

Wireless Capsule Endoscopy: Our Experience at King Hussein Medical Center

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ABSTRACT

Objective: Evaluate the yield of wireless video capsule endoscopy in patients with suspected small bowel disease.

Methods: The data of 35 patients, who underwent wireless video capsule endoscopy at King Hussein Medical Center from July 2010 till November 2011, was collected and analyzed.

Results: Video capsule endoscopy was normal in 11 patients. The diagnostic yield of wireless video capsule endoscopy were 64.7% in obscure gastrointestinal bleeding, 60% in anemia, 66.6% in chronic diarrhea, 100% in abdominal pain and 57.1% in Crohn's disease. All the lesions were found in small bowel apart from three cases where the lesions were found outside small bowel and were considered relevant to the complaint.

Conclusions: The diagnostic yield of wireless video capsule endoscopy in our study is consistent with other international studies done. We stress the importance of repeat upper and lower endoscopy prior to wireless video capsule endoscopy and the importance of bowel preparation to improve the diagnostic yield. More studies on larger number of patients would probably give better assessment of the wireless video capsule endoscopy yield in Jordan.

Key words: Anemia, Crohn's disease, Diagnostic yield, Small bowel pathologies, Obscure GI bleeding, Wireless capsule endoscopy

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Introduction

Wireless video capsule endoscopy (WCE) is an emerging technology for evaluation of small bowel. It was introduced in 2000 and first marketed in 2001. The capsule is swallowed with sip of water after receiving bowel preparations where it captures two frames per second as it traverses the bowel and transmits them to recorder carried on the patient.⁽¹⁾

Video capsule endoscopy is used for evaluation of obscure gastrointestinal (GI) bleeding, refractory iron deficiency anemia, celiac disease,

Crohn's Disease (CD), chronic diarrhea, abdominal pain and as screening tool for small bowel polyps and malignancy.

A study published in February 2012 compared the role of small bowel endoscopy in clinical practice from 2002 till 2006 in Nottingham, UK where 1431 WCE, 247 push enteroscopies, 102 double balloon enteroscopies and 107 intraoperative enteroscopies were reviewed. The diagnostic yield was 88% in intraoperative enteroscopy, 34.6% in WCE, 34.5% in push enteroscopy and 43% in double balloon

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Table I: Characteristic and indication of patients underwent WCE

Patients Characteristics	
Age (median)	54
Male/Female	32/12
Obscure GI Bleeding	17
Crohn's Disease	7
Anemia	5
Abdominal pain	3
Chronic Diarrhea	3

Table II: WCE findings according to indications and location

Indication for WCE	Normal	Abnormal		Total
		Small Bowel	Outside small bowel	
Abdominal pain	0	3	0	3
Crohn's Disease	3	4	0	7
Obscure GI Bleeding	6	8	3	17
Anemia	2	3	0	5
Chronic Diarrhea	1	2	0	3

Table III: Findings in obscure GI Bleeding

Obscure GI Bleeding	
Normal	6
Angiodysplasia	8
Erosions	1
Ulcers	1
watermilon stomach	1

Table IV: Findings in Anemia patients

Anemia	
Normal	2
Angiodysplasia	2
Lymphangectasia	1

endoscopy but 44% who underwent the double balloon endoscopy found the procedure difficult to control. This study recommend WCE as first line investigation for small bowel to be followed with other small bowel endoscopic procedure according to findings.⁽²⁾

Obscure GI bleeding (around 10-20% of GI bleeding) which classified as overt or occult bleeding, is defined as isolated or recurrent melena, rectal bleeding or IDA with evidence of GI loss with negative upper and lower endoscopy. Some authors also include a negative imaging of small bowel. WCE has comparable yield in obscure GI bleeding with double balloon enteroscopy (43-60% for double balloon vs. 59-80% in WCE) and better yield than push enteroscopy. The greatest yield is seen in overt bleeding and when done during episode of bleeding or as early as possible from the bleeding episode.

In Crohn's Disease WCE is useful in cases of indeterminate colitis, if suspected clinically or laboratory work up or during recurrence with negative radiological and endoscopic evaluation, if patient with known disease his small bowel

involvement will influence management strategy and finally detection of jejunal ulceration after ileocecal resection which predict early recurrence of the disease.⁽³⁾

The lesions detected in CD include erosions, ulcers, aphthoid lesions, stricture and purpuric lesions.

Till now no valid diagnostic criteria for diagnosis of CD in WCE, but up to date the most commonly used diagnostic criterion is presence of more than three ulcers in absence of NSAID ingestion which we use in our department to diagnose CD. Other diagnostic criterion suggested by other authors is the presence of more than ten aphthoid lesions or the presence of stenosis not detected by the previous evaluation.^(3,4)

The role WCE in Celiac disease is to assess patient with warning symptoms (weight loss, abdominal pain and anemia) despite the adherence on gluten free diet and detecting malignant lesions particularly if ulcerative jejunitis present. The finding in capsule endoscopy include scalloping of folds, mosaic pattern, nodularity, layering of folds and even

villous atrophy with assessment of extent of small bowel involvement. A recent meta-analysis for the role of WCE in the diagnosis of Celiac disease published in European Journal of gastroenterology and hepatology in march 2012 showed that WCE has sensitivity and specificity 89% and 95% respectively to diagnose Celiac Disease.^(5,6)

The contraindication for WCE is suspicious GI obstruction even partial, pace maker, any implantable devices, pregnancy or any swallowing disorder. Morbid obesity considered relative contraindication.

Methods

The data of thirty five patients collected retrospectively from July 2010 till November 2011 at King Hussein Medical Center (KHMC). The age range of patients started from eleven to eighty two years. The males constitute 23 patients and 12 patients were females as shown in Table I.

The indication of capsule endoscopy was occult GI bleeding, iron deficiency anemia (IDA), abdominal pain, chronic diarrhea and to rule out Crohn's disease (Table I).

All patients received bowel preparations one day prior to procedure in the form of polyethylene glycols and bisacodyl tablets. No patient had contraindication for the use of WCE and no complications occurred with any patient.

The WCE used in the study is Microcam from Intromedic. The size of capsule is 11×24mm and it captures images at three frames per second with field view angle of 150 degrees and battery life of twelve hours.

Results

Thirty five patients underwent WCE for obscured GI bleeding, IDA, chronic diarrhea, abdominal pain or to rule out Crohn's disease. (Table II) Eleven patients out of 35 (31.4%) were normal (6 patients had obscure GI bleeding, two suspected to have Crohn's, one with chronic diarrhea and two patients with IDA) .

Relevant findings in obscure GI bleeding were found in 11 out of 17 patients (64.7%), the most prevalent finding was angiodysplasia, and other findings included ulcers, enteropathy and missed gastric or colorectal lesions in endoscopies. (Table III) Five patients studied for IDA, three

out of them (60%) had relevant findings in form of typical endoscopic view of lymphangectasia and angiodysplasia. (Table IV) In chronic diarrhea two out of three patients (66.6%) had relevant findings in the form of quick transit time. For the three patients that were studied for abdominal pain, WCE showed relevant findings in all the patients (100%); enteropathy with ulcers and lymphangectasia were the cause of their complaints.

In the seven patients who underwent WCE to rule out CD, two of them had normal studies, one was inconclusive due to poor preparation and the rest (57.1%) had findings consistent with Crohn's disease. We depended on the diagnostic criterion of presence of more than three ulcers in the absence of NSAID intake to diagnose Crohn's disease.

Discussion

WCE is major contributor to the diagnosis of small bowel pathologies, which was for a longtime difficult to access. It is considered a safe procedure and well accepted by patients.

The major limitations in our study were the small number of patients and the retrospective nature of the study.

Obscure GI bleeding is defined as recurrent or persistent gastrointestinal bleeding with negative initial upper and lower endoscopy. It is subclassified as occult or overt obscure GI bleeding. In our study all patients were referred after overt bleeding. When WCE was done for all except one patient where the bleeding episode had ceased.

The diagnostic yield for obscure GI bleeding in our study was 64.7%. If we compare to other studies like a study done in Amsterdam, Netherlands in 2010 by Bouma *et al.*, the yield of WCE was 49% with advice to repeat upper endoscopy and colonoscopy prior to WCE as significant lesions were found outside the small intestine.⁽⁷⁾ In another study by Goenka *et al.* in India, 385 patients underwent WCE for obscure GI bleeding, 74% had some lesion detected by WCE but only 58% had lesion unequivocally explain the obscure GI bleeding. The study showed that the highest diagnostic yield is in patients who underwent WCE in less than 48 hours from overt obscure GI bleeding (87%) compared to those more than 48 hours (68%) or

those with occult bleeding (59%).⁽⁸⁾

Pignaton *et al.* studied the role of WCE in clinical practice 70 patients who underwent the study for obscure GI bleeding, their results in descending order were: vascular lesions 48%, no findings in 14%, tumors in 11%, erosions along the small bowel in 9% and lesions within the range of EGD in 7%.⁽⁹⁾

Another study done in Belgium on 120 patients with obscure GI bleeding and published in September 2011 showed diagnostic yield 47.5% with no difference between occult or overt group and only the presence of cardiovascular comorbidity was associated with statistically significant increase in diagnostic yield (p value 0.041).⁽¹⁰⁾

A study done in Czech Republic on 119 patients to assess the importance of upper GI lesions detected in WCE for patients with obscure GI bleeding and published in September 2011 showed relevant findings in the small bowel in 42% of the cases. Regarding gastric mucosa, excellent visibility of gastric mucosa was seen in 70.3% of patients with potentially significant gastric lesions seen in 21.2% of patients and potential source of bleeding seen in upper GI tract in 10.2%.⁽¹¹⁾

To assess the benefit of emergency WCE in severe overt obscure GI bleeding, a study done in France and published in March 2012 in the Endoscopy Journal. Severe overt GI bleeding was defined as ongoing bleeding with hemodynamic instability or need of significant blood transfusion with negative upper and lower endoscopy. WCE was done within 24 to 48 hours from the negative endoscopies, 5,744 patients in the period from 2003 till 2010 were reviewed only 1% (n=55) underwent emergency WCE. The WCE showed blood in 75% of them (n=41) and detected lesions in 67% (n=37) with angiodysplasia being the most frequent lesion found (35%).⁽¹²⁾

If we compare our findings in the group suspected to have Crohn's disease which is 57.1% with a study done in Portugal in 2010 by Figueiredo *et al.* that used the same diagnostic criterion we used, 72 patients out of 95 patients' completed the study. Pathological images constant with CD were detected in 37 patients out of 72 patients (51.3%).⁽¹³⁾

A retrospective study done in 54 patients with CD in China compared the diagnostic yield of ileocolonoscopy compared to WCE and Double Balloon Endoscopy (DBE). The study found that the diagnostic yield for WCE and DBE was 92.6% compared to 75.9% for ileocolonoscopy.⁽¹⁴⁾

A prospective study done in Tunis and published in May 2011 to compare WCE with CT enteroclysis and small bowel radiography; twenty patients with confirmed ileal disease underwent WCE, CT enteroclysis and small bowel radiography. WCE showed ileal disease in all patients and nine patients showed proximal small bowel lesions. Small bowel radiograph showed proximal ileal disease in two patients and CT enteroclysis showed only one proximal lesion. The study came out with conclusion that WCE more accurate than radiologic method in detecting small bowel CD.⁽¹⁵⁾

Also another study to assess efficacy of WCE in detection proximal small bowel lesions in patient with CD was done in Italy and was published in July 2010. Sixty four patients examined, thirty two have CD and thirty two patients as control have IDA or diarrhea. All these patients underwent WCE then small bowel contrast sonography. They consider ulceration, stenosis, aphthoid ulcers (more than three) and erosions as diagnostic criteria. Finding in CD was 50% have proximal small bowel lesions found by WCE but only 19% showed proximal lesions by small bowel contrast sonography. Distal lesions (which defined as lesions proximal to ileocecal valve) were seen in 93% of patients by WCE same percent was seen also by small bowel contrast sonography. No lesions diagnostic of CD were detected in the control group by either method.⁽¹⁶⁾

In our study, 60% of patients studied for IDA have identifiable cause with lymphangectasia and angiodysplasia as cause. In comparison to the study done by Pignaton *et al.* published in 2011 six patients studied for anemia, 75% of them presented vascular lesions, mainly vascular ectasias, two patients presented infiltrative lesion in the jejunum.⁽⁹⁾

We used WCE in three patients with chronic abdominal pain where ulceration and lymphangectasia was the cause. Katsinelos *et al.*

published in European Journal of Internal Medicine in October 2011. Seventy two patients were studied by WCE for chronic abdominal pain with or without diarrhea; the diagnostic yield was 44.4% generally and was 21.4% in patients with negative inflammatory markers, 66.7% in patients with positive inflammatory markers (ESR and CRP) and 90.1% in patients with positive inflammatory markers and diarrhea.⁽¹⁷⁾

Another study done in Germany on the role of WCE in abdominal pain with other symptoms or signs (weight loss more than 10%, inflammatory marker, chronic anemia, suspected occult GI bleeding) the relevant finding was 36% and 40% by two investigators and potential relevant findings in 14% and 24% of patients.⁽¹⁸⁾

Conclusions

Our study showed the importance of WCE as diagnostic tool in evaluation of small bowel pathologies, obscure GI bleeding, anemia, Crohn's disease and abdominal pain with comparable results to studies done in other centers. We ascertain the importance of repeat upper and lower endoscopy prior to WCE and looking of objective findings in abdominal pain group prior to WCE.

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