

# Performance of PILLCAMS B3 Video-Capsule Endoscopy in the Diagnosis of the Non-Small Bowel Hemorrhagic Lesions Undetected by Upper and Lower Digestive Endoscopy

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## Abstract

**Introduction:** Videocapsule endoscopy (VCE) is a minimally invasive approach to visualize the mucosal surface of the gastrointestinal tract. It was initially used in the evaluation of small-bowel lesions, however many studies showed that it has a potential role in evaluating other digestive segments as the stomach and large bowel. Our study aim to assess the diagnostic performance of VCE after a non-conclusive upper and lower digestive endoscopy and to highlight the comfort and the diagnostic efficiency of this tool. **Materials and Methods:** In this monocentric and descriptive study, we include all patients who underwent a Pillcam SB3 VCE (59 patients), from July 2018 to September 2022, after a normal gastroscopy and ileocoloscopy. All the patients received a preparation by PEG (2l the day before ingestion of the capsule) with clear broth the day before the examination, and a 10 days off oral iron if previously prescribed. **Results:** 59 patients were included and 15 VCE (25%) allowed the diagnosis of non-small haemorrhagic lesions, unnoticed by usual endoscopy. The main indication for VCE was an unexplained digestive bleeding (73%) with an average hemoglobin level of 5,4g/dL. The mean age was 59 years (23-90 years) with a femal predominance (sex-ratio:0,6). 40% of the patients had a chronic renal failure, 13% had a portal hypertension, 13% had a history of heart disease, 6% had a Rendu-Osler disease. 13% of patients were on antiplatelet agent, 6% on anticoagulants therapy and 6% on non-steroidal anti-inflammatory drugs. The mean time between the onset of symptoms and the VCE was 26,3months. The lesions noticed by VCE were: angiodysplasia (80%), with different localizations: gastric (46%), duodenal (21%), cecal (21%), bulbar (12%) and Forrest III gastric ulcerations (20%). The diagnostic yield of VCE in non-small bowel hemorrhagic lesions was 25%. **Conclusion:** The VCE represents the most patient-friendly alternative method of examination. It is a first-line approach in the evaluation of small-bowel lesions, but it can also detect upper and lower digestive lesions. However, we believe that the slightest doubt concerning the quality of the first upper and lower digestive endoscopies in patients with digestive bleeding and/or anemia should lead to the repetition of the conventional endoscopies before performing VCE.

**Keywords:** Videocapsule endoscopy, digestive bleeding, endoscopy, non-small bowel lesions.

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## INTRODUCTION

The small bowel video-capsule endoscopy (VCE) is a non-invasive technic for exploring the small bowel. It's mainly indicated in the diagnosis of unexplained digestive bleeding and/or isolated anemia.

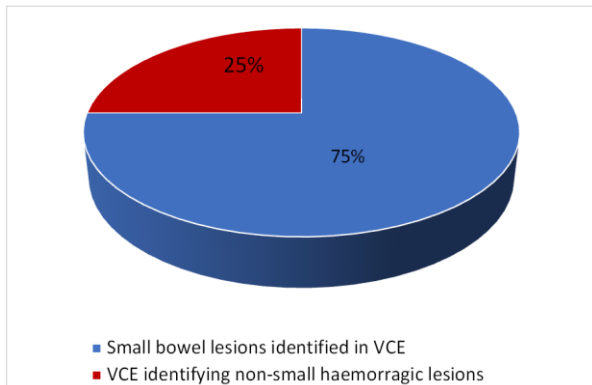
The aim of this study is to assess the diagnostic performance of PillCamSB3 VCE in the non-small bowel lesions after a non-conclusive upper and lower digestive endoscopy.

## MATERIALS AND METHODS

This is a monocentric and descriptive study including all patients who underwent a PillCamSB3 VCE, from July 2018 to September 2022, after a normal gastroscopy and ileocoloscopy. All the patients received a preparation by PEG (2l the day before ingestion of the capsule) with clear broth the day before the examination, and a 10 days off oral iron if previously prescribed.

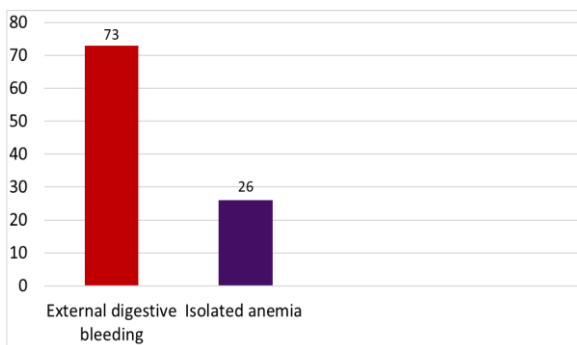
## RESULTS

59 patients were included and 15 VCE (25%) allowed the diagnosis of non-small haemorrhagic lesions, unnoticed by usual endoscopy (Figure 1).



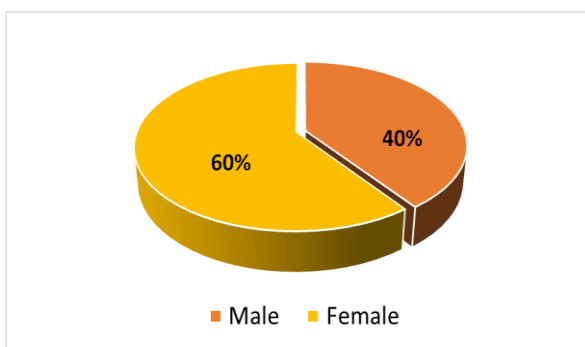
**Figure 1: Frequency of non-small haemorrhagic lesions diagnosed by VCE**

The main indication for VCE was an external digestive bleeding (hematemesis, melena, rectorrhagia) (73%) with an average hemoglobin level of 5,4g/dL (Figure 2).



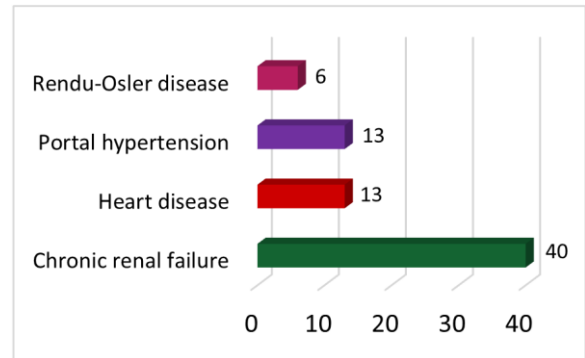
**Figure 2: Indications for VCE**

The mean age was 59 years (23-90 years) with a femal predominance (sex-ratio:0,6) (Figure 3).



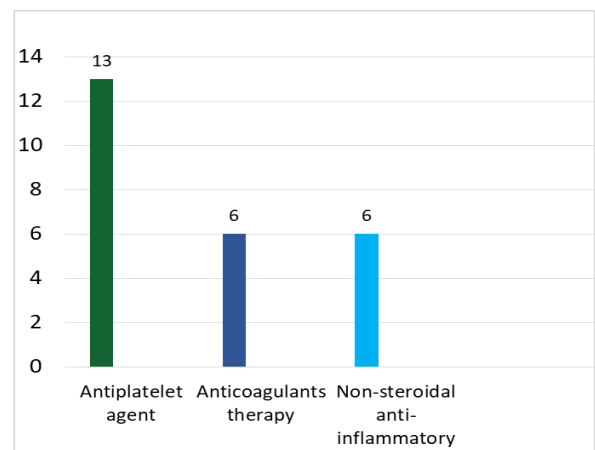
**Figure 3: Distribution by sex**

40% of the patients had a chronic renal failure, 13% had a portal hypertension, 13% had a history of heart disease, 6% had a Rendu-Osler disease (Figure 4).



**Figure 4: Comorbidities**

13% of patients were on antiplatelet agent, 6% on anticoagulants therapy and 6% on non-steroidal anti-inflammatory drugs (Figure 5). The mean time between the onset of symptoms and the VCE was 26,3months.



**Figure 5: Drugs taken by our patients**

The non-small bowel lesions individualized by VCE were : angiodysplasia in 80%, in stomach in 46% (Figure 6), in duodenum in 21% (Figure 7), in cecum in 21% (Figure 8), in bulbus in 12% (Figure 9), and gastric ulcerations in 20% (Figure 10).

Thus, the PillsCamSB3 VCE identified non-small bowel hemorrhagic lesions in 25%.



**Figure 6: Gastric angiodysplasia**



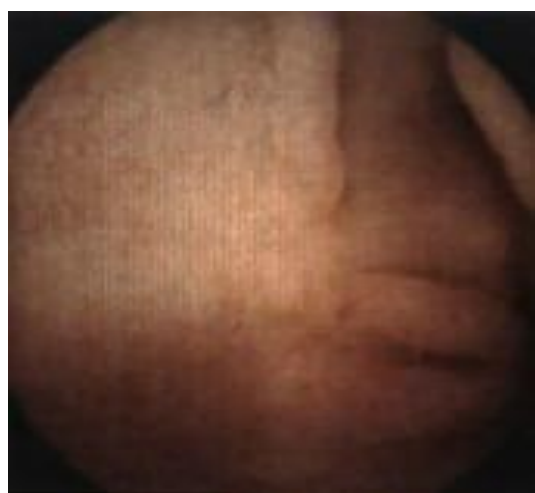
**Figure 7: Duodenal angiodysplasia**



**Figure 10: Forrest III Gastric Ulcerations**



**Figure 8: Cecal angiodysplasia**



**Figure 9: Bulbar angiodysplasia**

## DISCUSSION

The origin of digestive bleeding is identified, in most of cases, after an upper and/or a lower gastrointestinal endoscopy [1], but some gastrointestinal bleeding remain obscure.

Fortunately, the introduction of the videocapsule endoscopy (VCE) into medical practice has allowed a significant progress especially in the assessment of the small intestine that always has been difficult to explore [2]. Studies showed that it can increase the diagnostic yield of conventional endoscopy by 20% allowing an overall diagnostic rate up to 95.7% [3].

VCE is a small device which length can measures 11x26mm with a field of vision of 140°, and which can take 2 photos per second [4] (Figure 11). It's attached to a system that includes sensing belt, a data recorder, a battery pack and a software for image review and interpretation. The examination requires a preparation per 2 liters of Polyethylene glycol solution 12 hours before the beginning of the examination. A fluid diet 24 hours and a fasting beginning from the night before the examination is mandatory, which was the case of our patients [3]. The endoscopic capsule is swallowed by the patient who continue to drink water during the entire procedure. It progresses through the digestive tract until it is excreted naturally after a determined time according to the transit of the patient.



**Figure 11: Pillcam Caspule endoscopy**

Videocapsule endoscopy allows visualization of the mucosal surface of the gastrointestinal tract in a minimal invasive manner [5]. It was mainly indicated for the evaluation bleeding, but its application have expanded to include inflammatory disease and neoplasia [3]. It's mainly contraindicated in patients with suspected intestinal obstruction, strictures or fistulas and recommended to be used with special precautions in patient with implanted electrical devices [6, 7]. Typical reading times vary between 15 and 120 minutes depending on the duration of transit and the experience of the reader [5]. The study of Lepileur *et al.*, 2018 showed that more than 6% of patients with gastrointestinal bleeding and presumed negative upper and lower digestive endoscopies had gastric potentially bleeding lesions [8]. The most common lesions were gastritis and angiodysplasia. In our study, the VCE allows us to identify gastric hemorrhagic lesions in 11,5%, that were either ulcerations or angiodysplasia. Conventional gastroscopy has always been the 'gold-standard' in the diagnosis of stomach disease. Unfortunately, it's known for its invasiveness and discomfort under no-sedated situations, causing a low compliance. Although, sedation is more expansive and riskier in a few patients. However, given the safety of the VCE [9], the use of this device has been extended not only to other indications but also to other localizations as esophagus, stomach. Thus, an upper gastrointestinal VCE, almost identical to the PillCamSB3, has been developed for gastric and esophageal applications. It only differs in battery life which last 90 minutes. Studies also found that a magnetically controlled capsule endoscopy can substantially increase the diagnostic rates making it a promising alternative especially for high-risk patients [10]. However, some disadvantages are to be specified. First, the preparation that is more complicated than the conventional gastroscopy. Second, the duration of the process which last longer and third the current cost of VCE that is higher but can decrease in the future if widely used [10]. Colonic hemorrhagic lesions has been identified by the PillCamSB3 VCE in 2% of patients

which was similar to the study of Lepileur *et al.*, 2018 [8]. This low diagnostic yield of PillcamSB3 VCE is essentially related to the battery life of the capsule endoscopy which usually ends up at the beginning of the large bowel. Colonoscopy is a well-established procedure for exploring the large bowel. However, it comes with potential risks especially of elderly patients, younger female patients with a lower Body Mass Indices and patients with abdomino-pelvic surgery [11] explaining partly the anxiety related to this investigation [12]. Discomfort and the embarrassment are also a common fear for patients [13, 14]. Some studies showed that VCE had a higher yield than colonoscopy for identifying hemorrhagic lesions [15]. Based on this data, a colon capsule endoscopy (CCE) has been developed and was first introduced in 2008 [5]. It is essentially used for incomplected colonoscopy and patients with an increased risk for procedural adverse events. Its main advantage is that it does not require sedation.

In summary, VCE is an interesting tool in the diagnosis of non-small bowel lesions. It has advantages as not requiring sedation. However, it has also several limitations as the lack of air insufflation, the unavailability of taking biopsies and/or treating lesions.

## CONCLUSION

The VCE represents the most patient-friendly alternative method of examination. It is a first-line approach in the evaluation of small-bowel lesions, but it can also detect upper and lower digestive lesions. However, we believe that the slightest doubt concerning the quality of the first upper and lower digestive endoscopies in patients with digestive bleeding and/or anemia should lead to the repetition of the conventional endoscopies before performing VCE.

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