Original Article

An experience of capsule endoscopy from a tertiary care hospital in Pakistan

Sajida Qureshi,[1] Shahriyar Ghazanfar,[2] Altaf Dawood,[3] Muhammad Zubair,[4] Aftab Leghari,[5]
Saad Khalid Niaz,[6] Mohammed Saeed Quraishy[7]

Department of Surgery,[1-3,5,7] Department of Medicine,[4] Department of Gastroenterology,[6] Dow University of Health Science, Civil Hospital, Karachi.

Abstract

Objectives: To evaluate the effectiveness of capsule endoscopy in the management of patients with obscure gastrointestinal bleeding.

Methods: A prospective descriptive study was conducted at surgical unit IV, Civil Hospital Karachi over a period of 2 years from December 2007 to November 2009. Twenty eight consecutive patients presenting with obscure gastrointestinal bleeding were included in the study. Patients having history of acute intestinal obstruction were excluded. Study was approved by the hospital ethical committee. Informed and written consent was taken from all the patients included in the study. The procedure was performed as day case. Patients were asked to swallow a capsule with a glass of water after an overnight fast and bowel preparation. Endocapsule (Olympus MAJ-1469) was used in the study. Examination was termed as complete when the capsule reached the caecum or incomplete if capsule failed to enter the caecum or the battery life was exhausted. Computer recordings were read by two examiners and finally results were interpreted. Follow up was done on telephone every 24 hours till the passage of capsule and then monthly for 4 months. In case of failure to pass the capsule after 14 days or adverse effects like vomiting, abdominal pain, an abdominal radiograph was obtained and decision regarding surgical intervention was made.

Results: A total of twenty eight patients were included in this study, 15 (53.6%) males and 13 (46.4%) females. Age of the patients ranged from 15-85 years (mean 56.25 ± 19.6 years). There were 8(28.6%) diabetics, 8(28.6%) hypertensives and 5(17.9%) hepatitis C positive patients. The indication for the capsule endoscopy was malena in 9 (32.1%), occult bleed in 18 (64.3%) and non specific abdominal pain in 1(3.6%). Examination was completed in 22/28 (78.6%) patients while 6 (21.4%) patients had incomplete examination. In 2/28 (7.1%) patients endoscopic assistance was required to push the capsule through the pylorus. There was history of abdominal surgery in 3/28 (10.7%) patients prior to capsule endoscopy. Capsule entrapment occurred in 2/28 (7.1%) patients who were subjected to surgery. The results of capsule endoscopy showed ulceration and bleeding in distal ileum in 7 patients followed by Arterio Venous Malformation in 6 patients. The management and follow up was done accordingly.

Conclusion: The diagnostic yield of CE in this study was 64.28% (18/28 patients).In a total of 28 patients referred for capsule endoscopy, bleeding was resolved in 13 patients (46.42%). Capsule endoscopy is a well tolerated and safe examination of the small bowel with a diagnostic yield superior to radiological investigations (JPMA 60:1001; 2010).

Introduction

Serious small bowel pathologies are rare but symptoms related to disordered function of small bowel are quite common. Bleeding with diarrhoea and pain are the common reasons for which health care is sought. Although small intestine is on uncommon source of gastrointestinal bleeding but when it occurs it presents unique clinical problems, which differ from upper and lower gastrointestinal bleeding in many aspects. These patients undergo more diagnostic procedures, require more blood transfusions, and have a longer hospitalization with higher health care expenditure.[1]

Demonstration and diagnosis of small bowel lesions is a very challenging task probably because of anatomical inaccessibility of this region by the conventional diagnostic modalities. The available imaging tools of small intestine consists of X-ray studies i.e. Small bowel follow through, Small bowel enema, CT scan, Enteroscopy, Angiography and Technetium 99m labeled RBC scan. Small bowel follow through has a low diagnostic yield 0-5.6% in the investigation of obscure gastrointestinal bleeding.[2] Diagnostic yield of nuclear scanning (sulphur colloid) or RBC scan and angiography are low even in patients with recurrent malena or haematochezia.[3,4]

Capsule endoscopy is a recent technology that allows visualization of small bowel non-invasively. In 1981, Dr Gavriet developed a device by the name of M2A (mouth to anus) capsule which had a camera to visualize small intestine after being swallowed by the patient.[5,6] This was later modified and called Pillcam. This vitamin pill size capsule has enormous potential as a non invasive investigation of small bowel pathologies. Since its introduction in 2001, it has led to enormous impact along with broadening the diagnostic yields of small bowel abnormalities because of its ability to assess small bowel mucosa in details. Clinical conditions which warrant the use of capsule endoscopy apart from obscure gastrointestinal bleeding include NSAID's induced mucosal damage, diagnosis and surveillance of patients with hereditory polyposis syndrome, Inflammatory bowel disease, malabsorption syndrome (coeliac disease), radiation enteritis and clarification of abnormal small bowel imaging. The main indication of capsule endoscopy is however obscure gastrointestinal bleeding.[7]

More than 400 peer reviewed articles about capsule endoscopy have appeared in literature over past six years[8-11] but in our part of the world capsule endoscopy is still a new and emerging diagnostic modality which has not been explored or reported before. We present our experience of 28 cases of capsule endoscopy.

Patients and Methods

A prospective descriptive study was conducted at surgical unit IV, Civil Hospital Karachi over a period of 2 years from December 2007 to November 2009. Twenty eight consecutive patients presenting with obscure gastrointestinal bleeding were included in the study. Obscure bleeding included occult and overt gastrointestinal bleed. Occult bleeding refers to the initial presentation of a positive faecal occult blood test (FOBT) result and/or iron-deficiency anaemia (IDA) when there is no evidence of visible blood loss to the patient or physician. Overt bleeding was defined as a history of multiple episodes of malena, haematemesis or haematochezia. Patients with history of acute intestinal obstruction were excluded from the study. Study was approved by the hospital ethical committee. Informed and written consent was taken from all the patients included in the study.

All patients had endoscopic examination of digestive tract including upper gastrointestinal endoscopy and colonoscopy with retrograde examination of ileum. Other diagnostic investigations included small bowel studies, CT scan and radioisotope scans. Complete medical history, blood picture and history of blood transfusions were recorded in the database. The procedure was performed as day care. Patients were asked to swallow a capsule with a glass of water after an overnight fast and bowel preparation using 30ml of sodium picosulphate on the afternoon prior to the procedure. Endocapsule (Olympus MAJ-1469) was used in the study. Capsule was activated before swallowing and recording started. No limitation of activity was imposed and no promotility drugs were given during the procedure. Examination was termed as complete when the capsule reached the caecum or incomplete if capsule failed to enter caecum or the battery life was exhausted. After this patients were discharged with special advice to check their stools for passage of the capsule. The recording was transferred to the computer database. Computer recordings were read by two examiners and finally results were interpreted. Follow up was done every 24 hours till the passage of capsule and then monthly for 4 months. In case of failure to pass capsule after 14 days or adverse effects like vomiting or abdominal pain, an abdominal radiograph was obtained and decision regarding surgical intervention made.

Results

A total of twenty eight patients were included in this study. There were 15 (53.6%) males and 13 (46.4%) females. Male to female ratio was 1.15:1. Age of the study population ranged from 15-85 years with a mean of 56.25 years ±19.6. There were 8 (28.6%) diabetics, 8 (28.6%) hypertensives and 5(17.9%) hepatitis C positive patients.

The indication for the capsule endoscopy was malena in 9 (32.1%), occult gastrointestinal bleed in 18 (64.3%) and non specific abdominal pain in 1(3.6%). Mean transit time

Table-1: Findings of capsule endoscopy (N=28).

Findings	Number of patients	Percentage %
Ulcerations ± bleeding distal ileum	7	25
Non Bleeding AVM's	6	21.4
Normal	6	21.4
Bleeding AVM	3	10.7
Gastropathy and Duodenopathy	2	7.1
Multiple bleeding areas in small bowel	1	3.6
Multiple polyps in small bowel	1	3.6
Haemobilia	1	3.6
Old blood in ileum	1	3.6

AVM: Arterio Venous Malformation.

from stomach to duodenum was 52.85 ± 51.16 minutes and mean intestinal transit time was 294.9 ± 76.58 minutes.

Examination was completed in 22/28 (78.6%) patients while 6 (21%) patients had incomplete examination. Only 5/28 (17.9%) had CT scan abdomen which was normal. All patients had upper and lower gastrointestinal endoscopy done prior to capsule endoscopy. Upper gastrointestinal endoscopy was normal in 21(75%) while 5 (17.9%) had pangastritis and of the remaining 2 patients, 1 had oesophageal varices while the other had vascular ectasia of stomach. Lower gastrointestinal endoscopy was normal in 22(78.6%) while 2 (7.1%) had Arteriovenous malformation (AVM), 1(3.6%) had

Table-2: Management and follow up of patients (4 months).

Findings	n	Indication	Follow up
Ulcerations ± bleeding distal ileum	7	2 Malena	1 Died
		5 Occult Bleed	1 Crohn's
			5 TB
Non Bleeding AVM's	6	2 Malena	1 req. blood trans.
		4 Occult Bleed	5 maintained Hb
Normal	6	2 Malena	2 req. blood trans.
		3 Occult Bleed	4 maintained Hb
		1 Chronic abd. pain	
Bleeding AVM	3	3 Occult bleed	Argon plasma coagulation. stable
Gastropathy and Duodenopathy	2	1 Malena	Beta blockers and PPI
		1 Occult bleed	stable
Multiple bleeding areas in small bowel	1	1 Malena	Scintigraphy normal
			Enteroscopy normal
			Not bled again
Multiple polyps in small bowel	1	1 Occult Bleed	Surveillance. Hb Stable
Haemobilia	1	1 Occult Bleed	Angiographic embolization
Old blood in ileum	1	1 Malena	Lost to follow up

AVM: Arterio Venous Malformation.

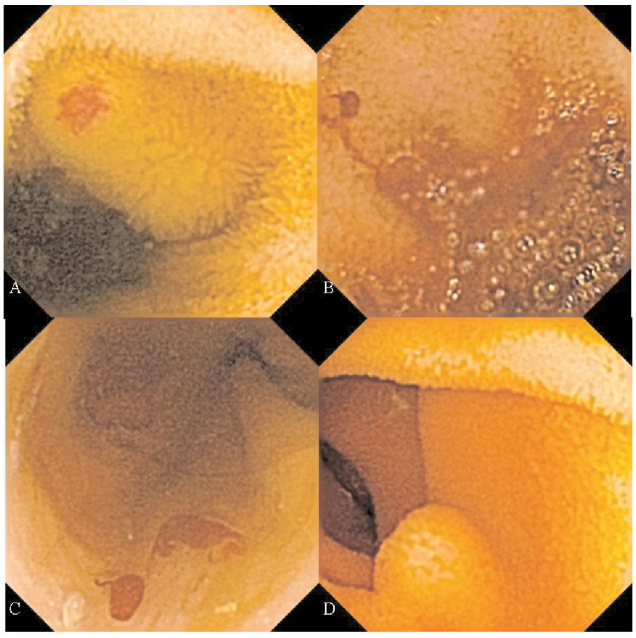

Figure: Capsule endoscopy images. (A) Bleeding AVM in duodenum (B) bleeding ulcer in ileum (C) Haemobilia (D) Polyp in ileum.

a sessile polyp in the rectum, 1 (3.6%) had blood in the colon without any source, 1 (3.6%) had blood in the terminal ileum without any source and 1(3.6%) had multiple polyps in the colon. Mean number of upper gastrointestinal endoscopy was 1.61±0.73 while lower gastrointestinal endoscopy was 1.25±0.51. Radioisotope scan (RBC tagged) was done in 4(14.3%) patients. It was normal in 2 (7.1%) while 1 (3.6%) patient had abnormal tracer in left iliac region and 1 (3.6%) had bleed from the jejunum. In 2/28 (7.1%) patients endoscopic assistance was required to push the capsule through the pylorus after 1.5 hours.

There was history of abdominal surgery in 3/28 (10.7%) patients prior to capsule endoscopy. One patient had resection and anastomosis for small bowel pathology; one had total colectomy for familial adenomatous polyposis while the third patient had limited colectomy for large bowel cancer. Capsule entrapment occurred in 2/28 (7.1%) patients. Two of the patients underwent surgery for capsule retrieval. Definite clue to the source of bleeding was seen in 18/28 patients (64.28%), the most common cause being Arteriovenous malformation seen in 9/28 (32.14%), next

common cause being ileal ulcers with bleeding in 7/28 (25%) patients, where as non diagnostic lesions were seen in 4/28 (14.28%) patients. Normal capsule endoscopy was seen in 6/28 (21.4%) patients. The results of capsule endoscopy are given in Table-1. The management and follow up is given in Table-2.

There were 3 patients with bleeding arteriovenous malformations who underwent argon plasma coagulation and recovered. There was one patient with haemobilia who underwent selective embolization of the bleeding vessel and recovered. Two patients had gastropathy and duodenopathy. One was hepatitis C positive and was managed with beta blockers and proton pump inhibitors. The other patient was hepatitis B and C negative. He was kept on proton pump inhibitors and has received further blood transfusions. Capsule endoscopy images can be viewed in the Figure.

Discussion

Capsule endoscopy has been shown as a good diagnostic tool in patients with obscure gastrointestinal bleeding. It has been shown to be superior to push enteroscopy,[8,11] small bowel series and CT scan, in identifying small bowel lesions.[12,13] Current diagnostic yield of capsule endoscopy is 38-93%.[14,15] The definition of positive finding on capsule endoscopy is an important issue regarding which the consensus is still awaited.[6] In our study nonspecific mucosal changes like red spots, erythema or thickened folds were considered clinically insignificant. Lesions like angioectasias, tumours, masses or ulcers were considered positive findings accounting for blood loss. Bleeding without definite lesion was described as non diagnostic findings. Eighteen (64.3%) patients in our study had occult bleeding and 9 (32.1%) patients had malena. Capsule endoscopy was diagnostic in 18/28 (64.28%) patients in this study which is comparable with the figures given in the international literature.

Up to 20-40% of patients with clinical bleeding had no abnormalities detected by capsule endoscopy in various international clinical trials and studies.[15] The cause for bleeding could not be found in 8/28 (28.57%) patients. The treatment of patients having normal capsule endoscopy remains a dilemma. A study from China published in 2006 looked at the long term follow up of patients with gastrointestinal bleeding after negative capsule endoscopy.[15] It concluded that patients with occult gastrointestinal bleeding and negative capsule endoscopy had a very low rebleed rate so further invasive investigations can be deferred. Whereas the patients with positive capsule endoscopy had higher rebleed rate on long term follow up. Thus these patients warrant further investigations. Only 2/8 (25%) patients needed further blood transfusion in 4 months follow up after capsule endoscopy while the rest did not have any decrease in haemoglobin.

In a study[16] of 309 patients who underwent capsule endoscopy for obscure gastrointestinal bleed, the common findings were small bowel mass, angioectasias and Crohn's disease. The most common finding on capsule endoscopy in our series was arteriovenous malformation seen in 9 patients followed by ulcerations with bleeding in seven patients, five of these turned out to be tuberculosis, all of whom responded to antituberculous therapy. One patient was diagnosed as having Crohn's disease and was started on steroids. The other died one week after capsule endoscopy. The cause of death was unknown. The capsule passed spontaneously in this patient.

Timing of capsule endoscopy in patients who have obscure gastrointestinal bleed has been addressed in a few studies. When the capsule is administered to patients with ongoing overt bleeding the yield is higher (87-92%) than in those with previous overt bleeding or iron deficiency anaemia (46-56%).[17,18] The high yield of capsule endoscopy, however justifies this non-invasive test even if timing cannot be optimized. Only two patients were bleeding at the time of capsule endoscopy in this study. One patient had ulcerations and bleeding in distal ileum (Fig-B) while the other had multiple areas of bleeding in the small bowel but no source could be identified. The patient with ulcerations and bleeding in distal ileum underwent surgery for capsule entrapment. Antituberculous treatment was started and he recovered. The patient with multiple bleeding areas in small bowel had normal scintigraphy. This patient underwent enteroscopy after 1 week of capsule endoscopy, which was normal. This patient has not bled again.

Capsule entrapment occurs in 0.75% to 5% of cases.[19,20] Most entrapment occurs in small intestine usually at the site of small bowel pathology such that surgical intervention also addresses the underlying problem. The risk factors for entrapment include use of NSAID's, prior abdominal radiation, Crohn's enteritis and prior major abdominal surgery. To minimize the risk of capsule entrapment, a patency capsule can be administered. This is a dissolving capsule and of the same size as the video capsule. Alternatively in high risk patients barium small bowel series is recommended to rule out subclinical obstruction. There were 6 patients in this study where the capsule failed to enter the caecum and the examination was termed as incomplete. Four of these patients were with ulcerations and bleeding in the ileum. While one patient had multiple bleeding areas in ileum and one patient had normal study up to the area examined. In 2 (7.14%) patients with ulcerations and bleed in the ileum, capsule entrapment occurred and both underwent surgical exploration. In one patient the capsule got stuck at the site of anastomotic stricture in the small bowel. Resection and anastomosis was done and she was diagnosed as having Crohn's disease and was started on steroids. The other patient

with ulcerations and bleeding in ileum on capsule endoscopy was found to have multiple strictures in the ileum on laparotomy. He was diagnosed as having tuberculosis and treated with antituberculous drugs.

Ideal visualization of the mucosa may be obscured by solid debris, liquid, bubbles and blood.[21] Numerous agents have been used in an attempt to improve visualization of the mucosa during capsule endoscopy. A few small studies have used prokinetics agents or bowel preparation to mitigate these problems. In our study we used bowel preparation in the form of 30ml of sodium picosulphate a day before the procedure. The patients were advised to fast for 8 hours prior to the procedure. Once the capsule entered the duodenum the patients were allowed small amount of clear liquids. This method of bowel preparation proved to be successful.

Conclusion

The diagnostic yield of capsule endoscopy in this study was 64.28% (18/28). In a total of 28 patients referred for capsule endoscopy, bleeding was resolved in 13 (46.42%). Capsule endoscopy is a well tolerated and safe examination of the small bowel with a diagnostic yield superior to radiological investigations.

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