

Data were collected by the principal investigator. Data were cleaned, coded and analyzed by using IBM SPSS Statistics 23. Results were expressed in tables and graphs after analysis. Descriptive statistics were used for most variables and the Chi-square test, where necessary, was used to test the association among various variables. P-value of < 0.05 was used as a cut-off for determining statistical significance.

Ethical clearance was obtained from SPHMMC ethical review committee, and the name of the patient was not included in the study to preserve privacy.

RESULTS

In the one-year retrospective study, 608 colonoscopies were done at SPHMMC, of which 372 (61.2%) were males and the mean (±SD) age was 45.8 (±14.6) years with a range of 12 to 85 years. The commonest indications for colonoscopy were rectal bleeding (34.8%), Constipation (14.0%), Diarrhea (12.6%) and abdominal pain (10.3%) (Table 1). Others (2.8% of the indications) includes a positive occult blood test, perianal pain, recurrent perianal abscess, screening for metastasis, pain during defecation, Tuberculosis (TB) peritonitis, recurrent perianal lesions, incontinence, Family history of familial adenomatosis polyp, and a combination of the above signs and symptoms. Each of them constitutes less than 0.7% of the indications.

Table 1: Indications for colonoscopy among patients seen at St. Paul's Hospital Millennium Medical College endoscopy unit from February 1, 2016 – January 31, 2017, E.C

Indications	Frequency	Percent
Rectal Bleeding	212	34.8
Constipation	85	14.0
Diarrhea	79	12.6
Abdominal pain	61	10.3
Screening for Colorectal Cancer	32	5.3
Suspicions for Colorectal cancer (Specific reason not mentioned)	28	4.6
Mass on digital rectal examination	20	3.3
Intestinal obstruction	15	2.5
Surveillance after Polypectomy/Surgery	9	1.5
Anemia	9	1.5
In search of primary tumor (For secondaries of unknown origin)	8	1.3
Abdominal mass	8	1.3
Anal Discharge	9	1.5
Suspicious lesions on imaging	7	1.2
Rectal prolapse	6	1.0
Others	17	2.8
Not mentioned	13	2.1
Total	608	100

Preprocedural analgesia or sedative drugs were given for 93.9% of patients before colonoscopy. For the remaining 37 (6.1%) of the patients, colonoscopy was done without any medication (analgesia or sedation). Hyoscine, diazepam, and pethidine were the commonest pre-procedural single drugs used with frequencies of 35.5%, 18.8%, and 13.3%, respectively. In 15.2% of patients, a combination of two drugs (analgesics, sedative, and anti-spasmolytic drugs) were used. A combination of three drugs (hyoscine, diazepam, and pethidine) was given before colonoscopy for 4.1% of patients. Less than 1% of patients have received propofol and lidocaine spray.

In around one-half (50.5%) of the data sources, the degree of bowel preparation was not mentioned, but among the formats that had the information, 22.6% of patients had poor/inadequate bowel preparation (i.e. 11.2% of the study group). The remaining 53.2% and 24.2% had fair/good and excellent bowel preparations, respectively.

Colonoscopy, until the level of the terminal ileum, was done in only 77 (12.7%) of the patients. In the majority, 385 (63.3%), it was done till the level of the ileocecal valve. In the rest it was discontinued at the level of hepatic flexures (4.3%), rectum (4.3%), ascending colon (3.8%), sigmoid (3.3%), splenic flexures (3%) and descending colon (0.7). The procedure was completely abandoned in four (0.7%) patients. Colonoscopy completion rate (till the level of the ileocecal valve and terminal ileum) was 76%. After excluding cases with circumferential obstructing mass preventing further advancement, the adjusted colonoscopy completion rate was 80.5% (462 of 574 cases).

One hundred forty-six (24%) of colonoscopies didn't intubate the cecum (incomplete colonoscopies). The main reason for this was completely obstructing mass that prevented further advancement of the scope in 53.1% of incomplete colonoscopies (half of the obstructing masses being at the rectum). Inadequate bowel preparation was a reason in 26.6% of incomplete colonoscopies and 100% of completely abandoned colonoscopies. The other reasons were due to recurrent loops that made further advancement difficult (10.9%), none cooperative patient (6.3%) and intra luminal bleeding (3.1%).

Nearly one third (29.8%) of the colonoscopies had found haemorrhoidal diseases - (internal, external and internoexternal (Table 2).

Almost one-quarter of the colonoscopies (27.5%) were normal. One or more pathology was found in the remaining 441 patients making the diagnostic yield in this study (72.5%). Other commonly found pathology was polyp (12.8%) with a 12.8% polyp detection rate. Others (4.9%) comprised anorectal mass, multiple nonspecific ulcers with exudation, ascending colonic mass, aphthous ulcer, Kaposi sarcoma, transverse colon mass, descending colon mass, scrotal cecum, vascular ectasia, distal ilium TB features, and anal wart; each comprising less than 0.9% of patients. 84 (19.0% of patients with positive findings) had lesions that were suspicious for colorectal ca, and 65.4% of these suspicious lesions were found at the rectosigmoid area.

Table 2 : Colonoscopic findings among patients seen at St. Paul's Hospital Millennium

Colonoscopic Findings	Frequency	Percent
Normal	167	27.5
Haemorrhoidal Disease	181	29.8
Rectal mass	37	6.0
Sigmoid mass	14	2.3
Chron's disease features	14	2.3
Ulcerative colitis features	14	2.3
Redundant Colon	17	2.8
Polyp	78	12.8
Spastic bowel loops	20	3.3
None specific Inflammation signs	20	3.3
Anal fissure	15	2.4
Diverticulosis	22	3.6
Colonic Stenosis	8	1.3
Extraluminal compression	6	1.0
Caecal mass	12	2.0
Rectal prolapse	10	1.6
Schistosomiasis features	6	1.0
Fistula in ano	7	1.2
Others	30	4.9

Medical College endoscopy unit from February 1, 2016 – January 31, 2017

There was no documented mortality during colonoscopy in the study period. The only documented complication was post-procedure intraluminal bleeding in two (0.3%) of the patients. Three hundred thirty-two (54.6%) of the colonoscopies were performed by gastroenterology fellows. The remaining 236 (38.8%) and 40 (6.6%) were performed by gastroenterologists and endo surgeon. respectively.

Some 212 procedures were performed during colonoscopy, of which 171 (80.7%) were a biopsy of colonic or distal ileum lesions, 39 (18.4%) were polypectomies and two (0.9%) were hemorrhoid band ligations. Biopsies were taken in all colonoscopies which have found a mass, ulcers, nodules or there is suspicion of inflammatory bowel disease (IBD) or non-specific inflammations. A majority, 73 (42.7%), of biopsies were taken for colorectal masses followed by 26 (15.2%) for suspected IBD, 24 (14%) for multiple polyps and 16 (9.3%) for non-specific inflammations.

Complete polypectomy was done for 37 (47.4%) of patients with polyps and 100% of patients with polyps underwent either polypectomy or biopsy.

The colonoscopy completion rate was 74% and 78.7% for those with excellent and fair/good bowel preparation respectively and 61.7% for those with inadequate/poor preparation. P-value <0.05 showing a significant association between the degree of bowel preparation and colonoscopy completion rate (Table 3).

Table 3: Association between colonoscopy completion rate and degree of bowel preparation, St. Paul's Hospital Millennium Medical College, February 1, 2016 – January 31, 2017

Bowel Preparation	Level of Colonoscopy				Colonoscopy completion rate (Percent)
	Terminal ilium	Ileocecal valve	Doesn't reach Ileocecal valve	Total	
Excellent/ Good	35	145	53	233	77.3
Inadequate/ Poor	7	35	26	68	61.7
P Value=0.02					

While colonoscopy completion rate was 90% in those performed by an endo surgeon, it was 75% each for gastroenterologists and gastroenterology fellows (Table 4). But there was no statistically significant association between them, the P-value was >0.05. There was no statistically significant association between colonoscopy completion rate and pre-procedural medication use in this study (P-value was 0.2, >0.05).

Among the indications for colonoscopy: rectal bleeding, mass on digital rectal examination (DRE), suspicious lesions on imaging and suspicion for colorectal cancer produced the highest diagnostic yield (around 85% each) followed by anemia (77.8%) and abdominal mass (75%) (Table 5). Lower yields were found in patients who are screened for colorectal cancer (34.3%) and evaluated for secondaries of unknown origin (37.5%).

Table 4: Association between colonoscopy completion rate and qualification of the health professionals who performed colonoscopy, St. Paul's Hospital Millennium Medical College, February 1, 2016 – January 31, 2017, E.C

Performed by	Level of Colonoscopy				Colonoscopy completion rate (Percent)
	Terminal ilium	Ileocecal valve	Doesn't reach Ileocecal valve	Total	
Endosurgeon	2	34	4	40	90
Gastroenterologist	33	144	59	236	75
Gastroenterology Fellow	42	207	83	332	75
P Value = 0.1					

Table 5: Diagnostic yield of indications for colonoscopy among patients seen at St. Paul's Hospital Millennium Medical College endoscopy unit from February 1, 2016 – January 31, 2017, E.C

Indication	Normal	Abnormality Detected	Total	Diagnostic Yield (%)
Rectal Bleeding	31	181	212	85.3
Constipation	27	58	85	68.2
Diarrhea	27	52	79	65.8
Abdominal pain	21	40	61	65.5
Screening for Colorectal Cancer	21	11	32	34.3
Suspicion for Colorectal cancer (Specific reason not mentioned)	4	24	28	85.7
Mass on DRE	3	17	20	85
Intestinal obstruction	5	10	15	66.6
Surveillance after Polypectomy/ Surgery	3	6	9	66.6
Anemia	2	7	9	77.8
In search of primary tumor (For secondaries of unknown origin)	5	3	8	37.5
Abdominal mass	2	6	8	75
Anal Discharge	4	5	9	55.5
Suspicious lesions on imaging	1	6	7	85.7
Rectal prolapse	2	4	6	66.6

DISCUSSION

In this retrospective study conducted at SPHMMC, the mean age of patients was 45.8 years. In other studies that analyze colonoscopies done in Canada, Jamaica and Nigeria the mean age of patients were 59, 60 and 50 years (4-6). In our study, all the procedures had appropriate indications based on the standard set by ASGE/ACG, unlike the study conducted in the Rambam health care campus, 95.3% of procedures had appropriate indications (7,8). This is because all patients at SPHMMC are screened before an appointment for colonoscopy by the professional who is performing the procedure and there is a request paper for a colonoscopy which dictates the appropriate indications.

In our study, 6.1% (37) of the colonoscopies were performed without a pre-procedural medication and 67.6% of patients receive single drugs, a spasmolytic (hyoscine) being the commonly used drug. A combination of drugs was used in 19.3% of patients. In a retrospective review of 797 patients' colonoscopy reports in Canada, the majority (97%) of the procedures were performed using at least two drugs (midazolam and fentanyl). Only four procedures were performed without sedation and another four received propofol (4). During our review we couldn't find any documented reason for not using a pre-procedural medication.

But this lower use of a combination of analgesics and sedatives as a pre-procedural drug in our set up can be due to lack of appropriate standard for pre-procedural sedation and analgesics and lack of monitor machines in the endoscopy room or due to inadequate supply of drugs.

In this study, the procedure note didn't document the degree of bowel preparation in 50.5% of reports. This was too much lower than the standard, >98% documentation rate, set by ASGE/ACG (8). This low documentation rate can be mainly due to the use of different incomplete colonoscopy reporting formats (i.e. lack of a standard reporting format).

In our study, of the formats that had information about the degree of bowel preparation, 22.6% of patients had poor/inadequate bowel preparation. This is higher than the standard, ASGE/ACG and ESGE/UEG, which detects inadequate bowel preparation rate should not exceed 15% and 10 % respectively (8,9). In the retrospective study conducted in the Rambam Health campus, it was found that good or excellent bowel preparation was documented for 57.4% of procedures (7).

In this study conducted at SPHMMC with retrospective data collection, terminal ileum evaluation was done in only 12.7% of the patients. In the majority, 63.3% colonoscopy was done till the level of the ileocecal valve. Colonoscopy completion rate was 76%. After excluding cases with circumferential obstructing mass preventing further advancement, the adjusted colonoscopy completion rate was 80.5%. According to the ASGE/ACG and ESGE/UEG standard the cecum should be intubated in >90% of all cases and >95% if adjusted (8,9). Therefore, the completion rate in SPHMMC is lower than the standard, which can be explained by the lower degree of bowel preparation and most of the cases have found haemorrhoidal diseases. Therefore, further advancement was abandoned once pathology was detected.

Colonoscopy completion rate was 92%, 96%, 92.4%, 59%, 80% and 79.3% in Canadian, Jamaica, Rambam Health care campus, Ghana, South Africa and Ethiopia studies, respectively (4,5,7,10,-12). This shows that the studies done in Africa and mentioned in this literature had less than 90% completion rate (less than the standard) unlike studies done in western countries. Redundancy of the colon, inadequate bowel preparation due to the bulky nature of stools, and lack of endoscopist who performs both upper and lower gastrointestinal endoscopies at the same sitting were the major reasons put for the lower completion rate in the African studies (10-12).

The commonest colonoscopy finding in this study was haemorrhoidal diseases (29.8%) followed by a normal colonoscopy (27.5%). This study's diagnostic yield was 72.5%. In the Canadian study, the commonest finding was colonic polyp (31%) (3). In the above Nigerian study, the colonoscopic findings were normal in 24% of patients, colitis in 24%, hemorrhoids in 20%. The diagnostic yield in this study was 76%, which is comparable to our study (6). In the study done here in Ethiopia, Addis Ababa University, half of the patients had normal findings (12). The pathology detection rate of our study was comparable with the other studies and higher than the Ghanaian and Addis Ababa University studies (10,12). But the polyp detection rate of our study (12.8%) is lower than the criteria set by ASGE/ACG which should be >25% (8). However, this polyp detection rate can be acceptable depending on the prevalence of polyps in Ethiopia, so it needs further study. Since most of the patients in Western studies are old age higher prevalence of polyp is expected.

There was no documented mortality during colonoscopy in the study period.

The only documented complication was post-procedure intraluminal bleeding in two (0.3%) patients. This meets the standard set by ASGE/ACG, the incidence of perforation should be <1:500 and Incidence of post-polypectomy bleeding should be <1% (8). In a meta-analysis of twenty-three articles evaluating adverse events in older people, there was a much higher perforation (1/1000), bleeding (6.3/1000) and death (1/1000) rates (13). In a four-year study conducted in Spain higher incidence of complications was seen (1/1000 perforation rate and 1/13,493 deaths) (14). This low perforation and bleeding rate in our study can be due to lower rates of colonoscopy procedures like polypectomies and biopsy for chronic diarrhea.

In this study, even though complete polypectomy was done for only 50% of patients with polyps, 100% of patients with polyps underwent either polypectomy or biopsy. According to the standard set by ASGE/ACG, >98% of encountered polyps should be removed endoscopically /80% for ESGE (8,9). In this retrospective study, biopsy specimens were obtained in 41% of colonoscopies performed for an indication of chronic diarrhea. This is lower than the standard set by ASGE/ACG (i.e. >98% of colonoscopies performed for an indication of chronic diarrhea should have biopsy specimens obtained) (8).

Among the indications for colonoscopy in this study, rectal bleeding, mass on DRE, suspicious lesions on imaging and suspicion for colorectal cancer produced the highest diagnostic yield (around 85% each). Lower yields were found in patients who are screened for colorectal cancer (34.3%) and evaluated for secondaries of unknown origin (37.5%). In a retrospective analysis at Addis Ababa University, similarly, rectal bleeding produced the highest diagnostic yield (70%). Lower yields were found in patients with abdominal mass (33.3%), follow up colonoscopy (28.6%) and abdominal pain (26.9%) (12).

REFERENCES

1. Lieberman D. How good is your dentist? How good is your endoscopist? The quality imperative. Gastroenterology 2012;142(2):194-6.
2. Wolff WI. 1989, Colonoscopy: History and development. Am J Gastroenterol;84(9):1017-1025.
3. Singh H, Demers AA, Xue L, et al. Time trends in colon cancer incidence and distribution and lower gastrointestinal endoscopy utilization in Manitoba. Am J Gastroenterol 2008;103:1249–56.
4. Singh H, Kaita L, Taylor G, Nugent Z, Bernstein C. Practice and documentation of performance of colonoscopy in a central Canadian health region. Canadian Journal of Gastroenterology and Hepatology. 2014;28 (4):185-90.
5. Plummer JM, Mitchell DI, Ferron-Boothe D, Meeks-Aitken N, Reid M. Colonoscopy in central Jamaica: results and implications. West Indian Medical Journal. 2012; 61(6):610-4.
6. Obonna GC, Arowolo AO, Agbakwuru A. Experience with colonoscopy in the riverine southwestern Nigeria. Journal of the West African College of Surgeons. 2012; 2(2):63.
7. Lachter J, Ben DH. Quality indicators in colonoscopy. Harefuah. 2011; 150(6):507-11.
8. Rex DK, Schoenfeld PS, Cohen J, et al. Quality indicators for colonoscopy. The American journal of gastroenterology. 2015; 110(1):72.
9. Kaminski MF, Thomas-Gibson S, Bugajski M, et al. Performance measures for lower gastrointestinal endoscopy: a European Society of Gastrointestinal Endoscopy (ESGE) quality improvement initiative. Endoscopy. 2017; 49(04):378-97.
10. Dakubo J. Assessment of colonoscopies in Ghana, J Med Biomed Sci 2014;3(1):6-13.
11. Mahomed AD, Cremona E, Fourie C, et al. A clinical audit of colonoscopy in a gastroenterology unit at a tertiary teaching hospital in South Africa: original. South African Gastroenterology Review. 2012; 1;10(3):9-15.
12. Kassa E. Colonoscopy in the investigation of colonic diseases, East Afr Med J 1996; 73(11):741-5.
13. Day LW, Kwon A, Inadomi JM, Walter LC, Somsouk M. Adverse events in older patients undergoing colonoscopy: a systematic review and meta-analysis. Gastrointestinal endoscopy. 2011; 1;74(4):885-96.
14. Alonso S, Dorcaratto D, Pera M, et al. Incidence of iatrogenic perforation during colonoscopy and their treatment in a university hospital. Cirugía Española (English Edition). 2010; 1;88(1):41-5.
15. Rex DK, Petrini JL, Baron TH, et al. Quality indicators for colonoscopy. Am J Gastroenterol 2006; 101:873–85.
16. Wolff WI, Shinya H. Earlier diagnosis of cancer of the colon through colonoscopy. Cancer 1974;34:912-931.
17. Harewood GC, Mattek NC, Holub JL, Peters D, Lieberman DA. Variation in practice of ileal intubation among diverse endoscopy settings: results from a national endoscopic database. Alimentary pharmacology & therapeutics. 2005; 22(6):571-8.