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Cecal and ilial intubation rates in colonoscopy: Comparative study

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ABSTRACT

Background: Colonoscopy is the procedure of choice for both the diagnosis and treatment of large intestine and distal ilium in patients complaining of bowel symptoms, anemia resulting from malabsorption, radiographic colon abnormalities, screening for colorectal carcinoma, after polypectomy and cancer resection surveillance, ulcerative colitis surveillance, and those with suspicion of neoplastic masses. Inspection of the whole colonic and distal portion of terminal ilial mucosa is usually feasible during colonoscopy. Quality examination of the large bowel includes intubation of the complete colon and mucosal visualization. The investigators demonstrate that terminal ilium intubation is possible in endoscopy practice and yields additional clinical details. Furthermore, it may be used as an indicator of colonoscopy completion.

Objectives: This study estimated the rate of cecal and ilial intubation by a single well-trained endoscopist and compared it with the results of a heterogeneous group of endoscopists.

Patients and Methods: This retrospective comparative study estimates the rate of cecal and ilial intubation in a private endoscopy center in which all the endoscopic procedures were conducted by a single consultant gastroenterologist, and compared it with the rates of a governmental center with by five colonoscopy endoscopists (general surgeons, general physicians, trained endoscopists, and gastroenterologists). The study population included 442 patients (245 males [55.42%] and 197 females [44.58%], ranging from 14 to 85 years of age.

Results: Overall cecal and ilial intubation rates were 88% and 47.5%, respectively. The adjusted rates for cecal and ilial intubations were 94.2% and 50.8%, respectively, after considering cases of anatomic colonic obstruction and when the clinical indications do not justify total colonic intubation. These figures were

superior in comparison to the results of a multi-operator study in which the cecal- and the ilial intubation rates were 51.81% and 30.69%, respectively.

Conclusion: Cecal and ilial intubation are important quality indicators for colonoscopy, and in this study, they were found to be superior in qualified gastroenterologists than in general surgeons and physicians. This outcome points to the importance of providing endoscopy units in Iraq, with qualified well-trained endoscopy personnel.

Keywords: *bowel preparation; cecal intubation; colon; colonoscopy; ilial intubationterminal ilum*

INTRODUCTION

Colonoscopy is the procedure of choice for both the diagnosis and treatment of several bowel diseases. When done by a well-trained person and full-proof technique, colonoscopy is quite hazardless in many in most instances. Inspection of the whole colonic and distal portion of terminal ilial mucosa is usually feasible during colonoscopy.

Colonoscopy is the best diagnostic tool to evaluate the large intestine and distal ilium in patients complaining about bowel symptoms, anemia resulting from malabsorption, those with radiographic abnormalities of the colon, screening for colorectal carcinoma, after polypectomy and cancer resection surveillance, surveillance in ulcerative colitis, and those with suspicion of neoplastic masses. Quality examination of the large bowel includes navigating through the whole colon and comprehensive mucosal visualization.

Intubation of cecum improve the sensitivity and reduces expenses by eliminating imaging studies or performing a second colonoscopy for whole colon visualization. A detailed mucosal examination is mandatory during screening for colorectal carcinoma for the prevention of colorectal cancer and reducing mortality.[1]

There is wide variability in the reported rates of terminal ilium intubation at colonoscopy among different studies. The investigators demonstrate that terminal ilium intubation is possible in endoscopy practice and yields additional clinical details in most cases. Furthermore, it may be used as an indicator of colonoscopy completion. It may be specifically helpful when investigating patients with chronic diarrhea, abnormalities seen on other radiographic modalities, and during suspicion of Crohn's disease.[2]

The maximal benefit of colonoscopy depends on the patient's role in the procedure, which relies mostly on performance of the bowel preparation.[3] The preparation quality affects the extent of examination, procedure duration , and the decision to abort or defer colonoscopy early.[4,5] Poor bowel cleansing can substantially increase the procedure costs.[6] A longer detailed examination[7,8] and prolonged extubating times[9–14] are important factors to enhance the rate of adenoma detection. A higher rate of adenoma detection is crucial to make the recommended intervals[15] between screening and surveillance colonoscopy secure.[16,17]. High quality performance is required to guarantee a high chance of dysplasia detection in ulcerative colitis and Crohn's disease.[17–21] Lastly, hand skills and personal expertise are essential to avoid unpleasant events that might be encountered during neoplastic lesion removal.[22]

OBJECTIVES

This study clarified the impact of the endoscopist skills and expertise on the quality of colonoscopy by estimating the rate of cecal and ilial intubation by a single well-trained endoscopist and compared the outcomes with a heterogeneous group of endoscopists.

PATIENTS AND METHODS

This retrospective comparative study estimated the rate of cecal and ilial intubation in a private endoscopy center where all endoscopic procedures were conducted by a single consultant gastroenterologist and compared the outcomes with those performed by five endoscopists consisting of general surgeons, general physicians, trained endoscopists, and gastroenterologists of a governmental center. All the endoscopists held a gastroenterology fellowship. The 3-year study data (December 2016 to December 2020) was obtained from the electronic records of the center.; All the colonoscopies were performed by a single endoscopist using a colonoscope (Pentax EC-3430 LK) connected to a Pentax EPK-3000 video system under conscious sedation using midazolam (3-5 mg) or without sedation in cases of medical contraindications. The study population included 442 patients (245 males [55.42%] and 197 females [44.58%]) ranging from 14 years to 85 years of age.

The results were compared with another study results conducted by the same investigator at Al-Diwaniyah Gastroenterology center and published in 2020.[23]

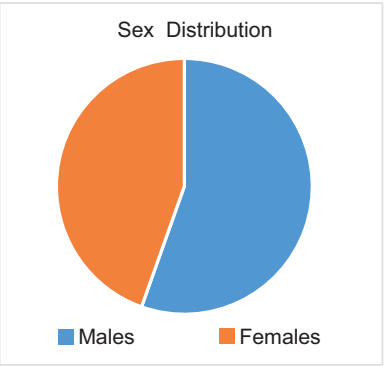

FIGURE 1. Sex distribution in the study population.

RESULTS

The sex distribution in the study population is shown in Figure 1. Table 1 demonstrates the extent of colonic intubation. It shows that cecal intubation was achieved in 389/442 patients (88%), and terminal ilium was intubated in 210/442 (47.5%). The comparison of the extent of colonic intubation between single- and multi-operator study as reported by the study by Muslim is demonstrated in Figure 2.[23] The causes of incomplete colonic intubation is shown in Table 2.

DISCUSSION

The sex distribution of the study population (55.5% males vs. 44.5% females) do not reflect the normal sex distribution of the province society, with sleight female dominance being the primary reason for some females to undergo the colonoscopic procedure by a male operator because of the social and religious considerations held by the population. This problem is often faced because of the absence of female endoscopists in most of the cities of central and southern Iraq.

The overall rate of cecal and ilial intubations was found to be 88% and 47.5%, respectively (Table 1). But increased intubation rates of 94.2% for cecal intubation and 50.8% for ilial intubation was observed in cases of anatomic obstruction in addition to the conditions with no indications for further progress (for e.g., solitary rectal ulcer and sigmoid volvulus).

International studies have shown variable figures regarding rates of cecal and ilial intubation.

TABLE 1. Extent of Colonic Intubation.

Level of intubation	Splenic flexure	Hepatic flexure	Cecum alone	Cecum and terminal ilium	Total
	30 (6.8%)	23 (5.2%)	179 (40.5%)	210 (47.5%)	442 (100%)

Marshal and Barthel reported 97% and 74% for cecal and ilial intubations, respectively, provided that malignant colonic obstruction was excluded.[24]

Florence et al.[26] reviewed 5477 colonoscopies over 6 years' conducted by 10 faculty endoscopist and found that the overall adjusted cecal intubation rate was 90.3% which increased over the last year to the highest adjusted rate of 93.7%.

Kundrotas et al.[26] studied 279 colonoscopies wherein the cecum was intubated in 91% and terminal ilium in 79% of cases.

From the preceding studies, we can conclude that the cecal intubation rate is comparable with international figures. Yet, the rate of ilial intubation is still inferior, mainly because of colonoscopic indications and certain epidemiological factors. Crohn's disease is less common in developing countries than the western industrialized countries attributing to fewer indications for ilial intubation in developing nations which is reflected in the rate of ilial intubation. In addition, this study was done on procedures conducted in a private endoscopy clinic in a country where the local regulations prohibit the use of general anesthesia or propafol or ketamine and only permit small doses of midazolam (3–5 mg). About 18.1% of patients terminated early because of patient irritability attributed, mainly because of inadequate sedation indicating that midazolam can affect the quality and the extent of colonoscopy.

The rate of ilial intubation not only depends on the endoscopist's intent but on several other factors such as the medical indications, bowel preparation, adequacy of patient sedation, the time factor, and the endoscopist expertise and hand skills.

Anatomic obstruction (mainly malignant obstruction) was the most common cause for failure of cecal intubation (33.9%), followed by poor preparation (26.4%) and inadequate sedation (18.1). In 20.8% of patients, the clinical indications such as solitary rectal ulcer, resection of rectal polyp diagnosed in a previous colonoscopy, or endoscopic deflation for sigmoid volvulus, and in similar conditions where the complete colonoscopy could not be performed, especially in a critical or poorly sedated patient were the main determinant factor for early termination.

Figure 2 represents a comparison of the extent of colonoscopic intubation between this study wherein colonoscopy was performed by one qualified gastroenterologist and another study where the same investigator conducted the test in a gastroenterology center in which colonoscopic procedures were done by five endoscopists. Among whom three were general physicians or surgeons trained for endoscopy and two qualified gastroenterologists. The cecal and ilial intubation rates were higher in

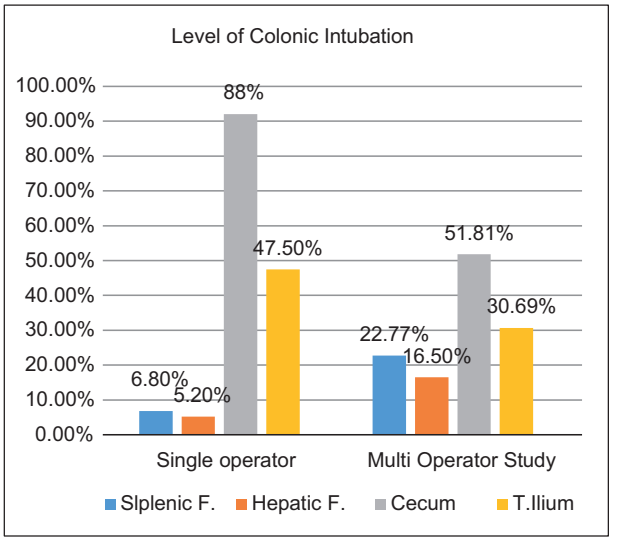

FIGURE 2. Comparison of the extent of colonic intubation between single and multi-operator study.

TABLE 2. Causes of Incomplete Colonic Intubation.

Anatomical obstruction	Bad preparation	In adequate sedation	Clinical indication	Total
18 (33.9%)	14 (26.4%)	10 (18.9%)	11 (20.8%)	53 (100%)

the single operator group than the multi-operator group (88.0% vs. 51.81% for cecal intubation; 47.5% vs. 30.69% for ilial intubation). The study outcomes of Cleveland Clinic screening colonoscopy of gastroenterologist and colorectal surgeon groups revealed differences in cecal intubation rate but a higher adenoma detection rate in the former and longer withdrawal time and lower bowel preparation level in the colorectal surgeon group.[27]

In this study, the rate of cecal and ilial intubation were superior in the single operator gastroenterology specialist than in a mixed specialty multi-operator group, indicating the importance of proper training to improve hand skills and technical expertise of the endoscopists.

CONCLUSION

Cecal and ilial intubation are important quality indicators for colonoscopy. In this study, they are found to be superior in qualified gastroenterologists than in general surgeons and physicians. This result points to the importance of providing endoscopy units in Iraq with qualified, well-trained endoscopy personnel.

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