Arab Journal of Gastroenterology 10 (2009) 57–62

Contents lists available at ScienceDirect

Arab Journal of Gastroenterology

journal homepage: www.elsevier.com/locate/ajg

The role of capsule endoscopy in obscure gastrointestinal bleeding

Mohamed Serag Zakaria [a,*], Magdy Amin El-Serafy [a], Iman Mohamed Hamza [a], Khaled Serag Zachariah [a], Tamer Mahmoud El-Baz [a], Jan Bures [b], Ilja Tacheci [b], Stanislav Rejchrt [b]

[a] Tropical Medicine Department, Faculty of Medicine, Cairo University, Egypt
[b] Department of Internal Medicine, Charles University, Faculty of Medicine, Hradec Kralove, Czech Republic

ARTICLE INFO

Article history:
Received 10 April 2009
Accepted 27 May 2009

Keywords:
Capsule endoscopy
Obscure gastrointestinal bleeding

ABSTRACT

Background and study aim: Obscure gastrointestinal bleeding is mostly recurrent and originates in the small bowel, which can be only partially examined by conventional endoscopy. Capsule endoscopy has revolutionized the evaluation of obscure gastrointestinal bleeding (OGIB). The diagnostic yield of capsule endoscopy in OGIB was a main concern of many studies. The aim of this study is to assess the diagnostic yield of capsule endoscopy in cases of OGIB. Capsule-related complications and degree of inter-observer variation will be recorded as well.

Patients and methods: 54 consecutive patients suffering from OGIB, whether occult or overt, were subjected to capsule examination and data analysis.

Results: The majority (74.1%) presented with obscure overt bleeding. Examination was complete in 68.4%. The commonest lesions were angiodysplasias (17.5%). Examinations were negative for lesions in 35.1% and hampered by limitations in 19.3%. The capsule diagnostic yield was 56.1%, while capsule retention occurred in 3.5%. The inter-observer agreement for the cause of bleeding was 91.2%.

Conclusions: Capsule endoscopy proved helpful in solving the mystery of OGIB. It succeeded in diagnosing the cause of bleeding and directing further management with good compliance, high proportion of inter-observer agreement and low incidence of complications.

Introduction

Patients with gastrointestinal hemorrhage of uncertain etiology are a diagnostic and therapeutic challenge [1]. By definition, obscure gastrointestinal bleeding is bleeding of unknown origin that persists or recurs (i.e. recurrent or persistent iron deficiency anemia (IDA), fecal occult blood test (FOBT) positivity, or visible bleeding) after negative endoscopic evaluation, including colonoscopy and/or upper endoscopy. Obscure gastrointestinal bleeding is divided into two types: obscure overt bleeding (clearly visible bleeding) and obscure occult bleeding which refers to hemo-occult positive stools with or without IDA [2]. Although infrequent (5–10% of all gastrointestinal bleeding), it is a diagnostic problem because bleeding is commonly recurrent and originates in the small bowel. Small bowel examination is usually incomplete by conventional endoscopy. Accordingly, patients with OGIB usually receive repeated endoscopic procedures and blood transfusions in multiple hospitalizations [3].

Vascular ectasias are the most common cause of obscure bleeding and account for up to 60% of lesions. Other important lesions include small bowel tumors, varices, ulcers, neoplastic, ischemic and NSAIDs associated lesions [4]. Although gastroscopy and/or colonoscopy can locate a bleeding source in more than 90% of these cases, in a small number of patients these examinations do not reveal the source of bleeding [1,5].

Capsule endoscopy is an ingestible miniature camera device capable of obtaining images of the whole small intestine. It comprises a new type of radiotelemetry video system which is small enough to be swallowed and has no external wires, fiberoptic bundles or cables. The addition of capsule endoscopy to the gastrointestinal armamentarium has revolutionized the evaluation of OGIB [6]. The major role of this new tool is to confirm, identify and localize a suspected small bowel bleeding source [7]. Being a purely diagnostic test, the recorded improvements in bleeding parameters cannot be directly attributed to capsule endoscopy. Instead, it is likely that the capsule directs clinicians to the most appropriate definitive therapy [6].

The aim of this study is to assess the diagnostic yield of capsule endoscopy in cases of obscure gastrointestinal bleeding, giving an idea about its predictive value for detecting the source of bleeding. Any capsule-related complications will be recorded. Additionally, the degree of inter-observer agreement will be recorded.

* Corresponding author. Address: Tropical Medicine and GI-Endoscopy Department, Kasr El-Aini Faculty of Medicine, Cairo University, Cairo, Egypt. Tel.: +20 2 3648170; fax: +20 2 5326439.
E-mail address: mserag@seragcenter.com (M.S. Zakaria).

1687-1979/$ - see front matter © 2009 *Arab Journal of Gastroenterology*. Published by Elsevier B.V.
doi:10.1016/j.ajg.2009.05.004

Patients and methods

This is a retrospective study of 54 consecutive patients suffering from obscure gastrointestinal bleeding. Fifty-seven capsule endoscopies were performed (three patients repeated the capsule endoscopy because of unexplained capsule retention in the stomach, marked limited view by excess blood and assessing a case of recurrent bleeding after managing angiodysplasias discovered by first capsule endoscopy). All capsule endoscopies were performed in the endoscopy unit of the Hradec Kralove University Hospital, Charles University, Czech Republic. Capsule endoscopy videos were analyzed by Czech experts and revised by an Egyptian second observer.

By definition, obscure gastrointestinal bleeding was considered as bleeding of unknown origin that persists or recurs after an initially negative endoscopy by gastroscopy and colonoscopy [2].

It was classified into:

- Obscure overt bleeding: apparent bleeding as hematemesis, melena and fresh bleeding per rectum.
- Obscure occult bleeding: positive fecal occult blood test or progressive anemia.

Inclusion criteria

- Age older than 10 years.
- Negative or irrelevant upper endoscopy.
- Negative or irrelevant colonoscopy.

Exclusion criteria

- Cases with suspected gastrointestinal obstruction.
- Pregnancy.
- Cardiac pacemaker installment.

Patients were instructed to have a clear fluid diet for 24 h before the study (without bowel preparation). A data recorder, to which the skin antennas were connected, was fixed to the abdominal wall in a designated pattern. The used capsule measures 11 mm in diameter, 26 mm in length and 3.7 g weight; it acquires and transmits two images per second. After ingestion of the capsule, patients were monitored for 8 h; the data recorder was then connected to the work station for downloading and processing of data. Some of the performed examinations were done using the small bowel Endocapsule by Olympus, while the majority was done by the Pill cam TM SB capsule endoscope using the given diagnostic system.

Results

The majority of the patients presented with obscure overt bleeding (74.1%) rather than occult bleeding (25.9%) (*P*: 0.01). Studied patients were age and sex matched, with equal intake of NSAIDs (23.5% and 16.7%) and anticoagulants (39.4% and 8.3%) among the overt and occult groups. Patients with occult bleeding were more anemic (mean hemoglobin 7.7 ± 1.77 g/dl) than the overt group (mean hemoglobin 9.45 ± 2.1 gms/dl, *P*: 0.02). The mean age at time of presentation was 61.2 years.

Examinations were performed using the Pillcam capsules in 52 (91.2%) cases and the Olympus endocapsule in five cases (8.8%). Examinations were done in a mean time of 8 h (480 min ± 60.63 min) and a mean of 90.7 min (±33.3 min) was needed to interpret the recorded videos. Complete examination was considered if the capsule reached the caecum (39 out of 57 examinations, 68.4%). Endoscopic introduction of the capsules was done in 15 cases. It assisted completeness of examination in only half of these cases (eight cases, 53.3%); in the other seven cases the proper lesion was diagnosed within the recorded period in six cases and only one case required repetition of capsule examination.

Calculation of the transit time was derived only from capsules performed without assisted endoscopic introduction (a total of 42 capsules out of which 31 reached caecum and 11 were incomplete). Mean gastric transit time (GTT) for all the 42 capsules was 24.88 min. For the 31 cases with complete examination the mean GTT was 18.4 ± 20.44 min, while the mean GTT was 43.1 ± 66.72 min in cases with incomplete examination (*P*: 0.27, by Welch test).

For cases reaching the caecum, small bowel transit time (SBTT) averaged 4 h 33 min and caecal entry time (CET) averaged 4 h 45 min. The suspected blood indicator (SBI), which automatically marks images that correlate with suspected blood in the small intestine, had a sensitivity of 49.5% and a specificity of 95%.

Total agreement (between a first observer (expert) and a second observer (trainee)) is shown in Table 1; the second observer over diagnosed a red spot as angiodysplasia, falsely considered the pyloric ring as a submucosal tumor in a retrograde view from the duodenum and lastly misnamed some phlebectasias as varices (see Table 2).

Limitations of examination were detected in 11 cases (19.3%). A markedly limited view due to the presence of excess bubbles or blood occurred in 7% (four cases); prolonged gastroparesis and capsule retention occurred in 3.5% (two cases). One case had pro-

Table 1
Findings driven from capsule examination.

	Mean/Number	STD/%
Gastric transit time (42 cases) mins	24.9	±39.89
Small bowel transit time (31 cases) mins	273.1	±78.5
Caecal entry time (31 cases) mins	285.9	±80.41
SBI[b] overall sensitivity	45.9%	
SBI[b] overall specificity	95%	
SBI[b] detecting angiodysplasias (10 cases)	4	40%
IOA[a] for transit times	55	96.5%
IOA[a] for cause of bleeding	52	91.2%
False positive lesions	3	5.3%

[a] IOA: Inter-observer agreement.
[b] SBI: Suspected blood indicator.

Table 2
Findings on capsule endoscopy.

Type of lesion	Number	%
Positive lesions (definite bleeding source)		
Total[a]	35/57	56.1
• Angiodysplasia	10	17.5
• Fresh blood	6	10.5
• Enteropathy ± ulcer	5	8.8
• Erosions	5	8.8
• Varices, phlebectasias and gastroentero-colopathy	3	5.3
• Ulcer	3	5.3
• Tumor	3	5.3
Suspected lesions (potential bleeding source)		
Total	5/57	8.8
• Erosions	3	5.3
• Red spots	2	3.5
No lesions	20/57	35.1

[a] Positive lesions were 35 lesions seen in 32 capsules as 3 cases had double lesions as follows: Angiodysplasias and ulcer; Fresh blood and erosions; and Angiodysplasias and erosions.