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# Small bowel transit time of capsule endoscopy as a factor for the detection of lesions in potential small bowel bleeding

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**ABSTRACT**

**Background:** the relationship between small bowel transit time (SBTT) of the capsule endoscopy (CE) and the diagnosis of small bowel bleeding (SBB) is controversial.

**Objective:** to evaluate the relationship between SBTT and CE and the identification of SBB.

**Material and methods:** CE was divided according to SBTT into < 4 hours and ≥ 4 hours.

**Results:** CE with SBTT ≥ 4 hours identified more angioectasias (p = 0.023), single lesions (p = 0.029) and jejunal lesions (p = 0.001) with an OR of 3.13 (95% CI, 1.61-6.10, p = 0.001) to identify the cause of SBB.

**Conclusions:** CE SBTT of ≥ 4 hours increases the diagnosis of SBB.

**Key words:** Small bowel bleeding. Capsule endoscopy.

## INTRODUCTION

Capsule endoscopy (CE) is the gold standard for the study of potential small bowel bleeding (SBB) (1,2). Small bowel transit time (SBTT) of the CE is close to four hours (3,4). There are a few studies that assess the relationship between CE SBTT and the detection of lesions. The purpose of this study was to assess if the CE SBTT is a factor for the identification of the cause of SBB.

## MATERIAL AND METHODS

This was a cross-sectional, retrospective, observational, analytical study of all the CE (Pillcam® SB2 and SB3; Given Imaging Ltd., Yoqneam, Israel) placed due to SBB by the Endoscopy Service of the Hospital de Especialidades CMN Siglo XXI. CE with an incomplete visualization or extraintestinal hemorrhage were excluded.

CE were classified as positive when one or more significant lesions were detected such as ulcers, angioectasias, tumors, stenosis or erosions. The CE was divided into two groups: group A: CE with SBTT < 4 hours; and group B: SBTT ≥ 4 hours. The groups were compared using the $Chi^2$ test. A logistic regression model analysis was performed to determine the cause of hemorrhage in both groups, using the SPSS program version 22.

## RESULTS

Two hundred and twenty-three patients were included in the study; 121 were female (54.3%) with a mean age of 58 years (IQR 42, 72). The most frequent indication was overt SBB (87.4%) and the median CE SBTT was 285 minutes (IQR 194, 429). Group A included 89 patients and group B 134; 62.9% of group A and 48.5% of B were female (p = 0.034). The mean age of group A was 53 years old (IQR 38.5, 69.5) and 60.5 years old (IQR 49.7, 72) in group B (p = 0.028) (Table 1).

The cause of hemorrhage was identified in group A in 56 patients (62.9%) and in 115 (85.8%) from group B ($p < 0.001$). There was a statistically significant difference between the groups with regard to angioectasias ($p = 0.023$). Furthermore, more single lesions (24.7% *vs* 38.8%; $p = 0.029$) and jejunal lesions were identified in group B (18% *vs* 38.1%; $p = 0.001$) (Table 2). The odds ratio to identify the cause of MDH was 3.13 in the CE SBTT ≥ 4 hours group (95% CI, 1.61-6.10; $p = 0.001$) and 1.02 for age (95% CI, 1.00-1.03; $p = 0.031$) (Table 3).

**DISCUSSION**

This study shows that CE with SBTT ≥ 4 hours can increase the identification of the cause of SBB by three times. In a similar study, Girelli et al. (5) observed that CE with significant findings have a higher mean SBTT.

We also showed that a CE with SBTT ≥ 4 hours detected more angioectasias, although a greater number of images are required to identify them due to their size (1-3 mm) (6). The same occurs with single lesions, in contrast to multiple lesions.

The CE passes through the duodenum and the jejunum at a greater velocity than through the ileum (7). In this study, we showed that when CE SBTT is ≥ 4 hours, it is possible to identify more lesions in these two areas, with a significant difference in the jejunum. As in other studies performed (7,8), our study proved that age is a factor that influences the SBTT of CE, as peristalsis is slower with increasing age, prolonging the CE SBTT.

This study included two types of CE, the Pillcam® SB2 and the SB3. However, a study performed by Xavier et al. (9) did not identify differences in the diagnostic yield of both CE. The main limitation in this study was the use of two different CE, although their percentage in both groups was similar ($p = 0.630$).

In conclusion, a CE SBTT ≥ 4 hours increases the identification of the cause of SBB.

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**Table 1. Characteristics of the population of the two small bowel transit time of capsule endoscopy groups**

| *Characteristics* | *Small bowel transit time < 4 hrs* (n = 89) | *Small bowel transit time ≥ 4 hrs* (n = 134) | *p* |
|---|---|---|---|
| Female sex (%)* | 56 (62.9) | 65 (48.5) | *0.034* |
| Age (years)† | 53 (38.5, 69.5) | 60.5 (49.7, 72) | *0.028* |
| Indication (%)* | | | |
| Overt SBB | 79 (88.8) | 116 (86.6) | 0.628 |
| Occult SBB | 10 (11.2) | 18 (13.4) | |
| Small bowel surgery (%)* | 2 (2.2) | 4 (3) | 0.739 |

*Values are presented as percentages, $X^2$. †Values are presented as the median and interquartile range (percentile 25, percentile 75), Mann-Whitney U. SBB: small bowel bleeding.

**Table 2. Findings of the capsule endoscopy with regard to small bowel transit time**

| *Finding* | *Small bowel transit time < 4 hrs (n = 89)* | *Small bowel transit time ≥ 4 hrs (n = 134)* | *p* |
|---|---|---|---|
| Identification of the cause of hemorrhage (%)* | 56 (62.9) | 115 (85.8) | *< 0.001* |
| Active bleeding (%)* | 4 (4.5) | 18 (13.4) | *0.028* |
| Findings of the capsule (%)* | | | |
| Ulcer | 24 (27) | 33 (24.6) | 0.695 |
| Angioectasia | 13 (14.6) | 37 (27.6) | *0.023* |
| Tumor | 4 (4.5) | 11 (8.2) | 0.278 |
| Stenosis | 2 (2.2) | 11 (8.2) | 0.063 |
| Erosions | 13 (14.6) | 23 (17.2) | 0.611 |
| Normal | 33 (37.1) | 19 (14.2) | *< 0.001* |
| Number of lesions (%)* | | | |
| Single | 22 (24.7) | 52 (38.8) | *0.029* |
| Multiple | 34 (38.2) | 63 (47) | 0.194 |
| Normal | 33 (37.1) | 19 (14.2) | *< 0.001* |
| Location of the lesions (%)* | | | |
| Duodenum | 5 (5.6) | 14 (10.4) | 0.206 |
| Jejunum | 16 (18) | 51 (38.1) | *0.001* |
| Ileum | 17 (19.1) | 27 (20.1) | 0.847 |
| All the intestine | 18 (20.2) | 23 (17.2) | 0.563 |
| Without lesion | 33 (37.1) | 19 (14.2) | *< 0.001* |
| Type of endoscopic capsule (%)* | | | |
| Pillcam® SB2 | 57 (64) | 90 (67.2) | 0.630 |
| Pillcam® SB3 | 32 (36) | 44 (32.8) | |

*Values are presented as frequencies and percentages, $X^2$.

**Table 3. Relationship between the identification of the cause of hemorrhage**

| *Variable* | *OR* | *95% CI* | *p* |
|---|---|---|---|
| Small bowel transit time ≥ 4 hrs | *3.13* | *(1.61-6.10)* | *0.001* |
| Male | 1.31 | (0.67-2.57) | 0.421 |
| Age | *1.02* | *(1.00-1.03)* | *0.031* |