Research Article
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Indications and complications of balloon enteroscopy in Southwest of Iran: a 3years cross sectional survey

Abstract

Introduction: The advent of capsule endoscopy (CE) and balloon-assisted Enteroscopy has changed the diagnosis and management of small intestine disorders over the past decade. The purpose of this evaluation is to review the findings of small intestine evaluation by Balloon Enteroscopy in Imam Hospital of Ahvaz between 2016 and 2019.

Method: The present study is a descriptive epidemiological study that has been conducted using the files in the archives of Ahvaz Imam Hospital on a cross-sectional basis between 2016 and 2019 on all of the cases referred to this tertiary center to perform balloon Enteroscopy about their indications and any potential complication. A questionnaire containing several sections designed to collect the following data. Part A: (Basic Information) including age, sex, date and type of admission. Part B: (Record of previous diseases and procedures) including general health profile. Part C: (Enteroscopy Process Findings) and Part D: any potential complication.

Results: Overall 42 procedures performed (29 male (69%) and 13 female (31%). The mean age of females (41.96y) was less than males (52.16y). The most common reasons for referring for Enteroscopy was Melena with unknown source (8 cases, 19%) and abdominal pain (6 cases, 14.3%). More than half of the patients (28 cases, 67%) were nonsmoker. The most common findings of Enteroscopy include peptic ulcer disease (PUD) (12 cases, 28.6%), hemorrhage from angiectasia (11 cases, 26.2%), erosive gastritis (9 cases, 21.4%) and small bowel stenosis and atrophy (7 cases, 16.7%). Among the complications after Enteroscopy, only abdominal pain was reported (2 cases, 4.76%).

Conclusion: balloon Enteroscopy is a safe procedure and useful for evaluation of source of obscure bleedings and pain of unknown origin.

Keywords: balloon enteroscopy, small intestine, obscure bleeding

Volume 13 Issue 4 - 2022

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Received: July 27, 2022 | **Published:** August 29, 2022

Introduction

The small intestine is consider as invisible part the gastrointestinal tract because most of the small intestine is not accessible by conventional endoscopy. The advent of capsule endoscopy (CE) and balloon-assisted Enteroscopy has changed the diagnosis and management of small intestine disorders over the past decade.[1] Capsule endoscopy, developed in 2001, as the primary method for endoscopic evaluation in small intestine disorders as a non-invasive and safe method for complete investigation of the small intestine. However, there are several major limitations to this approach, including the inability for therapeutic interventions and movement control.[2,3] In 2001, Yamamoto et al. introduced Double-Balloon Enteroscopy (DBE) technique, which is capable of performing treatment in the small intestine. The DBE mechanism is based on the concept that small intestine traction during endoscopy prevents further development of endoscopy tube, and the use of two balloons at the tip of the enteroscope and Overtube keeps the intestinal wall and prevents the formation of subsequent rings and makes Enteroscopy easier.[4] In 2007, Single-Balloon Enteroscopy Technique (SBE) introduced, in which a balloon (other than latex) has attached to the tip of a silicone over tube and is inflated and deflated by an air control system.[5] This system designed to make the procedure easier.

Single Balloon Enteroscopy such as DBE performs via over tube channel and provides the ability for flushing, suctioning, sampling and therapeutic interventions such as argon plasma coagulation, injections, clips insertion, polypectomy, intestine dilation and or extraction of external foreign bodies.[6] Its effectiveness and safety have shown and proved in several studies, which indicated high diagnostic performance and therapeutic potential similar to Double-Balloon Enteroscopy.[5,7,8]

The current cross sectional study evaluates indications, findings and potential complication of single balloon Enteroscopy in Ahvaz Imam Hospital as a tertiary referral center during 4years.

Method

The present study is a descriptive epidemiological study that has conducted using the files in the archives of Ahvaz Imam Hospital on a cross-sectional basis between 2016 and 2019 on all patients who referred to this tertiary referral center to perform Enteroscopy. The inclusion criterion include completeness of the above-mentioned files, so incomplete files were removed from the study. A form contains several sections designed to record the data including demographic characters of participants, finding during Enteroscopy and any potential complication after the procedure. The checklist sections include Part A: (Basic Information) including age, sex, date and type of admission; Part B: (Record of previous diseases and procedures) including blood pressure, coronary artery disease, diabetes Mellitus, chronic kidney disease, intestinal obstruction, gastrointestinal bleeding, abdominal pain, diarrhea and or history of Intestinal surgery; Part C: (Enteroscopy Process Findings) including adenoma, Angiectasia, pseudo-diverticula, diverticula, duodenal inflammation, stenosis & atrophy, polyps, bulging structures, leiomyoma, Ileitis,

ulcers, adenocarcinoma, carcinoids, hemorrhage and or metastatic lesions. All of the procedures performed with sedation by propofol and observation of anesthesiologist.

Findings

Overall 42 procedures performed (29 male (69%) and 13 female (31%)(. The mean age of females (41.96y) was less than males (52.16y). The most common reasons for referring for Enteroscopy was Melena with unknown source (8 cases, 19%) and abdominal pain (6 cases, 14.3%) (Table 1). More than half of the patients (28 cases, 67%) were nonsmoker. The most common findings of Enteroscopy include peptic ulcer disease (PUD) (12 cases, 28.6%), hemorrhage from angiectasia (11 cases, 26.2%), erosive gastritis (9 cases, 21.4%) and small bowel stenosis and atrophy (7 cases, 16.7%) (Table 2). Among the complications after Enteroscopy, only abdominal pain was reported (two cases, 4.76%).

Table 1 The most common reasons for Enteroscopy

Cause of enteroscopy	No. (Percentage)		
	Male	Female	Total
R/O GOO	2 (6.9%)	3 (23.1%)	5 (11.9%)
R/O Celiac Disease	1 (3.4%)	1 (7.7%)	2 (4.8%)
Anemia	6 (20.7%)	3 (23.1%)	9 (21.4%)
Vomiting	1 (3.4%)	0	1 (2.4%)
Diarrhea	1 (3.4%)	0	1 (2.4%)
Jejunal Intussusception	0	1 (3.4%)	1 (2.4%)
Nausea & Vomiting	1 (3.4%)	1 (3.4%)	2 (4.8%)
Abdominal Pain	4 (13.8%)	2 (15.4%)	6 (14.3%)
Jaundice	1 (3.4%)	0	1 (2.4%)
Weight Loss	4 (13.8%)	1 (7.7%)	5 (11.9%)
Melena	7 (24.1%)	1 (7.7%)	8 (19%)
Volvulus	1 (3.4%)	0	1 (2.4%)
Total	29	13	42 (100%)

Table 2 Balloon Enteroscopy findings

Variable		No. (Percent)	
		Yes	No
Enteroscopy findings	Angiectasia	2 (4.8%)	40 (95.2%)
	Diverticula	2 (4.8%)	40 (95.2%)
	Duodenal Inflammation	2 (4.8%)	40 (95.2%)
	Duct Stenosis & Atrophy	7 (16.7%)	35 (83.3%)
	External pressure effect	3 (7.1%)	39 (92.9%)
	Gastritis	9 (21.4%)	33 (78.6%)
	Ulcers	12 (28.6%)	30 (71.4%)
	Polyps	4 (9.5%)	38 (90.5%)
	Carcinoid	1 (2.4%)	41 (97.6%)
	Hemorrhage	11 (26.2%)	31 (73.8%)

There was no significant relation between Enteroscopy findings and confounders such as smoking, blood pressure, coronary artery disease, and diabetes mellitus (P>0.05). However, a significant relationship observed between history of chronic renal disease and Angiectasia (P=0.03) (Table 3). Moreover, there was a significant relation between previous history of gastrointestinal bleeding and gastritis (P=0.02) and diarrhea and duodenal inflammation and ulcers (P =0.04).

Discussion

Usually balloon Enteroscopy performing with deep sedation and observation of an anesthesiologist, because this procedure is time consuming and sometimes could last more than an hour.[4,5] Based on clinical indication and complain of subject, it could done as antegrade or retrograde.[5] According to the results, the most common reasons of requesting Enteroscopy among men was Melena (24.1%), abdominal pain and weight loss (13.8%) in descending order while among women, these indications include evaluation for gastric outlet obstruction (GOO) and anemia (23.1%). This finding was similar to a systematic review in 2011, which reported suspected GI bleeding as the most common indication of balloon Enteroscopy (62.5%), followed by symptoms/signs of small-bowel obstruction (5.8%), and Crohn's disease (5.8%).[9] Also, a cross sectional study from British American Hospital within December 2012 to December 2018 reported obscure gastrointestinal bleeding as the main indication for single balloon Enteroscopy.[10] The same results reported from South America in a report of multinational experience.[11] Among the medical records of patients referred for Enteroscopy, abdominal pain (59.5%), history of gastrointestinal bleeding (47.6%), cardiovascular diseases (38.1%), hypertension and diabetes mellitus (31%) were the most common comorbidities which is consistent with the results of a study by Tesijokawa et al. in 2008.[7] After Enteroscopy, there was not any major complication and just some degrees of abdominal pain reported in 4.8% of cases which is concordance with the study of Ramchandani et al.[12] This low rate of complications have confirmed in more recent studies which prove the safety of balloon enteroscopy not only as a diagnostic method but also for therapeutic interventions.[13,14]

The results of current work indicate that there is a significant relationship between chronic renal failure (CRF) and Angiectasia (P=0.03). This relation is a well-known complication of CRF[15] and explained by accelerated early vascular ageing process mediated by medial vascular calcification.[16] Another finding was relation between history of GI bleeding and gastritis that is logistic and have confirmed in other case series.[17,18] Moreover there was relation between diarrhea and duodenitis (P=0.04) which is observed in other studies.[19,20] These findings could be a guide for future investigations for treatment of intestinal diseases and more accurate selection of candidates for small intestine evaluation.

Table 3 Relation between different confounders and Enteroscopy findings (HTN, hypertension (n= 13); CAD,coronary artery disease (n=11); DM, diabetes mellitus (n=13); CRF, chronic renal failure (n=8))

Confounder	Smoking		HTN			CAD	DM			CRF
Finding	Yes	P	Yes	P	Yes	P	Yes	P	Yes	P value
Angiectasia	1/14(7.1%)	0.6	1/13(7.7%)	0.55	2/11(18.2%)	0.01	0/13	0.33	2/8 (25%)	0.003
Diverticula	2/14(14.3%)	0.04	1/13(7.7%)	0.55	1/11(9.1%)	0.43	0/13	0.33	1/8(12.5%)	0.25
Duodenitis	0/14	0.3	1/13 7.7%)	0.55	0/11	0.38	1/13 (7.7%)	0.55	0/8	0.48
Luminal stenosis	1/14 (7.1%)	0.5	0/13	0.11	3 /11 (27.3%)	0.27	2/13 (15.4%)	0.64	1/8 (12.5%)	0.95
Gastritis	2/14 (14.3%)	0.42	3/13 (23.1%)	0.86	0/11	0.04	2/13 (15.4%)	0.52	0/8	1
Ulcer	0/14	1	3/13 (23.1%)	0.59	3/11 (27.3%)	0.91	3/13 (23.1%)	0.59	3/8 (37.5%)	0.53
Polyp	1/14 (7.1%)	0.13	0/13	0.15	1/11 (9.1%)	0.95	0/13	0.15	1/8 (12.5%)	0.75
Bleeding	3/14 (21.4%)	0.62	3/13 (23.1%)	0.75	3/11 (27.3%)	0.92	3/13 (23.1%)	0.75	3/8 (37.5%)	0.41
Carcinoid	1/14 (7.1%)	0.15	1/13 (7.7%)	0.13	1/11 (9.1%)	0.08	1/13 (7.7%)	0.13	1/8 (12.5%)	0.03

Citation: Alavinejad P, Zergani FJ, Tarahom P, et al. Indications and complications of balloon enteroscopy in Southwest of Iran: a 3years cross sectional survey. *Gastroenterol Hepatol Open Access*. 2022;13(4):156–158. DOI: 10.15406/ghoa.2022.13.00515

Conclusion

Single balloon Enteroscopy is a safe procedure and useful for evaluation of source of obscure bleedings and pain of unknown origin with negligible complications.

Acknowledgments

This current article has derived from final thesis of Dr Pardis Tarahom for her course of general physician.

Conflicts of interest

The authors declare that there are no conflicts of interest.

Funding

None.

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