

## The Diagnostic Yield of Capsule Endoscopy in Egyptian Patients with Obscure Gastrointestinal Tract Bleeding

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### ABSTRACT

**Background:** Obscure gastrointestinal bleeding (OGB) is defined as a gastrointestinal (GI) bleeding of unknown aetiology that persists despite conventional assessment. OGB accounts for about 5% of all GI bleeding and is a real issue for doctors.

**Objective:** The major goal of this study was to see how effective capsule endoscopy (CE) was at diagnosing Egyptian patients with gastrointestinal (GI) bleeding, whether it was occult or overt.

**Patients and methods:** This is a prospective observational single center study. 32 patients with OGIB (overt or occult) were referred for capsule endoscopy during the 30-month period (from June 2017 to December 2019) to the Endoscopy Unit at Hospital of Ain Shams University. Follow up patients after performing capsule endoscopy was done, some of them were recommended to do enteroscopy, and the others were referred for either surgery, radiological intervention or just medical treatment according to the pathology detected by the capsule.

**Results:** In the current study, capsule endoscopy was able to detect accurate findings in all studied cases (twenty five) with exception of seven cases (22%) with overall diagnostic accuracy were 78%

**Conclusion:** Capsule endoscopy is an excellent tool in evaluation of obscure gastrointestinal bleeding (both overt and occult) with relative safety and high diagnostic yield, which helps guiding therapeutic management.

**Keywords:** Capsule endoscopy (CE), Obscure gastrointestinal bleeding (OGIB)

### INTRODUCTION

Obscure gastrointestinal bleeding (OGB) is defined as persistent, recurrent gastrointestinal (GI) bleeding of unknown aetiology despite standard evaluations such as upper endoscopy, colonoscopy, and small intestine specific radiological and endoscopic investigations. OGB accounts for about 5% of all GI bleeding and is a real challenge for clinicians<sup>(1)</sup>. Because endoscopists find difficulty in reaching the small bowel, it is dubbed "the dark continent of the GI system"<sup>(2)</sup>.

In the evaluation and therapy for OGIB, capsule endoscopy (CE) and device-assisted enteroscopy (DAE) have shown their worth and have a substantial impact on the result<sup>(3)</sup>.

### PATIENTS AND METHODS

This is a prospective observational single center study. Patients with OGIB (overt or occult) were referred for capsule endoscopy during the 30-month period (from June 2017 to December 2019) to the Endoscopy Unit at Ain shams (AL Demerdash) University Hospital. History taking, examination and investigations including complete blood count, liver and kidney functions, serum electrolytes, fecal occult blood test and coagulation profile for all cases of obscure GI hemorrhage. Abdominal ultrasound and CT abdomen with contrast was done to every patient.

All participants were instructed to undergo bowel preparation, which included adherence to a clear fluid diet and ingestion of poly ethylene glycol mixed with 2 liters of water for 24 hours prior to the procedure and also to avoid food or water for 12 hours before capsule.

### Capsule endoscopy procedure:

Capsule endoscopy was carried out after informed consent if upper endoscopy, ileocolonoscopy and radiological imaging modalities were failed to diagnose the cause of blood loss.

OMOMTM capsule endoscopy (Chongqing Jinshan Science and Technology Company, Chongqing, China) was used for this study. The recording was continued until 8 hours. When the assembly was turned off and the data were downloaded to a computer using conventional software (Rapid Reader) to examine the images.

Patients were allowed to start drinking colourless fluids at 2 and 4 hours after ingestion of the capsule and eating of light meal after 6 hours from capsule ingestion.

In every case, the capsule's excretion in the stool was monitored. If the capsule's excretion failed after 7 days, the capsule's position was verified by a plain X-ray of the abdomen.

### Interpretation:

When a bleeding source was discovered within the small bowel, CE findings were classified as positive, and when no source of haemorrhage was detected within the small bowel, they were classified as negative. A bleeding source is described as a lesion that has evident bleeding (current bleeding or blood clot) or a lesion that does not have obvious bleeding but could be the source of blood loss.

Follow up patients after performing capsule endoscopy was done, some of them were recommended to do enteroscopy, the other were referred for either surgery,

radiological intervention or just medical treatment according to the pathology detected by the capsule. The gold standard for confirming or refuting the lesion found on CE was enteroscopy or surgical findings. Clinical response to the prescribed treatment (e.g. gluten-free diet, antihelminthic) was accepted as evidence of real positive of the lesion observed on CE in patients treated medically. Re-evaluation with enteroscopy was done in individuals with a negative CE test who nevertheless complained of obscure bleeding.

**Ethical approval:**

**This work was conducted in accordance with the Code of Good Practice and the guidelines of**

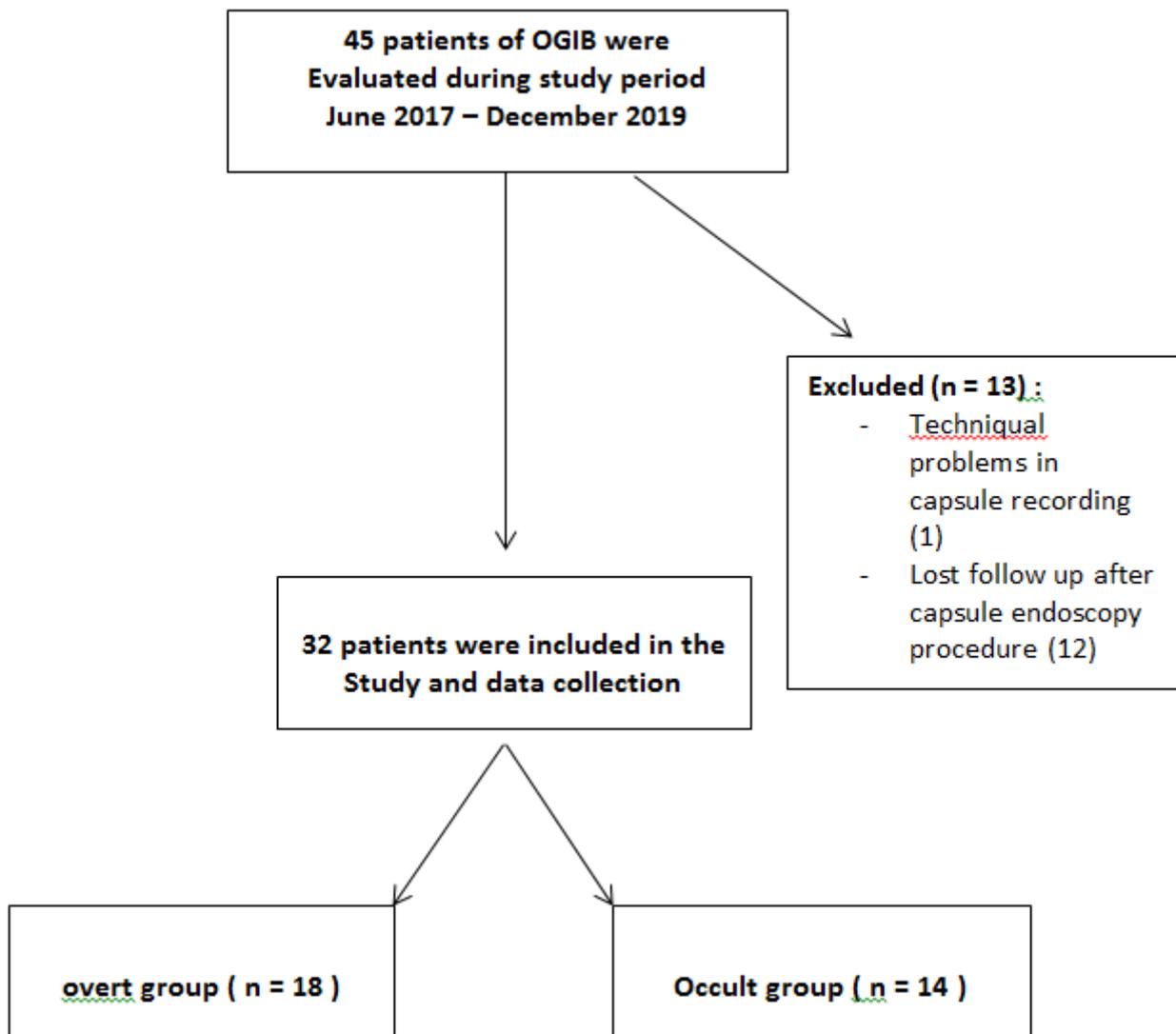
**Declaration of Helsinki, 7<sup>th</sup> revision, 2013 and being approved by the Medical Ethics Committee of the Faculty of Medicine at Assiut University. Informed consent was obtained from each patient.**

**Statistics interpretation**

The researcher checked the data, coded it, and analysed it with SPSS version 24. We calculated means, standard deviations, medians, ranges, and percentages.

**RESULTS**

Thirty-two patients were included in our study as per inclusion and exclusion criteria adopted in the study.



**Figure (1): Enrolment of cases with OGIB for capsule endoscopy**

OGIB, obscure gastrointestinal bleeding; n, number

**Demographic data of study group**

Age of enrolled patients ranged between 19 and 75 years with mean age was  $52.84 \pm 13.95$  years and median 56 years. Out of the studied patients, 17 (53.1%) were male gender and 15 (46.9%) were female gender.

**Clinical presentation among enrolled patients**

30 patients (93.8%) were presented with anemia, while 18 (56.3%) patients suffered from overt gastrointestinal bleeding. One patient (3.1%) suffered from diarrhea. Abdominal pain and loss of weight were presented in 12 (37.5%) and 8 (25%) patients, respectively. One patient might have more than one presentation.

**Co-morbid conditions**

Out of studied patients: 12 (37.5%) patients had chronic liver disease, 4 (12.5%) patients had diabetes mellitus and two patients (6.3%) had history of bilharziasis. Each of bleeding disorder (hemophilia), ischemic heart disease, and hypertension were present separately in only one patient (3.1%). 11(34.4%) patients had no co-morbid conditions.

**Capsule endoscopy findings**

As regard capsule endoscopy findings among the enrolled patients in our study; 18 patients had angiodysplasia, one patient had marked fissuring, festooning and atrophic villi with picture suggestive of coeliac disease by capsule endoscopy and six patients were normal. In our study no detected significant complications were observed and the capsule examined the entire small bowel in all enrolled patients (Table 1).

**Table (1): Capsule endoscopy findings**

Capsule endoscopy diagnosis	No. (32)	%
Angiodysplasia	18	56.3%
Intestinal parasites	2	6.3%
Atrophic villi	1	3.1%
Large bleeding ulcer	1	3.1%
Jejunal and ileal varices	1	3.1%
Small bowel mass	1	3.1%
Small bowel polyps	1	3.1%
Multiple small ulcers	1	3.1%
Normal findings	6	18.8%

**Confirmation of findings**

After application of capsule endoscopy, 27 patients (21 patients with positive findings and 6 patients who revealed normal findings) underwent enteroscopy either push or double balloon according to site of findings that was detected by capsule endoscopy. Two patients were referred to surgery (one had small bowel mass and the other had large bleeding small bowel ulcer), two patients who were diagnosed to have

small intestinal parasites received medical treatment, and lastly one patient diagnosed with ectopic varices was referred for transjugular intrahepatic portosystemic shunt (TIPS).

**Table (2): Final diagnosis among the enrolled patients**

	N= 32
Angiodysplasia	19 (59.4%)
Intestinal parasites	2 (6.3%)
Coeliac disease	1 (3.1%)
Ectopic varix	1 (3.1%)
Small bowel mass	1 (3.1%)
small bowel ulcers	2 (6.3%)
Small bowel polyp	4 (12.5%)
Normal findings	2 (6.3%)

Data expressed as frequency (percentage).

In our study, 18 cases presented with overt GI bleeding (melena, bleeding per rectum) and 14 cases presented with history of occult bleeding (Iron deficiency anemia (IDA) with positive occult blood test in stool in all cases).

**Accuracy of capsule endoscopy in diagnosis of obscure gastrointestinal bleeding:**

According to the previously mentioned final diagnosis among enrolled 32 patients. Capsule endoscopy was able to detect accurate findings in all studied cases with exception of seven cases (22%) with overall accuracy in detection of lesions was 78%.

In our study, the overall accuracy of capsule endoscopy in the diagnosis of cases with obscure occult gastrointestinal bleeding was 71%, but the overall accuracy of capsule in diagnosis of cases with obscure overt gastrointestinal haemorrhage was up to 83%.

**Table (3): Accuracy of CE in diagnosis of obscure gastrointestinal bleeding**

Final diagnosis	Diagnosis by capsule endoscopy		Total
	Correct	Incorrect	
Angiodysplasia	16	3	19 (59.4%)
Coeliac disease	1	0	1 (3.1%)
Ectopic varix	1	0	1 (3.1%)
Multiple small bowel ulcers	1	0	1 (3.1%)
Intestinal parasites	2	0	2 (6.2%)
Small bowel large single ulcer	1	0	1 (3.1%)
Small bowel mass	1	0	1 (3.1%)
Small bowel polyp	1	3	4 (12.5%)
Normal findings	1	1	2 (6.2%)
<b>Total</b>	<b>25 (78%)</b>	<b>7 (22%)</b>	<b>32 (100%)</b>

Data expressed as frequency (percentage). **CE:** capsule endoscopy

## DISCUSSION

Capsule endoscopy was able to detect accurate results in all twenty-five cases tested, with the exception of seven cases (22%), resulting in total diagnostic accuracy of 78 %. The diagnostic accuracy of CE in OGIB has been found to be 32 % to 83 % according to **Min et al.** <sup>(3)</sup>. The detection rate of CE for possible culprit lesions in OGIB ranges from 35 % to 79 %, according to another study by **Min et al.** <sup>(5)</sup> Clinically significant lesions were discovered in 49 individuals in **Chang et al.**'s <sup>(6)</sup> investigation, with a diagnostic yield of 34%.

No severe problems, such as retention, perforation, aspiration, or technical issues, were discovered in this trial. Our findings were backed up by a research by **Kaisara et al.** <sup>(7)</sup>, who found no problems during the capsule endoscopy operation. The capsule retention rate was 1.96 % in a study by **Chauhan et al.** <sup>(8)</sup>.

The most common finding by capsule endoscopy in the current investigation was angiodysplasia (16 patients by both capsule endoscopy and enteroscopy). **Ghoshal et al.** <sup>(9)</sup> found that vascular abnormalities were the most common finding, which backed up our findings. Lesions were found in 74 of 102 (72.5 %) of the patients in **Chauhan et al.** <sup>(8)</sup> investigation and twenty-one people had vascular anomalies (20.5 %). Mucosal break was considered the commonest lesion (53.3 %) among positive findings in the small intestine, according to **Otani et al.** <sup>(10)</sup>.

In the current study, the overall accuracy of capsule endoscopy in the diagnosis of cases with obscure occult was 71% and overt gastrointestinal bleeding was 83%. CE exhibited a greater diagnostic yield (64.1%) in patients with overt GI bleeding than in patients with occult GI bleeding (43.9 %), according to **Alyoubaki et al.** <sup>(11)</sup> In another study by **Ribeiro I et al.** <sup>(12)</sup>, positive findings were seen in 93 % of patients with on-going-overt OGIB, but only in 31.2% of patients who were presented with occult OGIB.

## CONCLUSION

Capsule endoscopy is an excellent tool in evaluation of obscure gastrointestinal bleeding (both overt and occult) with relative safety and high diagnostic yield, which helps in guiding therapeutic management. Also determining the optimal timing for its utilization is critical in order to obtain the maximum impact.

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**All authors have read and approved the manuscript.**

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