

Study of terminal ileum findings during total colonoscopy

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Abstract: this study aimed at determine the diagnostic value of terminal ileoscopy according to indications for colonoscopy. In addition to, evaluating the duration of the procedure and the rate of success. The Methods An observational descriptive study was conducted for the period of one year (January2020 -January2021) at Tishreen University Hospital in Lattakia-Syria. The study included 198 patients referred for colonoscopy due to various indications.

Results: The median age was 53 years, the most frequent age group was 40-60 years (42.9%), followed by the group ≥ 60 (32.8%). Males represented 58.6 % of the patients, and abdominal pain was the most frequent indication for colonoscopy. The success rate of terminal ileal intubation was 83.8% with a mean duration of the procedure 2.15 ± 1.6 m. Abnormal macroscopic findings were found in 23 patients (13.9%) and ulceration was the most frequent feature (4.5%). Significant pathological findings were present in 11 cases (47.8%), and included Crohn's disease (10 cases) and infectious colitis with Yersinia (1 case). The diagnostic yield was 5.5% in all ileoscopies, which was significant in patients with weight loss (20%) and right iliac fossa pain (16.7%).

Conclusion: Our study findings demonstrated high percentage of ileal intubation success with variable diagnostic yield according to the indications of colonoscopy.

Keywords: terminal ileoscopy, colonoscopy.

دراسة تحليلية لموجودات اللفائفي النهائي في سياق تنظير القولونات الكامل

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المستخلص: هدفت الدراسة إلى تحديد القيمة التشخيصية لتنظير اللفائفي النهائي تبعاً لاستطبابات تنظير القولون، بالإضافة لذلك تقييم المدة الزمنية لهذا الاجراء ومعدل النجاح. وكانت هذه دراسة رصدية وصفية أجريت في مشفى تشرين الجامعي في اللاذقية-سوريا خلال الفترة الممتدة ما بين كانون الثاني 2020- كانون الثاني 2021. شملت الدراسة 198 من المرضى المرشحين لإجراء تنظير القولون لاستطبابات مختلفة. النتائج: بلغ وسطي العمر 53 سنة، الفئة العمرية الأكثر تواتراً هي 40-60 سنة (42.9%)، تلاها الفئة الأكبر من 60 سنة (32.8%). مثل الذكور 58.6% من المرضى، والاستطباب الأكثر شيوعاً لإجراء تنظير القولونات هو الألم البطني. بلغ معدل نجاح قسطرة اللفائفي النهائي 83.8% مع متوسط مدة زمنية للإجراء 2.15 ± 1.6 دقيقة. وجدت التبدلات العيانية الشاذة عند 23 مريضاً (13.9%) والمظهر الأكثر تواتراً هو التقرحات (4.5%)، أما التبدلات النسيجية الهامة كانت موجودة عند 11 حالة (47.8%) وشملت داء

كرون (10 حالات) والخمج بالبرسيانيا (1 حالة). بلغ معدل القيمة التشخيصية لجميع حالات تنظير اللفائفي 5.5%، والتي كانت هامة عند المرضى مع نقص وزن (20%) ووجود ألم في الحفرة الحرقفية اليمنى (16.7%). الاستنتاج: أظهرت الدراسة الحالية نسبة مرتفعة لنجاح قسطرة اللفائفي مع قيمة تشخيصية متنوعة تبعاً لاستطباب تنظير القولون. الكلمات المفتاحية: تنظير اللفائفي النهائي، تنظير القولون.

Introduction.

Colonoscopy is one of the widely practiced procedures, which is performed for both diagnostic and therapeutic indications [1].

Terminal ileoscopy is a crucial procedure for diagnosis of ileal pathology of the last 20 cm of the ileum through direct endoscopic visualization, allowing evaluation of disease severity and histological features [2, 3]. Since the first report by Nagasaki in 1972 about successful ileal intubation, exploration of terminal ileum has gained rapidly interest as a complement to colonoscopy [4]. It has several important clinical indications including: chronic diarrhea, suspicion of inflammatory bowel disease especially in patients of negative colonoscopy, right lower quadrant abdominal pain, suspected ileocecal tuberculosis, and anemia [5, 6].

Passing through an ileocecal valve to complete of colonoscopy is not routinely performed in clinical practice (only in an average of 5-15% of colonoscopy examinations in daily routine)[7]. This is due to anticipated increase in the time of procedure and perceived difficulty of intubating the valve. In various studies, the success rate yielded by intubation of the terminal ileum was 74% to as high as 100% without a significant prolongation of procedure or occurrence complications in addition to those of colonoscopy [8]. The available evidence for benefit of routine ileoscopy is equivocal. In previous studies, the estimated diagnostic yield is 40% in patients with suspected inflammatory bowel disease, and Crohn's disease is the most frequent specific diagnosis obtained by ileoscopy [9]. The current study which is conducted in Syria for the first time was designed to: 1- evaluate the diagnostic yield of adding ileoscopy to colonoscopy. 2- determine the rate of success of procedures. 3- evaluate the mean duration of ileoscopy.

Patients and Methods.

This is an observational descriptive study (Cross-sectional) of a group of patients older than 14 years who underwent colonoscopy for various indications at department of Gastroenterology at Tishreen University Hospital in Lattakia-Syria during a one year (January 2020 to January 2021). Exclusion criteria were patients with one of the following: recent colonic surgery, acute intestinal obstruction, and abdominal adhesion.

The following data were collected: age, sex, primary indications for colonoscopy. Bowel preparation was done by taking liquid of poly-ethylene glycol on the night before colonoscopy, with taking adequate oral hydration during preparation [10]

The primary outcome was whether ileal intubation was achieved or not, time taken to intubate the ileum, and presence of ileal pathology. Ileum was biopsied in all patients whom ileoscopy was performed.

Ethical consideration: After discussing the study with the patients, all of them gave a complete and clear informed consent to participate in the study. This study was performed following the Declaration of Helsinki.

Statistical Analysis

Statistical analysis was performed by using IBM SPSS version20. Basic Descriptive statistics included means, standard deviations (SD), median, Frequency and percentages. The chi-square test was used to study the association between quantitative variables. All the tests were considered significant at a 5% type I error rate ($p < 0.05$), β :20%, and power of the study:80%.

Results.

198 colonoscopic examinations were performed between January 2020 and January 2021. As table one shows, ages range from 15 years to 87 years (median 51 years), patients were divided into four groups: <20 (3%), 20-40 (21.2%), 40-60 (42.9%), and ≥ 60 (32.8%). 116 patients were males and 82 were females with sex ratio of 1.4:1. The major indications for colonoscopic examinations were: abdominal pain (22.7%), hematochezia (22.2%), anemia (15.7%), suspected colon cancer (12.6%), diarrhea (11.6%), and constipation (10.6%).

Table (1) Demographic characteristics of the study population

Variables	Patients
Age (years)	range (15-87) median=51
<u>Sex</u>	
Female	82 (41.4%)
Male	116 (58.6%)
<u>Age groups (years)</u>	
<20	6 (3%)
20-40	42 (21.2%)
40-60	85 (42.9%)
60 \geq	65 (32.8%)
<u>Indications of colonoscopy</u>	
Abdominal pain	45 (22.7%)
Hematochezia	44 (22.2%)
Anemia	31 (15.7%)
Suspected colon cancer	25 (12.6%)
Diarrhea	23 (11.6%)

Variables	Patients
Constipation	21 (10.6%)
Right iliac fossa pain	6 (3%)
Melena	5 (2.5%)
Weight loss	5 (2.5%)
<u>Others</u>	<u>11 (5.5%)</u>
Follow up of ulcerative colitis	4 (2%)
Change in bowel habits	3 (1.5%)
Anal fissure	2 (1%)
Anal fistula	1 (0.5%)
Pruritus ani	1 (0.5%)

The terminal ileum was intubated in 166 cases (83.8%). The examination was abandoned before reaching caecum in 12 (37.5%) cases due to technical reasons, and in 20 (62.5%) cases due to poor bowel preparation. The mean duration of the procedure was 2.15 ± 1.6 m (1-10 m).

A total of 23 patients (13.9%) had a positive diagnosis under, colonoscopy, while 143 patients (86.1%) did not show any abnormality. Endoscopic findings of patients are as shown in table (2), ulceration was the most frequent feature (4.5%), followed by ulcers (2.5%). Biopsies were taken for all of the 23 patients with abnormal endoscopic findings. It showed non-specific histological findings in 12 cases (6%) including non-specific inflammation (4.5%), ulcerations secondary to chronic NSAIDs use (1%), and lymphoid hyperplasia (0.5%). Significant histological findings were present in 11 cases with a diagnostic yield of 5.5% in all ileoscopies. Crohn's disease was the most common pathology and was seen in 10 patients (5.1%). In addition to, Infectious colitis with Yersinia was found in 1 case (0.5%).

Table (2) Endoscopic and histological features

Variable	Result
<u>Endoscopic features</u>	
Ulceration	9 (4.5%)
Ulcers	5 (2.5%)
Nodular mucosa	3 (1.5%)
Polyps	2 (1%)
Erythematous edematous mucosa	2 (1%)
Cobblestone appearance	2 (1%)
Ulceration scars	2 (1%)

Variable	Result
<u>Histological features</u>	
Crohn's disease	10 (5.1%)
Non-specific inflammation	9 (4.5%)
Ulcerations secondary to chronic NSAIDs use	2 (1%)
Infectious colitis with Yersinia	1 (0.5%)
Lymphoid hyperplasia	1 (0.5%)

There were various endoscopic features with a significant differences according to the age group. As shown in table (3), Ulcers were the most common finding in the age group 20-40 year (p:0.03), nodular mucosa was present equally in the age groups <20, 40-60, and ≥ 60 years (p:0.01), erythematous edematous mucosa and cobblestone appearance were present equally in the two groups <20 and 20-40 years (p:0.001), and ulceration scars were present equally in the two groups <20 and 40-60 (p:0.001). A comparison of the significant histological findings according to the age, Crohn's disease was more frequently in the age groups 20-40 and 40-60 without significant difference (p:0.1).

Table (3) Comparisons of age and both endoscopic and histological findings

	<20	20-40	40-60	60≥	P value
<u>Endoscopic features</u>					
Ulceration	1 (20%)	1 (20%)	1 (20%)	2 (40%)	0.1
Ulcers	0 (0%)	5 (55.6%)	4 (44.4%)	0 (0%)	0.03
Polyps	0 (0%)	1 (50%)	1 (50%)	0 (0%)	0.6
Nodular mucosa	1 (33.3%)	0 (0%)	1 (33.3%)	1 (33.3%)	0.01
Erythematous edematous mucosa	1 (50%)	1 (50%)	0 (0%)	0 (0%)	0.001
Cobblestone appearance	1 (50%)	1 (50%)	0 (0%)	0 (0%)	0.001
Ulceration scars	1 (50%)	0 (0%)	1 (50%)	0 (0%)	0.001
<u>Histological features</u>					
Crohn's disease					
Infectious colitis with Yersinia	1 (10%)	4 (40%)	4 (40%)	1 (10%)	0.1
Non-specific inflammation	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0.7
Ulcerations secondary to chronic NSAIDs use	2 (22.2%)	3 (33.3%)	2 (22.2%)	2 (22.2%)	0.09
Lymphoid hyperplasia	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0.08

According to the indication for colonoscopy, high percentages of abnormal endoscopic findings were present in 50% of patients with right iliac fossa pain, table (4).

Table (4) Positive rates of endoscopic features abnormalities according to the indications

Indication	Cases with abnormal Endoscopic findings
Constipation	19%

Indication	Cases with abnormal Endoscopic findings
Diarrhea	17.4%
Abdominal pain	15.5%
Hematochezia	13.6%
Weight loss	20%
Suspected colon cancer	4%
Right iliac fossa pain	50%

A high percentage of significant abnormal histopathological findings were present in (20%) of patients with weight loss, followed by right iliac fossa pain (16.7%).

Table (5) Positive rates of histopathological features abnormalities according to the indications.

Indication	Cases with abnormal histopathological findings
Diarrhea	13%
Abdominal pain	13.3%
Hematochezia	4.5%
Weight loss	20%
Right iliac fossa pain	16.7%

Discussion

Ileoscopy is the gold standard for the diagnosis of mucosal lesions of the terminal ileum. However, few data exist regarding the diagnostic value of intubation of the terminal ileum.

Our study demonstrated that 75% of the patients were older than 40 years. The most common clinical indications for colonoscopy were abdominal pain, hematochezia, and anemia. The success rate of ileoscopy was 83.8% with abnormal macroscopic results in 13.9% of the patients. The mean duration of the procedure was 2.15 ± 1.6 m (1-10 m).

Significant positive histopathological findings were identified in 47.8% and the majority was Crohn's disease. The diagnostic yield of ileoscopy was 5.5%, varied with the indications of colonoscopy, which was statically significant with weight loss and right iliac fossa pain.

Cherian *et al.*, (2004) demonstrated that ileoscopy is the gold standard in documentation completeness of colonoscopy. The success rate was 85%, adds only 3 minutes to the time of the procedure, and contributes significantly to the diagnostic yields which reach to 16.7% in patients with inflammatory bowel disease [11].

Emami *et al.*, (2008) demonstrated that the success rate of ileoscopy was 93.9%, and abnormal findings were seen in 4 cases (4.3%)[12].

Jeony *et al.*, (2008) found that terminal ileum was successfully intubated in 87.1%. Macroscopy abnormality on terminal ileum was found in 3.7% with significant pathology in 1.8% of cases with abdominal pain, and the diagnostic yield was very low for other indications [13].

Khalil *et al.*, (2015) showed that 12.6% of patients had abnormal terminal ileum mucosa, but the histopathological analysis didn't show any significant yield of ileoscopy[14].

Akere *et al.*, (2017) showed that the success rate of terminal ileum intubation was 30.9%, with very low diagnostic yield 2.4%[15].

Conclusions:

Similar to the results of previous studies, our findings support the conclusion that terminal ileoscopy is valuable according to the indication with a high rate of procedure success except of Akere *et al* study in which success rate was low.

In summary, terminal ileoscopy can be helpful diagnostically according to the indications of colonoscopy

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