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Original Article

Lower Gastrointestinal Endoscopy in Elderly: A Single-center Experience

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ABSTRACT

Objective: Endoscopic procedures are frequently applied to the elderly population over 65, with the increased population of this age group. The comorbidities of this population are thought to be increased risk factors for endoscopic interventions. We need more literature on applying lower gastrointestinal (GI) endoscopy to the elderly population. This study aims to analyze the efficiency and safety of lower GI endoscopy in the aged population.

Methods: We performed a retrospective observational study of patients over 65 who underwent lower GI endoscopy from January 2016 to January 2021 at the Istanbul Sultanbeyli State Hospital Endoscopy Unit. This study was approved by the local Ethics Committee and registered with ClinicalTrials.gov (NCT05012527). A total of 564 patients' following parameters were analyzed: indications, endoscopic findings, histopathological findings, and complications of lower GI endoscopy.

Results: The cecal intubation rate was 90% in colonoscopies. The inadequate bowel cleansing rate was 12.4% in colonoscopies and 13% in all lower endoscopy procedures. There was a six percent malignancy detected. The polyp detection rate is approximately 45% in colonoscopies, and polyps are seen mainly left side of the colon. The overall diagnostic yield rate is 48.7%, and colorectal cancer yield is 5.9% on colonoscopies. The complication rate was 1.2%.

Conclusion: This study showed that colonoscopy in the elderly has a high diagnostic yield and can be applied safely.

INTRODUCTION

Lower gastrointestinal (GI) endoscopy is the most important diagnostic tool used in colorectal system disease diagnosis and screening.[1] All over the world, millions of colonoscopies are performed annually for GI bleeding, colon cancer screening or surveillance, diagnosis of other GI diseases, and therapeutic applications such as a colonoscopic polypectomy, hemostasis, decompression, or dilation.[2]

With the rapid increase in the elderly population worldwide, the number of people over 65 is expected to double in the next 25 years. The incidence of colorectal cancer (CRC) increases with age; therefore, the number of endoscopies performed on the elderly will gradually increase. The colonoscopy procedure performed in the elderly population has some difficulties, and the risk of developing complications is thought to be higher.[3,4]

We need more literature on applying lower GI endoscopy to the elderly population. Therefore, in this article, we evaluated lower GI system endoscopic interventions that were performed in our hospital over 65 years of patients. This study aimed to analyze the indications, endoscopic findings, histopathological findings, and complications of lower GI endoscopy.

MATERIALS AND METHODS

We performed a retrospective observational study of patients who underwent lower GI endoscopy from January 2016 to January 2021 at the Istanbul Sultanbeyli State Hospital Endoscopy Unit. This study was approved by the Marmara University Faculty of Medicine Clinical Research Ethics Committee (Number: 09.2021-724) and registered with ClinicalTrials.gov (NCT05012527). This study was to determine inadequate bowel cleansing rate, cecal intubation rate, the prevalence of polyps/cancer, and total complications rate.

We used patients' endoscopy and hospital records for data acquisition. Patients with missing data and duplicate records were excluded from the study. Patients over the age of 65 who underwent colonoscopy and rectosigmoidoscopy were included in the analysis.

The following parameters were analyzed: age and gender, type of endoscopy, examination date, indication, endoscopic results, completeness of the procedures, polyp/tumor localization, histopathological examination of biopsies, and complications.

For further analysis, patients were stratified according to age into three groups: 65–74 (youngest-old), 75–84 (middle-old), and ≥85 (oldest-old), and also into two groups as symptomatic and screening.

CRC, polyps, diverticula, and inflammation are clinically important endoscopic findings.[5] We calculate the overall diagnostic yield according to these parameters.

The patients were suggested on a grain-free, pulp-free, and liquid diet for three days before the colonoscopy. One day before the colonoscopy, patients were given two doses of oral sodium phosphate (45 ml) as a laxative, and enemas were administered twice. All endoscopies were performed using standard video-colonoscopes (Fujinon EC-530WL, ES-530WE-sigmoidoscope) by six general surgeons who have at least five years of experience in endoscopy.

Almost all colonoscopy procedures were performed under sedation, but rectosigmoidoscopy without drugs. Conscious sedation was achieved with Propofol 1% 10 mg/ml by an anesthetic technician under the supervision of an anesthesiologist. Continuous monitoring was provided by recording oxygen saturation, blood pressure, and pulse rate.

The endoscopy indications were classified by the American Society for GI Endoscopy guideline.[6] Pathological results were evaluated according to the World Health Organization criteria.[7]

The primary outcome of this study was to determine inadequate bowel cleansing rate, cecal intubation rate, prevalence of polyps/cancer, and total complications rate.

All authors had access to the study data and reviewed and approved the final manuscript.

Statistical Analysis

We performed statistical analysis using the Statistical Package for the Social Sciences (Version 24 for Mac, IBM Corporation). Chi-square or Fisher exact tests were used to compare categorical variables. For quantitative variables, the t-test, Mann–Whitney or Kruskal–Wallis, and ANOVA are applied. $p<0.05$ were considered statistically significant.

RESULTS

From January 2016 to January 2021, 5214 lower GI en-

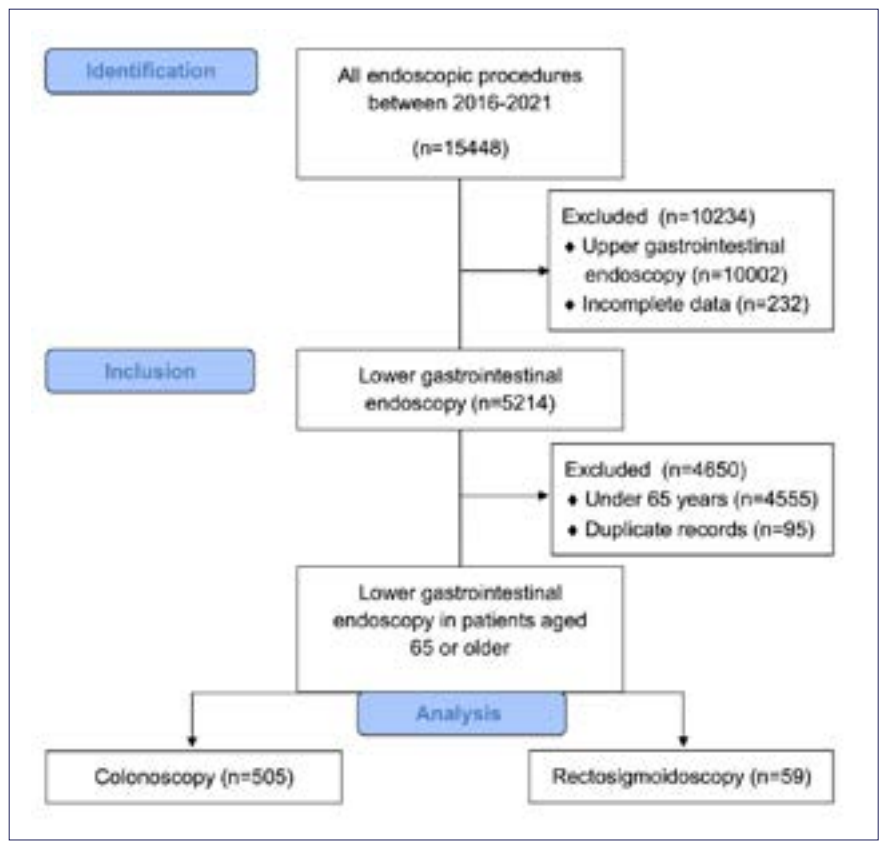

Figure 1. Flowchart of patient selection

Table 1. General characteristics of the elderly patients

Procedure	n (%)
Colonoscopy	
Sex	
Male	261 (51.7)
Female	244 (48.3)
Total	505 (100.0)
Age (years)	
65–74	396 (78.4)
75–84	93 (18.4)
≥85	16 (3.2)
Total	505 (100)
Minimum–maximum	65–93
Mean–SD	71.09–5.585
Rectosigmoidoscopy	
Sex	
Male	33 (55.9)
Female	26 (44.1)
Total	59 (100.0)
Age (years)	
65–74	43 (72.9)
75–84	11 (18.6)
≥85	5 (8.5)
Total	59 (100)
Minimum–maximum	65–96
Mean–SD	72.49–6.655

SD: Standard deviation.

doscopies were performed at Istanbul Sultanbeyli State Hospital Endoscopy Unit. After exclusion criteria, 564 (11%) patients were analyzed aged 65 years or older (Figure 1). Patient demographics by age subgroups are detailed in Table 1. The cecal intubation rate was 90% in colonoscopies. The inadequate bowel cleansing rate was 12.4% in colonoscopies and 13% in all lower endoscopy procedures.

The major indications for lower GI endoscopy were identified GI bleeding symptoms, screening, and surveillance. Detailed indications are given in Table 2. Major endoscopic findings identified hemorrhoids, colonic polyps, diverticular disease, and normal examination. There was a six percent malignancy detected (Table 2). Synchronous tumors were seen in one patient on an ascending and descending colon.

We detected a total of 204 polyps on colonoscopies. In order of polyps/cancer, location and frequency were; rectum 20.1%, sigmoid colon 23%, descending colon 8.3%, splenic flexure 5.4%, transverse colon 8.8%, hepatic flexure 2%, ascending colon 6.4%, caecum 2.9%, multiple localization 21.6%, and unspecified 1.5%. Furthermore, we detected a total of 18 polyps with rectosigmoidoscopy, and their location was rectum 50%, sigmoid colon 27.8%, descending colon 16.7%, and multiple localization 5.6%.

Regarding the results of histopathological examination (total of 307 biopsies), neoplastic (adenomatous) polyps 172 (53.4%) and non-neoplastic polyps 40 (13%) were the major pathological findings. In addition, intramucosal carcinoma was detected in 4 patients with adenomatous

Table 2. Indications and endoscopic findings for lower gastrointestinal endoscopy

Procedure	Indications	n (%)	Findings	n (%)
Colonoscopy	Abnormal imaging	31 (6.1)	Normal findings	166 (32.9)
	GI bleeding	144 (28.5)	Colorectal polyps	154 (30.5)
	Anemia	47 (9.3)	Hemorrhoids	61 (12.1)
	Screening and surveillance	125 (24.8)	Diverticular disease	57 (11.3)
	Diarrhea	9 (1.8)	Cancer	30 (5.9)
	Constipation	57 (11.3)	Findings secondary to operation	10 (2.0)
	Abdominal pain	72 (14.3)	Perianal findings (fissure/fistula/abscess)	10 (2.0)
	Weight loss	15 (3.0)	Angiodysplasia	7 (1.4)
	Other	5 (1.0)	Inflammation-ulceration	5 (1.0)
	-	Other	5 (1.0)	
	Total	505 (100)	Total	505 (100)
Rectosigmoidoscopy	Abnormal imaging	3 (5.1)	Hemorrhoids	20 (33.9)
	GI bleeding	46 (78.0)	Normal findings	15 (25.4)
	Screening and surveillance	5 (8.5)	Colorectal polyps	11 (18.6)
	Constipation	1 (1.7)	Cancer	4 (6.8)
	Other	4 (6.8)	Inflammation-ulceration	3 (5.1)
	Total	59 (100)	Diverticular disease	2 (3.4)
			Angiodysplasia	1 (1.7)
			Other	3 (5.1)
			Total	59 (100)

GI: Gastrointestinal.

Table 3. Results of pathological examinations

Diagnosis	n (%)
Adenocarcinoma	26 (8.5)
Neoplastic (adenomatous) polyp	
Tubular adenoma	
Without dysplasia	84 (27.4)
With low-grade dysplasia	59 (19.2)
With high-grade dysplasia	8 (2.6)
Tubulovillous adenoma	
Without dysplasia	4 (1.3)
With low-grade dysplasia	8 (2.6)
With high-grade dysplasia	7 (2.3)
Villous adenoma	
With low-grade dysplasia	1 (0.3)
With high-grade dysplasia	1 (0.3)
Intramucosal carcinoma	4 (1.3)
Nonneoplastic polyp	
Hyperplastic polyp	36 (11.7)
Inflammatory polyp	4 (1.3)
Nonspecific colitis	26 (8.5)
Normal findings	13 (4.2)
Nonspecific proctitis	11 (3.6)
Active colitis	9 (2.9)
Malignant melanoma (anal canal)	1 (0.3)
Malignant invasion (prostate cancer)	1 (0.3)
Other	4 (1.3)
Total	307 (100)

polyps. Adenocarcinoma was detected in 26 of all biopsies. According to histopathological features, tubular adenoma was the most common type of adenomatous polyp, as expected. Normal colorectal mucosal findings were seen in 13 (4.2%) cases of all biopsies. The results of pathological examinations are detailed in Table 3.

According to the diagnostic yield definition, our overall diagnostic yield rate is 48.7%, and CRC yield is 5.9% on colonoscopies.

The comparison of age groups showed no difference between gender, presence of polyps and/or cancer and location, bowel preparation rate, and cecal intubation rate. Diverticular disease prevalence is increasing with age: youngest-old: 9.6%, middle-old: 12.5%, and oldest-old: 19% (Table 4).

The patients were divided into two groups: symptomatic and screening in terms of colonoscopy indications. The mean age of the screening group was significantly higher (71.4 vs. 69.8, p=0.005). Benign diseases were seen at a rate of 63% in the screening group. The incidence of polyps and/or cancer was significantly higher in the symptomatic group (p=0.001) (Table 5).

The complication rate was 1.2%. During the colonoscopy, three cardiac arrhythmias occurred and were treated medically. One patient was readmitted for rectal bleeding four hours after discharge, in an endoscopic examination showed hemorrhage at the polypectomy site, and it was controlled by endoscopic clipping. Two colonic perforations (80-year-old female, 69-year-old male) occurred and were treated by emergency surgery. The 80-year-old female patient was treated with primary suture repair, and she was discharged with no other complications. A 69-year-old male patient was in the intensive care unit because of his comorbidities (kidney failure, pneumonia). Colonoscopy was requested due to rectal bleeding. Colonoscopy revealed a rectosigmoid tumoral mass before perforation. He was operated on and applied just colostomy without resection was done due to his general

Table 4. Comparisons by age groups

Parameters	n=396, n (%)	n=93, n (%)	n=16, n (%)	p
Age (years)	65–74	75–84	≥85	
Sex				
Female	184 (46)	54 (58)	6 (37.5)	0.08
Male	212 (54)	39 (42)	10 (62.5)	
Polyp detection	151 (40)	43 (46)	7 (43)	0.7
Benign findings				
Hemorrhoids	60 (13.7)	18 (17.3)	3 (14.3)	0.6
Diverticular disease	42 (9.6)	13 (12.5)	4 (19)	
Polyp location				
Right colon	30 (20)	9 (21)	2 (29)	0.47
Left colon	87 (57)	27 (63)	2 (29)	
Both side	34 (23)	7 (16)	3 (42)	
Bowel preparation				
Optimal	341 (86)	83 (89)	14 (87.5)	0.72
Suboptimal	55 (14)	10 (11)	2 (12.5)	
Cecal intubation rate	357 (90)	83 (89)	14 (87.5)	0.7

Table 5. Comparisons by screening and symptomatic groups

Parameters	Screening group (n=380), n (%)	Symptomatic group (n=125), n (%)	p
Age	71.4	69.8	0.005
Sex			
Female	186 (49)	67 (53)	0.34
Male	194 (51)	58 (47)	
Pathology			
Polyp/cancer	142 (37)	62 (49)	0.001
Benign disorders	238 (63)	63 (51)	

condition. He died 19 days after the operation. Unfortunately, we could not obtain information about delayed complications of colonoscopies.

DISCUSSION

Endoscopic procedures are frequently applied to the elderly population over 65, with the increased population of this age group.[8,9] The comorbidities of this population are thought to be increased risk factors for endoscopic interventions. On the other hand, it is emphasized that special attention should be paid to endoscopic procedures in this age population with the possible problems that the patients may experience during the preparation phase. In the current study, 564 patients who had colonoscopy and rectosigmoidoscopy were evaluated in this single center. In most of the patients, the cecum was successfully reached with adequate cleaning, and the colonoscopy was completed safely. Endoscopy was performed on most patients due to rectal bleeding, screening, and surveillance, and polyps were detected in approximately one-third of them.

In this study, major colonoscopy indications are lower GI bleeding and screening. The main part of the population in our study was aged 65–74. Studies that emphasize a high diverticular disease rate had a study population over 75. Therefore, We consider that this affects our main findings, which the majority are the normal result, and a low rate of diverticular disease compared to the other published data.[3,10]

Some studies showed younger patients have higher bowel preparation rates rather than the elderly. Therefore, inadequate bowel cleansing is related to low completion rates. Our result that cecal intubation (90%) and poor preparation (12.4%) in colonoscopies is similar to other studies.[11-13] In comparison by age groups, we did not detect statistically insignificant cecal intubation and bowel preparation rates between youngest-old, middle-old, and oldest-old.

The prevalence of colorectal malignancy increases with age, so lower GI endoscopy plays a major role in cancer detection in the elderly population. The yield of colonoscopy in the elderly is reported differently in many studies. Our data showed lower GI endoscopy in the elderly has a high diagnostic yield.[10,12,14]

The colonoscopy results of the symptomatic groups are compared to the screening group. Screening groups were older than symptomatic patients, and there was no difference between the two groups in terms of gender. Our results showed the detection rate of polyp/cancer was symptomatic group (49%) higher than the screening group (37%) and statistically significant. This result is compatible with other published data.[3,5,12,13,15,16]

There is no difference in gender and polyp detection between age groups. Our polyp detection rate is approximately 45% in colonoscopies, and polyps are seen mainly on the left side of the colon. However, in some studies, more polyps were detected in the screening group, and another study showed that the symptomatic group had more polyp detection rate. In this study, polyp detection was seen more in the symptomatic groups. The polyp detection rate increased with age, but in the present study, we could not find a correlation between age with polyp detection rate.[3,17-20]

In the elderly population, less considered symptoms, including abdominal pain, weight loss, diarrhea, and constipation, should be reckoned for endoscopic investigation.

Our complication rate of 1.2% is similar to published data.[3] The most common complications have been reported as bleeding and perforation. The published review reported perforation rate was 0.005–0.085% and bleeding in 0.001–0.687%, and the incidence of post-colonoscopy complications increased in elderly patients.[21] The post-colonoscopy mortality rate was reported at 0.0029% for all indications.[22] Therefore, before deciding to perform a colonoscopy on the elderly, we should consider their general condition and comorbidities. The literature and our study show lower GI endoscopy is a safe procedure for elderly patients.[23]

Our study has certain limitations. It is a retrospective, single-center, and low-volume study. Our center is a secondary care hospital. So might be our patient population has a low morbidity rate, and its related to low complication rates. Due to retrospective design, we do not know the surveillance colonoscopy result on these patients.

Conclusion

With the increase in the population over 65, the application of screening and therapeutic colonoscopy is increasing in the elderly. We need to take precautions for prepa-

ration and during the procedure due to the frailty of this population. The present study showed colonoscopy in the elderly has a high diagnostic yield and can be applied safely.

Ethics Committee Approval

This study approved by the Marmara University School of Medicine Ethics Committee (Date: 16.07.2021, Decision No: 09.2021.724).

Informed Consent

Retrospective study.

Peer-review

Externally peer-reviewed.

Authorship Contributions

Concept: **M.E., T.K.U.**; Design: **M.E., T.K.U.**; Supervision: **M.E., T.K.U.**; Fundings: **M.E., T.K.U.**; Materials: **M.E., T.K.U.**; Data: **M.E., T.K.U.**; Analysis: **M.E., T.K.U.**; Literature search: **M.E., T.K.U.**; Writing: **M.E., T.K.U.**; Critical revision: **M.E., T.K.U.**

Conflict of Interest

None declared.

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Yaşlılarda Alt Gastrointestinal Endoskopi: Tek Merkez Deneyimi

Amaç: Endoskopik işlemler, bu yaş grubunun artan nüfusu ile birlikte 65 yaş üstü hastalarda sıklıkla uygulanmaktadır. Bu popülasyonda komorbiditelerin endoskopik girişimler için esktra risk oluşturduğu düşünülmektedir. Bu çalışma, yaşlı popülasyonda alt gastrointestinal endoskopinin etkinliğini ve güvenliğini değerlendirmeyi amaçlamıştır.

Gereç ve Yöntem: İstanbul Sultanbeyli Devlet Hastanesi Endoskopi Ünitesinde Ocak 2016-Ocak 2021 tarihleri arasında alt gastrointestinal endoskopi yapılan 65 yaş üstü hastaların verileri retrospektif olarak incelendi. Bu çalışma yerel Etik Kurul tarafından onaylandı ve ClinicalTrials.gov'a (NCT05012527) kaydedildi. Toplam 564 hastanın sıralanan parametreleri analiz edildi: Endikasyonlar, endoskopik bulgular, histopatolojik bulgular ve alt gastrointestinal endoskopi komplikasyonları.

Bulgular: Kolonoskopilerde çekal entübasyon oranı %90 olarak saptandı. Yetersiz barsak temizliği oranı kolonoskopilerde %12.4 ve tüm alt gastrointestinal endoskopi işlemlerinde %13 saptandı. Yüzde 6 malignite tespit edildi. Kolonoskopilerde polip görülme oranı yaklaşık %45 idi ve polipler ağırlıklı olarak kolonun sol tarafında tespit edildi. Kolonoskopilerde genel tanı verimi %48,7 ve kolorektal kanser tanı koyma oranı %5.9 saptandı. Komplikasyon oranı %1.2 idi.

Sonuç: Bu çalışma, kolonoskopinin yüksek tanısal verime sahip olduğunu ve yaşlı hastalarda güvenle uygulanabileceğini göstermiştir.

Anahtar Sözcükler: Kolonoskopi; rektosigmoidoskopi; proktoskopi; yaşlı hasta; yaşlılık.