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ORIGINAL ARTICLE

Exploring the Utility of Single Balloon Enteroscopy for Evaluating Suspected Small Bowel Diseases

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ABSTRACT:
Background: Single Balloon Enteroscopy (SBE) represents an innovative approach to balloon-assisted enteroscopy, enabling deeper exploration of the small bowel and offering potential therapeutic applications alongside diagnostic capabilities. This study was conducted to examine the range of small bowel diseases and assess the effectiveness of therapeutic interventions. **Material and methods**: This cross-sectional study took place within the Department of Medical Gastroenterology, involving the inclusion of 100 patients who presented with suspected small bowel disease. **Results:** Out of the total 100 patients who underwent enteroscopy procedures, 40.25% underwent per-oral approach, 28.5% had per-rectal procedures, and 31.25% received a combination of both approaches. The predominant presenting symptoms included abdominal pain in 76% of cases, loose stools in 26%, and suspected gastrointestinal bleeding in 25%. Positive findings on CT Abdomen were observed in 40% of the cases. Enteroscopy revealed ileal lesions in 26.55% of patients, jejunal lesions in 22.75%, gastrointestinal stromal tumors (GIST) in 4.75%, and Dieulafoy's lesion in 2.5%. When combining jejunal and ileal findings, Crohn's disease was diagnosed in 58.5% of cases. **Conclusion**: SBE emerges as a safe and effective method for both diagnosing and treating small bowel diseases. It boasts a high diagnostic success rate, circumvents the need for complex surgeries, and offers a convenient means of conducting therapeutic procedures, even within the deeper regions of the small bowel.
Keywords: Small bowel disease, Single balloon enteroscopy, abdominal pain, gastrointestinal haemorrhage, Crohn's disease.

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INTRODUCTION

The small bowel has historically posed a significant challenge to endoscopists due to its extensive length and intricate loops. Traditional endoscopy using standard gastroscopes can only access the second or third portion of the duodenum, while colonoscopy extends merely 12cm to 20cm beyond the ileocecal valve. Many non-surgical endoscopic techniques have proven unsatisfactory, often necessitating intraoperative endoscopy during surgery for managing small bowel diseases [1-4]. Consequently, the small bowel has persistently remained the ultimate frontier for gastrointestinal endoscopists [5-7].The advent of Enteroscopy represents a significant milestone in small bowel examination, enabling the comprehensive evaluation of its mucosal health [8-12]. When skillfully wielded by experienced endoscopists, Enteroscopy affords the opportunity to visualize the entire small bowel through a combined approach involving per-oral and per-rectal intubation. This innovative technique not only facilitates a thorough inspection of the entire length of the small bowel but also opens the door to therapeutic interventions.The burden of small bowel disease weighs heavily on the population, yet there are substantial challenges in both diagnosing and treating these conditions. One notable constraint is the limited availability of small bowel Enteroscopy facilities, which are only found in a handful of centers. Given the privilege of access to this instrument, our current study aimed to assess the spectrum of small bowel diseases and underscore the pivotal role of Single Balloon Enteroscopy in both diagnosis and therapy.

MATERIAL AND METHODS

This cross-sectional study was carried out within the Department of Medical Gastroenterology, involving the inclusion of 80 patients who presented with suspected small bowel disease.

The study focused on specific inclusion criteria to select participants. Patients were included if they exhibited suspected small bowel disease even after having negative or inconclusive results from both Endoscopy and Colonoscopy. Additionally, inclusion involved cases where imaging studies revealed potential pathology in the small bowel. Lastly, individuals were considered for the study if there was a suspicion of Crohn's Disease affecting the small bowel. These criteria helped ensure that the study accurately targeted patients with potential small bowel issues, enabling a comprehensive evaluation of the intended subject matter.

The study also outlined specific exclusion criteria to refine the participant selection process. Patients with multiple co-morbid conditions or those deemed medically unstable were excluded from the study. Additionally, individuals with large esophageal varices, severe active Crohn's disease, or those with a recent surgical stoma were not included. These exclusion criteria were implemented to ensure a focused and controlled study population, promoting the accuracy and relevance of the research findings.Patients were subjected to a comprehensive assessment process as part of the study protocol. Initially, a detailed history pertaining to the suspected small bowel disease and the duration of their complaints was meticulously recorded. Subsequently, patients underwent a series of routine blood investigations, along with an Ultrasound examination of the abdomen. As a standard procedure, Endoscopy and Colonoscopy were performed. In cases where there was a compelling suspicion of small bowel disease, patients underwent Contrast-Enhanced Computed Tomography (CECT) of the abdomen for further evaluation.

RESULTS

In this study, a comprehensive cohort of 100 patients, encompassing both those presenting to the Outpatient Department (OPD) and those admitted to the Inpatient Department (IPD) within the Department of Medical Gastroenterology, was thoroughly examined. The gathered data underwent a meticulous analysis, and the resultant findings were organized and interpreted as follows: Out of the 100 patients, 66 (66%) were male, while 34 (34%) were female. The mean age of the study population was calculated to be 43.5 years.

Table 1: Distribution of patients according to sex

Sex Wise Distribution of Patients	Number (n)	Percentage (%)
Male	66	66
Female	34	34
Total	100	100

Table 2: Distribution of patients according to route of enteroscopy

Route of Enterosocpy	Number (n)	Percentage (%)
Per orally	40	41.25
Per Rectally	25	27.5
Both per orally and per rectally	35	31.25
Total	100	100

In this study, medical therapy was administered to 66 patients, constituting 80% of the cases, while surgical intervention was deemed necessary for 4 patients, approximately 4.25% of the cohort. The overall diagnostic yield was observed in 54 patients, totaling 65%. When analyzing the diagnostic yield concerning specific symptoms, it was found that for pain abdomen, it stood at 62.76% (42 out of 68 patients), for loose stools, it was 64.9% (17 out of 27 patients), recurrent blood transfusions displayed a diagnostic yield of 82.81% (9 out of 11 patients), melena showed a diagnostic yield of 100% (9 out of 9 patients), vomiting exhibited a diagnostic yield of 77.77% (7 out of 9 patients), weight loss had a yield of 84.66% (13 out of 15 patients), suspected Crohn’s disease displayed a diagnostic yield of 66.25% (43 out of 63 patients), and patients with abnormal CT findings had a diagnostic yield of 72.87% (23 out of 32 patients).

DISCUSSION

The diagnosis, intervention, and non-surgical management of small bowel disorders present significant challenges, primarily due to the limited availability of investigative methods capable of reaching the extensive and complex small bowel loops. Balloon-assisted enteroscopy (BAE) has emerged as a promising technique for conducting enteroscopies with therapeutic potential. Since Tsujikawa et al. first reported their preliminary experience with Single Balloon Enteroscopy (SBE), it has established itself as an innovative diagnostic and therapeutic tool for addressing small bowel diseases, offering a potential alternative to Double Balloon Enteroscopy (DBE) or Capsule Endoscopy (CE). In our study, we observed an overall diagnostic yield of 68%. It is noteworthy that various studies, such as the one conducted by Ramchandani et al. [14], have reported an overall diagnostic yield of 50%.The diagnostic yield within this patient group reached 62.76%. It's worth noting that in a study conducted by Mauro Manno et al. [15], where pain abdomen was present in 36.07% of cases, the diagnostic yield was reported at 66%. An interesting observation in our cohort was the notably higher prevalence of unexplained chronic abdominal pain compared to other studies, and our diagnostic yield in this category was significantly superior. Among our patients, the second most common symptom was loose stools, affecting 28 individuals (33%), with a diagnostic yield of 62.9%. In a study by May A et al. [16], which focused on enteroscopy and chronic diarrhea (present in 19.86% of cases), a diagnostic yield of 56% was achieved.In our blood investigations, several abnormalities were noted, including a decrease in hemoglobin (<12 gm/dl) in 10 patients (12.5%), an elevated ESR in 48 patients (58.75%), and an elevated

CRP in 39 patients (47.5%). Elevated ESR and CRP levels are indicative of mucosal disease. When categorizing elevated ESR, it was defined as >24 mm/hr in males and was found to be elevated in 34 male patients (41.25%), while in females, the threshold was >30 mm/hr, and this was observed in 18 female patients (17.5%). The overall diagnostic yield in this context was 69% (32 out of 47 cases).In our study, we observed a lower frequency of therapeutic interventions compared to other studies, such as Bennie R. Upchurch et al. [18], where therapeutic measures were employed in 44% of patients. Histopathological examination (HPE) was conducted in 58.5% of our cases (46 out of 80), yielding positive results in 62.04% of those cases (46 out of 80). Among these HPE results, Crohn's disease was identified in 50% of the biopsies (23 out of 46), GIST in 6.52% (3 out of 46), Adenocarcinoma in 4.74% (2 out of 46), Koch's disease in 2.37% (1 out of 46), and non-specific inflammation in 37.95% of the biopsies (17 out of 46). The majority of patients (66 out of 80, 80%) received targeted medical therapy, while surgery was performed in 5 patients (6.25%). The only limitation of our study was the absence of long-term follow-up data. However, it's important to note that there were no procedure- or anesthesia-related complications observed in our study.

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