Gastroenterol Hepatol. 2017;40(1):10–15

Gastroenterología y Hepatología

www.elsevier.es/gastroenterologia

ORIGINAL ARTICLE

Impact of the endoscopist's experience on the negative predictive value of capsule endoscopy☆

Benito Velayos Jiménez*, Noelia Alcaide Suárez, Guillermo González Redondo, Luis Fernández Salazar, Rocío Aller de la Fuente, Lourdes del Olmo Martínez, Lourdes Ruiz Rebollo, José Manuel González Hernández

Servicio de Aparato Digestivo, Hospital Clínico de Valladolid, Valladolid, Spain

Received 5 November 2015; accepted 7 March 2016
Available online 6 January 2017

KEYWORDS
Capsule endoscopy;
Learning curve;
Obscure gastrointestinal bleeding;
Training;
Reading;
Negative predictive value

Abstract
Introduction: The impact of the accumulated experience of the capsule endoscopy (CE) reader on the accuracy of this test is discussed.
Aim: To determine whether the negative predictive value of CE findings changes along the learning curve.
Methods: We reviewed the first 900 CE read by 3 gastroenterologists experienced in endoscopy over 8 years.

These 900 CE were divided into 3 groups (300 CE each): group 1 consisted of the sum of the first 100 CE read by each of the 3 endoscopists; group 2, the sum of the second 100 and groups 3, the sum of the third 100.

Patients with normal CE were monitored for at least 28 months to estimate the negative predictive value.
Results: A total of 54 (18%) CE in group 1, 58 (19.3%) in group 2 and 47 (15.6%) in group 3 were normal, although only 34 patients in group 1, 38 in group 2 and 36 in group 3 with normal CE completed follow up and were eventually studied.

The negative predictive value was 88.2% in group 1, 89.5% in group 2 and 97% in group 3 ($p > .05$).
Conclusion: The negative predictive value tended to increase, but remained high and did not change significantly after the first 100 when readers are experienced in conventional endoscopy and have preliminary specific training.

☆ Please cite this article as: Velayos Jiménez B, Alcaide Suárez N, González Redondo G, Fernández Salazar L, Aller de la Fuente R, del Olmo Martínez L, et al. Influencia de la experiencia acumulada del explorador en el valor predictivo negativo de la cápsula endoscópica. Gastroenterol Hepatol. 2017;40:10–15.

* Corresponding author.
E-mail address: benitovelayos@hotmail.com (B. Velayos Jiménez).

PALABRAS CLAVE
Cápsula endoscópica;
Curva de aprendizaje;
Hemorragia digestiva de origen oscuro;
Entrenamiento;
Lectura;
Valour predictivo negativo

Influencia de la experiencia acumulada del explorador en el valor predictivo negativo de la cápsula endoscópica

Resumen
Introducción: La influencia de la experiencia acumulada del médico que interpreta cápsulas endoscópicas sobre su capacidad diagnóstica es discutida.
Objetivo: Determinar si existen diferencias en el valor predictivo negativo de las cápsulas endoscópicas informadas por los mismos endoscopistas a lo largo del tiempo.
Métodos: Revisamos las 900 primeras cápsulas endoscópicas realizadas por tres gastroenterólogos expertos en endoscopia durante 8 años. Se dividieron en 3 grupos de 300 cápsulas cada uno. El grupo 1 fue la suma de las tres primeras centenas informadas por cada uno, el grupo 2 la suma de las tres segundas centenas y el grupo 3 la suma de las tres terceras centenas. Se hizo un seguimiento mínimo de 28 meses a los casos con exploración normal.
Resultados: Aunque se consideraron normales el 18% de las cápsulas del grupo 1, el 19,3% de las del grupo 2 y el 15,6% de las del grupo 3, solo fue posible seguir y finalmente analizar a 34 enfermos en el grupo 1, a 38 en el 2 y a 36 en el 3. Sobre estos casos, el valor predictivo negativo fue del 88,2% en el grupo 1, del 89,5% en el grupo 2 y del 97% en el grupo 3 ($p > 0,05$).
Conclusión: El valor predictivo negativo de la cápsula endoscópica, aunque con tendencia a aumentar, se mantiene alto y sin diferencias significativas desde las 100 primeras exploraciones si los médicos que la interpretan son expertos en endoscopia convencional y tienen formación específica previa.

Introduction

Capsule endoscopy (CE) has become an essential test for diagnosing small bowel (SB) disease since it was approved by the *Food and Drug Administration* in 2001.[1] CE is safer, easier to use, and more acceptable to patients than other techniques, and as such continues to be a key tool for studying and monitoring of lesions distal to the ligament of Treitz versus other techniques.[2–8]

Although indications and contraindications for CE are well documented,[1,9,10] the length of training needed to acquire competence in reading and interpreting images[11] and the specific learning curve associated with the technique remain unclear.[12,13] Thus, the learning curve is currently assumed to be short, provided the clinician has sufficient experience with conventional endoscopy,[14] although this has not been corroborated in specific studies.[15]

Our aim was to determine whether the accumulated experience gained from performing an increasing number of CE studies has any impact on the diagnostic yield of the technique, measured in terms of the negative predictive value (NPV) of test results.

Patients and methods

We performed a retrospective review of the first 900 complete, clean, valid CE studies performed between December 2003 and December 2011 and interpreted by 3 gastroenterologists with wide experience in conventional endoscopy. The endoscopists were self-taught in the interpretation of CE images, but had also attended conferences on the topic and had completed at least 1 specific training course during the 12 months prior and subsequent to the introduction of the technique in our hospital.

The 900 CE studies were divided into 3 groups: group 1 (300 CEs, consisting of the sum total of the first 100 CEs interpreted by each endoscopist); group 2 (300 CEs, consisting of the sum total of the second 100 CEs interpreted by each endoscopist), and group 3 (300 CEs, consisting of the sum total of the third 100 CEs interpreted by each endoscopist).

Only CEs reported as negative were included in the negative predictive value analysis. Based on previously published recommendations,[16,17] CE studies presenting erosions, aphthae, ulcers, stenosis, oedema or denudation, tumours, or any vascular lesion of any size that could cause haemorrhage were excluded. The endoscopists were aware of each patient's medical history. Time from the order to performance of the CE did not vary significantly over the study period, and was always less than 2 months.

The Given Imaging PillCam SB and SB2 with PillCam recorder and different versions of the Rapid software provided by the manufacturer since it was marketed were used in all patients. The protocol did not differ significantly during the study period: all patients were instructed to follow a liquid diet the day before the test and to fast the night before and until 2–4 h from the start of the test, when they were allowed to drink liquids. Prokinetics or intestinal lavage solutions were only used in a few cases. All patients had previously undergone gastroscopy and colonoscopy and had signed an informed consent form. Double video images were acquired at a rate of 8–14 frames per second.

Epidemiological data (age, sex) and date the study was performed were collected from the post-CE reports. The