

Capsule endoscopy: Current status in obscure gastrointestinal bleeding

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Abstract

Capsule endoscopy (CE) is a safe, non invasive diagnostic modality for the evaluation of small bowel lesions. Obscure gastrointestinal bleeding (OGIB) is one of the most important indications of capsule endoscopy. Capsule endoscopy has a very high diagnostic yield especially if the bleeding is ongoing. This technique appears to be superior to other techniques for the detection of suspected lesions and the source of bleeding. Capsule endoscopy has been shown to change the outcome in patients with obscure gastrointestinal (GI) bleed.

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Key words: Capsule endoscopy; Obscure gastrointestinal bleeding; Luminal endoscopy; Diagnostic yield; Small bowel study

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INTRODUCTION

Visualization of the small bowel presents a great challenge to the practicing physician and is considered the final frontier in luminal endoscopy. Newer technologies are constantly being developed towards the goal of better, safer, and complete evaluation of the small intestine. Capsule endoscopy (CE) is a major technological advance in this direction. Its non invasive nature, safety profile, capability of imaging the entire small bowel and its ability to store images makes CE the investigation of choice for the evaluation of small bowel lesions. Obscure gastrointestinal bleeding (OGIB) both in the overt and

occult forms is one of the most important indications for CE^[1]. The widespread acceptability and utility of CE in OGIB is evident from the fact that the number of publications in peer reviewed journals have steadily increased since the first publication in 2000^[2]. The present article attempts to review the progress made in the last decade with special emphasis on the use of capsule endoscopy in obscure gastrointestinal (GI) bleeding.

Diagnostic yield of CE

Evaluation of the current status of CE in OGIB requires assessment of the efficacy and accuracy of the procedure. The diagnostic yield of CE in OGIB is extremely variable^[3,9], from > 70% in small studies (< 20 patients) to < 60% in larger studies (> 50 patients). In reality, the overall positive diagnostic yield of CE in OGIB is around 50%. Subgroup analysis shows that the diagnostic yield is much higher, reaching 92.3% in patients with ongoing overt GI bleeding compared with 44.2% in obscure occult bleeding and 12.9% in past OGIB. Current data suggests that the timing of the procedure is very important in optimizing the yield of CE in OGIB^[10]. The ICCE consensus meeting on OGIB recommended that CE should be performed early (preferably within 2 wk) in the workup of patients with OGIB^[11].

Comparison of CE with other modalities

The second issue is whether CE is superior to other diagnostic tests in the evaluation of OGIB^[12-16]. A meta-analysis compared CE with other modalities in patients with OGIB^[17], and showed that the diagnostic yield of CE was superior to push enteroscopy, small bowel radiography, CT enteroclysis, mesenteric angiography and small bowel MRI. Recently, several studies have compared CE with Double Balloon Enteroscopy (DBE). The detection rate of potential bleeding source was significantly better with CE than DBE^[18]. However these two procedures should be considered complimentary and not competitive. The usefulness of repeat CE in OGIB has been reported. In a retrospective study, repeat CE in patients with OGIB showed additional findings in 75% patients^[19]. However this data needs further validation with prospective studies.

The role of CE in iron deficiency anaemia

The role of CE in the evaluation of iron deficiency anaemia is still evolving. In two recent studies, the yield of CE in iron deficiency anemia using strict diagnostic criteria varied from 57% to 80%^[20,21]. These results

are encouraging and suggest a definite role of CE in documented iron deficiency anaemia.

Impact of CE on clinical outcome

Although several studies have assessed the yield of CE in OGIB, the exact significance of the lesions identified and their impact on clinical outcome has not been adequately examined. When we consider outcome in clinical practice, the emphasis should be on meaningful and positive results. In the case of OGIB, a positive outcome should either be stoppage of bleeding or resolution of anemia. The majority of studies on CE in OGIB discuss change in management rather than a change in the outcome. Pennazio *et al* determined the outcome in 56 patients, with a mean follow up of 18 mo. Complete resolution of bleeding was seen in 86.9% patients with ongoing overt GIB, 69.2% in occult OGIB and 41.4% in past OGIB. Other studies have assessed the change in clinical decision making after CE, with figures varying from 22% to 88% in patients with OGIB. In a multicentre study, Alberts *et al* assessed the impact of CE on clinical outcomes based on 247 capsule studies^[22]. A specific intervention or change of management was implemented in about 2/3rd of the patients who had a definite diagnosis on CE. In another recent study, 70% patients underwent definitive treatment based on CE results. On the other hand, Rastogi *et al* reported a positive clinical outcome in only 16% patients.

It is difficult to draw definite conclusions from these conflicting results. The variations in outcome may be explained by the differences in study population, the lack of a standardized approach to management, and different policies at different medical centers. However there is no doubt that CE plays a definite role in planning the management of patients with OGIB.

Cost effectiveness of CE

Not many studies have addressed the issue of cost effectiveness of CE in OGIB. One study examined the cost effectiveness of several approaches including initial DBE, CE followed by DBE if a lesion was detected, push-enteroscopy, intraoperative-enteroscopy, angiography and no treatment for the diagnosis and management of small bowel angiectasia, in patients with transfusion dependent obscure/occult bleeding. DBE was found to be the most cost effective strategy; however CE followed by DBE was more cost effective if the probability of angiectasia at DBE was less than 59%^[23]. Prospective clinical studies are needed to clarify as to when to use DBE or CE as the initial study.

CONCLUSION

Despite its limitation of being a purely diagnostic modality, CE is an important tool in the evaluation of OGIB. The technology is improving at a fast pace. The development of new software has reduced considerably the reading time of CE images. Many new capsule endoscopes are under development. CE is clearly a giant technological leap in GI endoscopy. In the near future, the technological qualities of capsule endoscope are likely to improve. A capsule

endoscope capable of not only localizing, but also treating a suspected lesion is a distinct possibility.

REFERENCES

- 1 Swain P, Adler D, Enns R. Capsule endoscopy in obscure intestinal bleeding. *Endoscopy* 2005; **37**: 655-659
- 2 Iddan G, Meron G, Glukhovskiy A, Swain P. Wireless capsule endoscopy. *Nature* 2000; **405**: 417
- 3 Pennazio M, Santucci R, Rondonotti E, Abbiati C, Beccari G, Rossini FP, De Franchis R. Outcome of patients with obscure gastrointestinal bleeding after capsule endoscopy: report of 100 consecutive cases. *Gastroenterology* 2004; **126**: 643-653
- 4 Appleyard MN, Walsh A. Capsule endoscopy for obscure gastro intestinal bleeding; a report of 100 consecutive cases and long term clinical outcome. *Gastrointest endosc* 2006; **63** Suppl: S154
- 5 Gupta R, Lakhtakia S, Tandan M, Banerjee R, Ramchandani M, Anuradha S, Ramji C, Rao GV, Pradeep R, Reddy DN. Capsule endoscopy in obscure gastrointestinal bleeding--an Indian experience. *Indian J Gastroenterol* 2006; **25**: 188-190
- 6 Ersoy O, Sivri B, Arslan S, Batman F, Bayraktar Y. How much helpful is the capsule endoscopy for the diagnosis of small bowel lesions? *World J Gastroenterol* 2006; **12**: 3906-3910
- 7 Lewis BS, Swain P. Capsule endoscopy in the evaluation of patients with suspected small intestinal bleeding: Results of a pilot study. *Gastrointest Endosc* 2002; **56**: 349-353
- 8 Appleyard M, Glukhovskiy A, Swain P. Wireless-capsule diagnostic endoscopy for recurrent small-bowel bleeding. *N Engl J Med* 2001; **344**: 232-233
- 9 Rastogi A, Schoen RE, Slivka A. Diagnostic yield and clinical outcomes of capsule endoscopy. *Gastrointest Endosc* 2004; **60**: 959-964
- 10 Bresci G, Parisi G, Bertoni M, Tumino E, Capria A. The role of video capsule endoscopy for evaluating obscure gastrointestinal bleeding: usefulness of early use. *J Gastroenterol* 2005; **40**: 256-259
- 11 Pennazio M, Eisen G, Goldfarb N. ICCE consensus for obscure gastrointestinal bleeding. *Endoscopy* 2005; **37**: 1046-1050
- 12 Appleyard M, Fireman Z, Glukhovskiy A, Jacob H, Shreiver R, Kadirkamanathan S, Lavy A, Lewkowicz S, Scapa E, Shofti R, Swain P, Zaretsky A. A randomized trial comparing wireless capsule endoscopy with push enteroscopy for the detection of small-bowel lesions. *Gastroenterology* 2000; **119**: 1431-1438
- 13 Eli C, Remke S, May A, Helou L, Henrich R, Mayer G. The first prospective controlled trial comparing wireless capsule endoscopy with push enteroscopy in chronic gastrointestinal bleeding. *Endoscopy* 2002; **34**: 685-689
- 14 Costamagna G, Shah SK, Riccioni ME, Foschia F, Mutignani M, Perri V, Vecchioli A, Brizi MG, Picciorchi A, Marano P. A prospective trial comparing small bowel radiographs and video capsule endoscopy for suspected small bowel disease. *Gastroenterology* 2002; **123**: 999-1005
- 15 Hara AK, Leighton JA, Sharma VK, Fleischer DE. Small bowel: preliminary comparison of capsule endoscopy with barium study and CT. *Radiology* 2004; **230**: 260-265
- 16 Hartmann D, Schmidt H, Bolz G, Schilling D, Kinzel F, Eickhoff A, Huschner W, Möller K, Jakobs R, Reitzig P, Weickert U, Gellert K, Schultz H, Guenther K, Hollerbuhl H, Schoenleben K, Schulz HJ, Riemann JF. A prospective two-center study comparing wireless capsule endoscopy with intraoperative enteroscopy in patients with obscure GI bleeding. *Gastrointest Endosc* 2005; **61**: 826-832
- 17 Triester SL, Leighton JA, Leontiadis GI, Fleischer DE, Hara AK, Heigh RI, Shiff AD, Sharma VK. A meta-analysis of the yield of capsule endoscopy compared to other diagnostic modalities in patients with obscure gastrointestinal bleeding. *Am J Gastroenterol* 2005; **100**: 2407-2418
- 18 Mehdizadeh S, Ross A, Gerson L, Leighton J, Chen A, Schembre D, Chen G, Semrad C, Kamal A, Harrison EM, Binmoeller K, Waxman I, Kozarek R, Lo SK. What is the

- learning curve associated with double-balloon enteroscopy? Technical details and early experience in 6 U.S. tertiary care centers. *Gastrointest Endosc* 2006; **64**: 740-750
- 19 **Jones BH**, Fleischer DE, Sharma VK, Heigh RI, Shiff AD, Hernandez JL, Leighton JA. Yield of repeat wireless video capsule endoscopy in patients with obscure gastrointestinal bleeding. *Am J Gastroenterol* 2005; **100**: 1058-1064
- 20 **Apostolopoulos P**, Liatsos C, Gralnek IM, Giannakouloupoulou E, Alexandrakis G, Kalantzis C, Gabriel P, Kalantzis N. The role of wireless capsule endoscopy in investigating unexplained iron deficiency anemia after negative endoscopic evaluation of the upper and lower gastrointestinal tract. *Endoscopy* 2006; **38**: 1127-1132
- 21 **Isenberg G**, Taylor J, Sigmundsson H, Chak A, Wong R, Sivak M. Comparison of wireless video small bowel endoscopy and upper gastrointestinal endoscopy in evaluation of IDA in patients with negative colonoscopy. *Gastrointest Endosc* 2006; **63** suppl: S166
- 22 **Albert J**, Schulbe R, Hahn W. Therapeutic consequences of capsule endoscopy in obscure intestinal bleeding; a multi-center outcome study, in proceedings of the 4th International Conference on Capsule Endoscopy 2005; Miami, Florida, USA
- 23 **Kamal A**, Gerson LB. Jejunal diverticulosis diagnosed by double-balloon enteroscopy. *Gastrointest Endosc* 2006; **63**: 864

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