Original Article

Terminal Ileal Endoscopic Findings in Chronic Diarrhoea: Experience of A Tertiary Teaching Hospital in Bangladesh

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ABSTRACT

Terminal ileal intubation is an integral part of colonoscopy in patients with chronic diarrhoea. Besides colonic diseases, terminal ileum can be involved in chronic diarrhea pathogenesis. The aim of this study was to assess the additional diagnostic yield of ileal intubation in chronic diarrhea. This cross-sectional study was conducted in the Department of Gastroenterology of National Gastroliver Institute and Hospital, Dhaka, Bangladesh, between July and December of 2021. One hundred and sixteen consecutive patients with chronic diarrhoea were enrolled. Thirteen patients were not fulfilling the inclusion criteria were excluded. In all patients, routine terminal ileal intubation was done as a part of routine colonoscopy and biopsies were taken from any visible lesion. Histopathology and GeneX-pert for detection of MTB were done from biopsy specimen. One-third (35.9%) of patients belonged to the 26-40 years age group. The mean age was 35.63±15.21 years (ranging between 18 and 74 years). Almost two-thirds (63.1%) of patients were male. More than three fourth (77.9%) of the patients were nonsmoker. In this study, isolated macroscopic abnormal ileum was found in 12(11.65%) patients and 13(12.62%) patients had macroscopic abnormality in both ileum and colon, which gave a diagnostic yield of 24.27% of all ileal intubation. No association was observed between macroscopic features and age or gender of the patients (p>0.05); however, significant association was found between macroscopic features and alarming features of the patients (p=0.001).

Keywords: *Colonoscopy, terminal ileal intubation, diarrhoea.*

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INTRODUCTION

Chronic diarrhoea, defined as the passage of loose or watery stools persisting for more than four weeks[1,2], represents a common yet diagnostically challenging clinical condition. It encompasses a wide spectrum of underlying etiologies, ranging from functional gastrointestinal disorders to inflammatory, infectious, and neoplastic diseases.[3] Identifying the precise cause is critical for effective management, especially when alarm features such as weight loss, anemia, or gastrointestinal bleeding are present. The terminal ileum (TI) plays a crucial role in the absorption of bile acids and vitamin B_{12} and serves as a common site for several pathological conditions including Crohn's disease, intestinal tuberculosis, lymphoma, and drug-induced enteritis. Despite its clinical relevance, the TI is often under-evaluated due

to the technical challenges associated with its visualization during colonoscopy. Advancements in endoscopic techniques have improved access to the TI, allowing for direct mucosal inspection and targeted biopsies. Endoscopic evaluation of the TI can reveal a range of findings, from normal mucosa to subtle or overt pathological changes, which may significantly influence diagnostic outcomes and therapeutic decisions in patients with chronic diarrhoea.

Chronic diarrhoea affects around 7.3% of adults and 14.2% of the elderly in the United States[4], where as in developing countries only limited data exist regarding the burden of chronic diarrhoea. Once clinical examination is unyielding and intestinal infection has been excluded by microbiological and serological investigations, colonoscopy with biopsy is usually performed.[3] But colonoscopy with ileal intubation is not routinely performed. However, alterations of the colonic mucosa have been involved in chronic diarrhoea pathogenesis in 15-18% of cases.[5] Chronic diarrhoea may also be caused by diseases involving the terminal ileum. In patients with chronic diarrhoea macroscopically abnormal ileum was found in 5% cases.[6] Ileoscopy has been regarded as a meaningful procedure in specific conditions, including inflammatory and some infectious disease.[7-9] Ileal intubation with biopsy is a key element for the diagnostic evaluation of chronic diarrhea, especially in patients suspected of having inflammatory bowel disease.[10,11] Histology of terminal ileal biopsy may be of greatest value when an macroscopic abnormal terminal ileum is identified during colonoscopy with ileal intubation.[12,13] Some studies from western population have reported the additional diagnostic benefit of terminal ileum intubation.[3,5,6,10,14] Most studies of routine terminal ileal intubation during colonoscopy have been performed in western population. Only a few studies have been conducted in Asian or other tropical regions.[15,16] These regions have different spectrum of gastrointestinal disease, relatively low prevalence of Crohn's disease and higher prevalence of gastrointestinal infections, including TB.[16,17] There is a paucity of data in our countries. Therefore, the study was designed to performed routine terminal ileal intubation during colonoscopy as part of the workup for chronic diarrhoea. The aim of this study was to assess the value of routine terminal ileal intubation during colonoscopy in patients with chronic diarrhoea in a tertiary teaching hospital of Bangladesh.

METHODS

This cross-sectional study was done in the Department of Gastroenterology of National Gastroliver Institute and Hospital (NGIH), Dhaka, Bangladesh, between July and December of 2021. Consecutive patients of chronic diarrhoea attending the inpatient and outpatient Department of Gastroenterology for evaluation of chronic diarrhoea were included. All adult patients of both sexes with chronic diarrhea who had complete colonoscopic examination with successful ileal intubation were included. Patients who refused to participate in the study or already known to be suffering from diarrhea associated disorder such as inflammatory bowel disease, celiac disease, pancreatic disease, intestinal tuberculosis or had a history of drug induced diarrhea, prior GI surgery or were pregnant not allowed to participate in the study. After obtaining informed written consent they were screened through history, clinical examination and some routine investigations such as full blood count, erythrocyte sedimentation rate, routine microscopic examination of stool, stool culture, RBS, C-reactive protein. Further specific investigations including IgA anti tTG antibody, distal duodenal biopsy, fecal calprotectin, hydrogen breath test, MR enterography and thyroid hormones were done on selected cases based on clinical suspicion. In all patients, terminal ileal intubation was done as a part of routine colonoscopy. All colonoscopic examinations were performed by experienced endoscopists by using video colonoscope Olympus 190 after preparation with 20% mannitol solution. Ileocolonoscopic findings were carefully recorded and biopsies were taken from any visible ileocolonoscopic lesion. Biopsy specimens were sent in 10% formalin for histopathological study in Department of Histopathology of the same institution and in normal saline for GeneXpert test for detection of MTB to the Laboratory Services of ICDDR,B, Dhaka. Information was collected in a predesigned data collection sheet which included demographic characteristics, duration of symptoms, associated symptoms, findings of colonoscopic and ileoscopic examination, histopathologic and GeneXpert for MTB detection of biopsy specimen.Data was recorded systematically in preformed data collection form (questionnaire). Statistical analysis was performed by using Statistical Package for Social Sciences (SPSS) version 25.0 for Windows. Categorical data were presented as numbers and percentages. Numerical

data were presented as mean and standard deviation, median and range. Student t-test was used for comparing continuous variables, ANOVA test was used for comparing means of more than two groups and Chi-square test for categorical variables. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 116 consecutive patients who attended for evaluation of chronic diarrhoea were recruited. Thirteen patients were excluded during the study – three patients had failed ileal intubation, while six patients were unwilling to do colonoscopy and four patients had known diagnosis of inflammatory bowel disease. Successful ileal intubation was achieved in 107(97.27%) patients. Table-I shows the demographic profile of the patients. In this study, more than one third (35.9%) of study population belonged to age level 26-40 years. The mean age was 35.63±15.21 years (ranging from 18 to 74 years). Almost two-thirds (63.1%) of the patients were male and more than three-fourths (77.9%) of them were nonsmoker.

Among all study participants, isolated macroscopic abnormality of ileum was found in 12(11.65%) of the patients and 13(12.62%) had macroscopic abnormality in both ileum and colon, which gave a diagnostic yield of 24.27% of all ileal intubation (Table-II). Alarm features were present in 80% of patients with macroscopic abnormality in ileum, on the other hand 19.04% of patients had alarm features with macroscopic normal ileum. Histopathological examination of terminal ileal biopsy reveals 40% chronic ileitis, 28% acute ileitis, 20% non-specific ileitis and 12% granuloma (Fig. 1). Gene X-pert for MTB were detected in three patients from 24 of terminal ileal biopsy. It was observed that more than one fourth (29.1%) of study population had irritable bowel syndrome followed by 22(21.4%) functional diarrhoea, 13(12.62%) intestinal TB, 9(8.7%) Crohn's disease, 6(5.8%) ulcerative colitis, 2(1.9%) colonic malignancy and 1(1.0%) patient had tropical sprue. However, in 20(19.5%) patients, the etiology of chronic diarrhoea was not determined. No association was observed between macroscopic features and age or gender of the patients (p>0.05); in contrast, significant association was found between macroscopic features and alarming features of the patients (p=0.001) (Table-III).

Table-I: *Demographic profile of the study participants (n=103)*

Variables	Frequency	Percentage
Age group (in years)		
≤25	35	33.98
26-40	37	35.90
41-55	15	14.56
>56	16	15.53
Mean±SD	35.63±15.21	
Range	18-74	
Gender		
Male	65	63.1
Female	38	36.9
Marital status		
Married	74	71.8
Unmarried	29	28.2
Occupation		
Housewife	29	28.2
Service	23	22.3
Student	20	19.4
Day labourer	15	14.56
Business	10	9.7
Others	6	5.8
Education		
Illiterate – Class V	15	14.6
Class VI – Class X	25	24.3
SSC – HSC	35	33.9
Graduate –Postgraduate	28	27.2
Religion		
Muslim	97	94.2
Hindu	6	5.8
Smoking history		
Non-smoker	80	77.6
Smoker	23	22.4

Table-II: *Distribution of the study population according to isolated macroscopic abnormality of ileum (n=12)*

Macroscopic	Frequency	Percentage
Abnormality		
Ulcer	11	10.67
Nodule	1	1
Total	12	11.65

Table-III: *Association of the macroscopic features and age, gender and alarming features of the study participants*

Variables	Macroscopic normal ileum (n=63)	Isolated macroscopic abnormal ileum (n=12)	Isolated macroscopic abnormal colon (n=15)	Macroscopic abnormal in both ileum and colon (n=13)	p-value
Age in years	34±14.8	37.7±15.6	35.5±12.0	41.8±19.4	[a]0.381[ns]
Gender					
Male	41(65.1%)	7(58.3%)	8(53.3%)	9(69.2%)	[b]0.789[ns]
Female	22(34.9%)	5(41.7%)	7(46.7%)	4(30.8%)	
Alarming features	12(19.04)	10(83.33)	12(80.0)	13(100)	[b]0.001[s]

[a]p-value reached from ANOVA test, [b]p-value reached from Chi-square test; s= significant, ns=not significant.

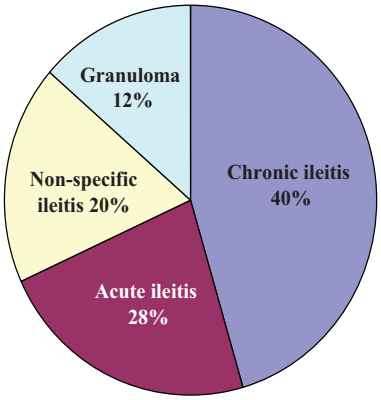

Fig. 1: *Pie chart showing the histopathological findings of ileal biopsy*

DISCUSSION

Chronic diarrhoea of unknown origin is one of the major indications for gastrointestinal endoscopy and accounts for approximately 4%-7% of all the colonoscopies performed in Western countries.[5,18,19] This study showed high prevalence of chronic diarrhoea with male preponderance, which is in concordance with several previous studies.[20-24] It was observed that 66% of the study population had abdominal pain. Shah et al. reported that 43% of their study subject had abdominal pain. This figure is much lower than our study results.[25]

This study reported that 24.27% of the study population have macroscopic abnormalities in the terminal ileum. Another study done by Melton et al. retrospectively examined 9785 unselected patients who underwent ileocolonoscopy with biopsy had abnormal ileum in 24.9% of patients. That study result is almost similar with our findings.[20]

Geboes et al. reported that among 257 immunocompetent patients with acute or chronic diarrhea with abdominal pain, 47.95% patients were found to have endoscopic abnormalities of the terminal ileum. This is a higher incidence compared to our study.[7] However, our study results showed a higher incidence compared to the studies conducted in the Western countries.[21-23] Another study showed that 2% to 7.2% diagnostic findings of TB were reported when routine terminal ileal intubation was performed in unselected patients.[16] Wijewantha et al. found 10.6% of their patients had macroscopic abnormalities in the terminal ileum. This is much lower figure compared to our study when routine terminal ileal intubation was performed not only for the evaluation of chronic diarrhoea.[26] A study from India showed 14% (8/57) study population had ileal abnormality when routine terminal ileal intubation was done in unselected patients.[15] In another study, diagnostic yield of routine terminal ileal intubation was as low as 0.3%.[23] This study had been carried out on asymptomatic patients undergoing screening colonoscopy.[23]

This study reported colonoscopic findings were normal in the majority of cases (72.81%). Specific changes like ulcers, polyps and diverticula were seen in 27.2% (28 cases); whereas 23.3%(24) of cases showed ulcers, 2.9%(3) polyps and 1%(1) diverticula. In this study, we found almost similar figure compared to another Indian study.

This study reported 13/103(12.6%) patients were diagnosed to have intestinal tuberculosis. Whereas Wijewantha et al. study described only 1.8%(14/764) of cases had evidence of ITB, this result was much

lower than our study results.[26] Although this study was conducted in tropical setting like Sri Lanka, they had recruited unselected patients. Kolhe et al. reported 7.5% (9/120) patients had intestinal tuberculosis which was also lower than our study results.[27]

In this study, we found 9/103(8.7%) patients were diagnosed to have CD. However, this study was conducted in a referral center. The high frequency of CD among patients undergoing colonoscopy with ileal intubation in this hospital was likely to be due to a referral bias. Another study from Sri Lanka reported that 3.6% (28/764) patients had Crohn's disease of unselected patients. Their lower incidence could be explained by the fact that they recruited unselected patients.[26]

This study reported 6/103(5.8%) patients were diagnosed to have ulcerative colitis. Kolhe et al study had 16.7% (20/120) of UC, this result was much higher than our study result.[27] A significant number of the patients (29.1%) in this study population subsequently diagnosed with IBS. These findings were consistent with the study findings of Read et al.[28], as they reported that (30%) (8/27) patients underwent an extensive evaluation for chronic diarrhoea were found to have the IBS. Shah et al. reported 31% of their study participants had IBS; this result is almost similar with the present study results.[25]

CONCLUSION

Routine terminal ileal intubation during colonoscopy, yield additional benefit to the diagnosis, especially in cases where routine investigations yield inconclusive results. Early identification of terminal ileal lesions can facilitate timely diagnosis and appropriate management, ultimately improving patient outcomes.

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