

Capsule Endoscopy: Is it Really Helpful in the Diagnosis of Small Bowel Diseases?

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ABSTRACT

Objective: To determine the diagnostic yield and safety of capsule endoscopy for small bowel diseases. **Introduction:** The small bowel evaluation for any pathology has always been a difficult task because both upper GI endoscopy and colonoscopy could not access this area and other radiological tools like barium studies and CT enteroclysis were less sensitive with associated risk of radiation exposure. Only Push enteroscopy could evaluate the small bowel effectively but was laborious and invasive. Capsule endoscopy was introduced in year 2000 and was accepted with great enthusiasm all over the world³. Now, during the past few years it has also been used for the diagnosis of acute gastrointestinal bleeding in emergency departments and results are quite encouraging^{5,6}. The procedure was introduced at Department of Gastroenterology-Hepatology, Shaikh Zayed Postgraduate Medical Institute, Lahore, Pakistan in year 2009. Since then, it has been regularly used for investigation of small bowel abnormalities. **Methods:** Video Capsule Endoscopy (VCE) using GIVEN Imaging system was performed on 60 patients having various indications like obscure GI bleeding, undiagnosed iron deficiency anemia, abdominal pain and malabsorption. This was a retrospective analytic study carried out at the Department of Gastroenterology-Hepatology,

Shaikh Zayed Postgraduate Medical Institute, Lahore, Pakistan from February 2009 to June 2014. Statistical Analysis was done using SPSS version 22. **Results:** Out of 60 patients, 41 (68.33%) were male, 19 (31.67%) were female. Mean age was 52 years with minimum 11 years and maximum of 85 years. No lesion was found on examination in 8.33% (n=5) patients while presence of blood in the gut resulted in poor visualization in 3.33% (n=2) patients. In remaining 88.34% (n=53) patients, the procedure detected various intestinal lesions. Our study detected presence of Angioectasias in 30.0% (n=18), visible vessels in 6.67% (n=4), strictures in 5.0% (n=3), small bowel ulcers in 10.0% (n=6), edema and erosions in 8.33% (n=5), loss of villi in 11.68% (n=7), intestinal worms in 3.33% (n=2), mass lesions in 8.33% (n=5) and Angioectasia with ulcers in 5.0% (n=3) of patients. The diagnosis in 3 patients was further verified by surgical operation, while enteroscopy was done in 2 patients for confirmation. Capsule impaction occurred in 2 patients. All images of Video Capsule Endoscopy (VCE) were of good quality. **Conclusion:** Capsule endoscopy is a safe and effective procedure with a good diagnostic yield and can be used routinely for the diagnosis of small bowel diseases.

Keywords: Capsule endoscopy, Angioectasia, Obscure GI Bleed, Malabsorption,

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INTRODUCTION

The evaluation of small bowel for any pathology is a difficult task and the small bowel was previously considered the 'no man's land' of the gastrointestinal tract (GIT). The imaging modalities available for investigation of this area

(i.e., small bowel follow through, CT enteroclysis, and push enteroscopy) are laborious, invasive, costly, not readily available and involve significant radiation exposure. With Wireless Capsule Endoscopy (WCE), these issues are resolved in majority of the patients and whilst more traditional methods of small bowel imaging are still utilized, diagnostic yield of Wireless Capsule Endoscopy (WCE) as compared to these is much higher^{1,2,4}.

Capsule endoscopy was first introduced in year 2000 by Iddan et al³ and was accepted with great enthusiasm. Since then, it has become an important tool in the investigation of small bowel abnormalities. Recent studies have been done to evaluate the role of capsule endoscopy in emergency department for diagnosis of acute upper gastrointestinal hemorrhage and results are acceptable^{5,6}.

Major use of capsule endoscopy is for diagnosis of obscure GI bleed when both upper GI endoscopy and colonoscopy are non-conclusive. The yield of capsule endoscopy for picking up the small bowel lesions is much higher as compared to radiological and other endoscopic procedures⁴.

The other indication is to evaluate for celiac disease in patients when the upper GI endoscopy and biopsies are non-conclusive and also to evaluate for distal small bowel involvement as the features of malabsorptions and celiac disease like scalloping of folds, villous atrophy, layering of folds, and a mosaic pattern can be detected by capsule endoscopy⁷. The Department of Gastroenterology-Hepatology, Shaikh Zayed Postgraduate Medical Institute, Lahore, Pakistan is the 2nd center in which Video Capsule Endoscopy (VCE) facility is available while to date only 2 centers are performing this procedure in Pakistan. A study published from the other center showed success rate of the procedure for diagnosis around 64%⁸.

Indications

The indications for the use of capsule endoscopy are as follows^{9,10}:

1. Obscure / Occult Gastrointestinal Bleeding
2. Suspected Crohn's Disease
3. Suspected Small Bowel Tumor
4. Surveillance of Inherited Polyposis Syndrome
5. Evaluation of Abnormal Small Bowel Imaging

6. Evaluation of Drug-Induced Small Bowel Injury
7. Partially Responsive Celiac Disease Chronic Diarrhea

MATERIALS & METHODS

Study Design: A retrospective analytic study. Results of patients who underwent the Video Capsule Endoscopy (VCE) during the period of February 2009 to June 2014 were analyzed.

The study was carried out at the Department of Gastroenterology, Shaikh Zayed Postgraduate Medical Institute, Lahore.

Inclusion Criteria:

Patients with following indications were included in the study

- Obscure GI bleed, both occult and overt bleed
- Suspicion of malabsorption
- Recurrent abdominal pain
- Suspected small bowel tumor
- Chronic diarrhea

Exclusion Criteria:

- Patients having suspicion of small bowel stricture
- Patients with cardiac pacemaker in place
- Children under the age of 10 years

After taking written consent, capsule endoscopy was done in all patients having suspicion of small bowel pathology and fulfilling the inclusion criteria. Upper GI endoscopy and Colonoscopy were done in all patients. For preparation of the bowel, patients were kept on clear liquid diet for 1 day and mild laxative was given a night before the procedure. 2 hours before the procedure, 2xTSF Semithicone suspension was given to reduce the frothing due to gastric secretions and bile.

Given imaging system with pillcam SB capsule and data recorder has been used for the procedure. Before starting the procedure, the patient data was entered in the data recorder through Rapid Software which is specifically meant for this purpose. When fully charged, the data recorder has a battery life of approximately 12 hours.

Patients had electrodes placed on the abdomen according to the requirement and the data recorder was then attached to these electrodes.

PillCam SB of GIVEN imaging for small bowel with battery life of approximately 12 hours was used in all the patients. The patient swallowed the capsule with 2-3 sips of water and just after the

swallowing, the position of the capsule was confirmed by using Rapid Real Time Software. Patient was kept Nil Per Oral for next 2 hours and later on again the position of capsule was checked by using the real time software, and if the capsule had passed into the jejunum, oral liquids were allowed. The position of the capsule was checked every 2 hours till it reached the cecum, which was identified by anatomical landmarks. The procedure was considered complete when the capsule reached the colon. The data recorder and the electrodes were then removed and patient discharged from hospital.

After completion of the data recording, the data recorder was attached to the computer and the recording was transferred through the Rapid Software to the computer either in raw form or to make a video. After making the video, the data was analyzed to pick up the pathology.

Statistical analysis:

Data was analyzed on SPSS version 22. Four variables assessed i.e. gender, age, indications and diagnosis. For age, mean, minimum and maximum were calculated. For remaining three frequency test was applied.

RESULTS

Table 1: Patients distribution (Gender)

Gender	No. of Patients	Percentage (%)
Male	41	68.33
Female	19	31.67

Table 2: Patients distribution (Age)

Age		
Mean	Minimum	Maximum
52.10	11	85

Table 3: Patients Distribution (Indications)

Indication	No of patients	Percentage (%)
Obscure GI bleed	45	75
Chronic Diarrhea	07	12
Abdominal pain	08	13

Table 4: Patients distribution (Disease)

Diagnosis	No. of Patients	Percentage (%)
Angioectasia	18	30.00
Loss of Villi	7	11.68
Ulcers	6	10.00
Small Bowel Mass	5	8.33
Edema & Erosions	5	8.33
Visible Vessels	4	6.67
Strictures	3	5.00
Angioectasia & Ulcers	3	5.00
Worms	2	3.33
Poor Visualization	2	3.33
Normal	5	8.33
Total	60	100.00

Out of 60 patients who were included in the study, 41 (68.33%) were male, while 19 (31.67%) were female (Table1). Mean age was 52 years with minimum 11 years and maximum of 85 years. (Table2) The major indication for the procedure was obscure GI bleed (75%), while other indications were chronic diarrhea and recurrent abdominal pain. (Table3)

5 patients (8.33%) out of 60 did not show any finding. Presence of blood in the gut obstructed visualization in another 2 patients (3.33%). In remaining 53 patients (88.34%), various intestinal lesions were detected. 1 patient required endoscopic assistance to push the capsule beyond the pylorus. Capsule impaction was occurred in two patients (3.33%), which is known complication to in patients having strictures.⁹

Our study revealed presence of Angioectasias in 30.00% (n=18), visible vessels in 6.67% (n=4), strictures in 5.00% (n=3), ulcers in 10.00% (n=6), edema and erosions in 8.33% (n=5), loss of villi in 11.68% (n=7), intestinal worms in 3.33% (n=2), and mass lesions in 8.33% (n=5) patients. 3 patients (5.00%) were diagnosed having both Angioectasia and small bowel ulcers. (Table4)

3 patients were further verified by surgical operation, while enteroscopy was done in 2 patients for the confirmation. Capsule impaction was dealt endoscopically in one patient, while the other required surgical intervention. All images of Video Capsule Endoscopy (VCE) were good. Patients' satisfaction and acceptability of procedure were excellent. Various findings which were initially picked up on Video Capsule Endoscopy (VCE) were later on confirmed via enteroscopy and biopsy in some patients. In 1 patient, hyperemia with inflammation of the intestinal mucosa and skip lesions were found and a diagnosis of Intestinal Crohn's disease was made, later on confirmed via colonoscopy and biopsy of the lesion. Findings of ulcers and Angioectasias beyond the duodenum were subjected to Push enteroscopy for therapeutic purpose which resulted in visual confirmation of the findings thereby completing therapeutic intervention. Overall, this study revealed a good diagnostic yield of over 88% with very low adverse event profile.

DISCUSSION

The findings of this study reveal that capsule endoscopy is helpful in the diagnosis of small bowel diseases. Video Capsule Endoscopy (VCE) is a more acceptable option for the patients, as those who can afford this prefer a capsule over push enteroscopy. This study reveals that capsule endoscopy was able to pick up the findings in a large number of patients (>88%) while only a minority had a negative report. These results are much higher as compared to the previous study carried out at Civil Hospital Karachi.⁸ The study by Iddan et al³ further states that video capsule endoscopy is not operator dependent and can be used as a reliable tool for evaluation of various disorders of gastrointestinal tract. Further advancements in the software and hardware relevant to this field shall further enhance its reliability and application in investigation of small bowel disorders. Currently, not much data is available in Pakistan regarding efficacy of this novel procedure.

CONCLUSION

Video Capsule Endoscopy (VCE) despite being more costly than regular endoscopy is a useful tool in the investigation of small bowel disorders. It is a comfortable procedure for the patients and involves no risk of serious complications, which may be associated with regular endoscopies and enteroscopies. With the only disadvantage of being non therapeutic, Video Capsule Endoscopy (VCE) proves to be a very useful tool in diagnosing small bowel diseases.

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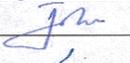
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