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ORIGINAL ARTICLE

Utility of capsule endoscopy in gastroenterology practice: A single-center experience

Kapsül endoskopinin gastroenteroloji pratiğinde kullanımı: Tek merkez deneyimi

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ABSTRACT • **Background and Aims:** Capsule endoscopy is an easy and a non-invasive diagnostic tool used in evaluation of gastrointestinal tract. Despite being a valuable diagnostic method, widespread use has not been established in Türkiye. With this study, we aimed to report our single-center experience with capsule endoscopy in order to both reveal our data and utility of capsule endoscopy in gastroenterology practice. **Materials and Methods:** This retrospective study was conducted at Antalya Training and Research Hospital. Patients evaluated by capsule endoscopy between 2018 and 2024 were included in the study. **Results:** Thirty one patients were included in the study. Most common indications were overt bleeding with suspicion of small bowel bleeding and iron deficiency anemia. Angiodysplasias were the most common finding in both overt bleeding with suspicion of small bowel bleeding and iron deficiency anemia groups (n = 3, 33% for both indications). Ulcers in small intestine were the most common finding in patients with abdominal pain (n = 5, 62%). All of the four patients with Crohn's disease evaluated for disease activity had ulcers in small intestine. Out of 31 patients enrolled in the study, capsule endoscopy did not reveal an underlying condition related to clinical indication in 8 patients (26%). **Conclusion:** Capsule endoscopy is a valuable tool in evaluating gastrointestinal disorders ranging from obscure bleeding to inflammatory bowel diseases. Accessibility of capsule endoscopy devices and training of gastroenterologists will help the healthcare team with diagnostic challenges in gastroenterology practice.

Key words: Capsule endoscopy, gastrointestinal bleeding, iron deficiency anemia

ÖZET • **Giriş ve Amaç:** Kapsül endoskopi gastrointestinal traktın değerlendirilmesinde kullanılan, kolay uygulanabilen ve girişimsel olmayan bir tanısal yöntemdir. Değerli bir tanı yöntemi olmasına karşın Türkiye'de yaygın kullanımı mevcut değildir. Bu çalışma ile kapsül endoskopide tek merkez deneyimimizi aktarmayı ve kapsül endoskopinin gastroenteroloji pratiğinde kullanımını araştırmayı amaçladık. **Gereç ve Yöntem:** Bu retrospektif çalışma Antalya Eğitim ve Araştırma Hastanesinde yürütüldü. 2018 ile 2024 yılları arasında kapsül endoskopi ile değerlendirilen hastalar çalışmaya alındı. **Bulgular:** Çalışmaya 31 hasta dahil edildi. En sık endikasyon aşikar kanamalı ince bağırsak kanaması şüphesi ve demir eksikliği anemisi idi. Aşikar kanamalı ince bağırsak kanaması şüphesi ve demir eksikliği anemisi nedeniyle kapsül endoskopi yapılan hastalarda her iki grup için de en sık bulgu anjiyodisplaziler idi (her iki endikasyon için de n = 3, %33). Karın ağrısı nedeniyle kapsül endoskopi yapılan hastalardaki en sık bulgu ince bağırsakta ülserler idi (n = 5, %62). Crohn hastalığı tanısı bulunan ve hastalık aktivitesi değerlendirilen dört hastada da ince bağırsak ülserleri saptandı. Çalışmaya dahil edilen 31 hastanın 8'inde (%26), kapsül endoskopi endikasyonu ile ilişkili bir bulguya rastlanmadı. **Sonuç:** Kapsül endoskopi aydınlatılmamış gastrointestinal sistem kanamalarından inflamatuvar bağırsak hastalığı değerlendirmesine kadar geniş bir çerçevede gastrointestinal sistem hastalıklarının değerlendirmesinde faydalıdır. Kapsül endoskopiye erişimin artırılması ve bu alanda gastroenterologların eğitimi, gastroenteroloji pratiğinde tanı koymada zorluk yaşanan durumlarda fayda sağlayacaktır.

Anahtar kelimeler: Kapsül endoskopi, gastrointestinal kanama, demir eksikliği anemisi

INTRODUCTION

Capsule endoscopy (CE) is an easy and a non-invasive diagnostic tool used in evaluation of gastrointestinal (GI) tract (1). Main indications for CE examination are suspected small bowel bleeding with

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overt bleeding and iron deficiency anemia (IDA), but this diagnostic modality is also being used in the evaluation of a wide array of conditions such as inflammatory bowel diseases (IBD), polyposis syndromes and abdominal pain of unidentifiable cause by conventional diagnostic tools albeit abdominal pain being a controversial indication for CE (2,3). Clear diet prior to examination and bowel preparation with polyethylene glycol or sennoside A + B are required for optimal imaging, and prolonged gastric and intestinal transit times are linked to lower rates of CE diagnostic yield (4-7).

Despite being a valuable tool especially in investigating suspected small bowel bleeding and IDA with up to 77% detection rate of suspected small bowel bleeding, widespread use has not been established in Türkiye mainly due to cost of the procedure (8). However, CE has been shown to be cost-effective in a variety of indications including Crohn's disease surveillance and low and moderate risk patients with GI bleeding (9,10).

With this study, we aimed to report our single-center experience with CE in order to both reveal our data and utility of CE in gastroenterology practice.

MATERIALS and METHODS

This retrospective study was conducted at Antalya Training and Research Hospital, Antalya, Türkiye. Patients evaluated by CE for various indications between 2018 and 2024 were included in the study. Indications for CE were gathered from patient records and corresponding CE findings were matched. Overall, 31 patients were enrolled in the study. Ethics committee approval was obtained from University of Health Sciences, Antalya Training and Research Hospital Ethics Committee (Date: 23/05/2024 No: 7/4 2024-134).

RESULTS

Thirty one patients were enrolled in the study. Mean age of the patients was 48.9 (± 19.3) years. 18 patients were male (58%) and 13 patients were female (41.9%). Most common indications for CE were suspected small bowel bleeding and IDA (n = 9, 29% for both indications), followed by abdominal pain (n = 8, 26%). Angiodysplasias were the most common finding in both overt bleeding with suspicion of small bowel bleeding and IDA groups (n = 3, 33% for both indications). No identifiable source or cause were found for overt bleeding with suspicion of small bowel bleeding and IDA in one third of patients in both groups. Ulcers in small intestine were the most common finding in patients with abdominal pain (n = 5, 62%). All of the four patients with Crohn's disease evaluated for disease activity had ulcers in small intestine. Out of 31 patients enrolled in the study, capsule endoscopy did not reveal an underlying condition related to clinical indication in 8 patients (26%). Capsule endoscopy findings of the study population is given in Table 1. Images of various CE findings are shown through Figures 1 to 4.

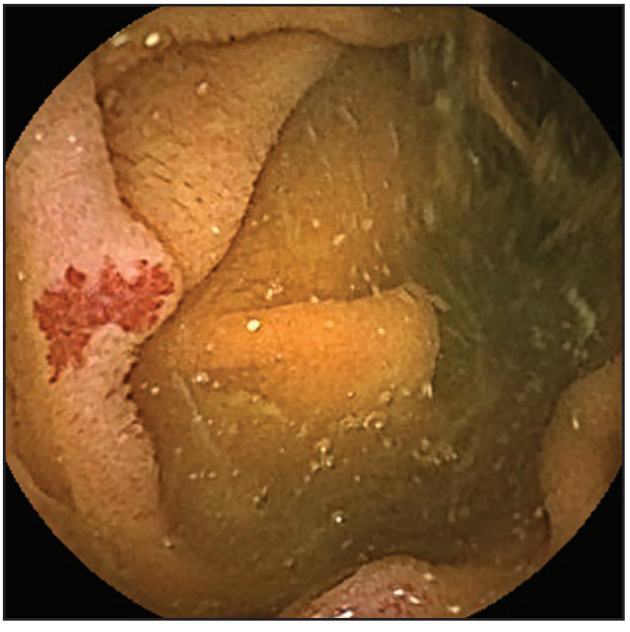

Figure 1 Angiodysplasia of ileum in a patient with overt bleeding with suspicion of small bowel bleeding.

Table 1 Capsule endoscopy findings of the study population

Indication	Number of Patients	Study Findings	Number of Patients
Overt bleeding with suspicion of small bowel bleeding	9	Angiodysplasia (small intestine)	3
		Ulcers (small intestine)	2
		Malignancy (jejunal adenocarcinoma)	1
		No source identified	3
IDA	9	Angiodysplasia (small intestine)	3
		Ulcers (small intestine)	3
		Polyp (ileum)	1
		No cause identified	3
Abdominal pain	8	Ulcers (small intestine)	5
		Erosions in ileum	2
		No cause identified	1
Evaluation of CD	4	Ulcers (small intestine)	4
Chronic diarrhea	1	No cause identified	1

IDA: Iron deficiency anemia, CD: Crohn's disease.

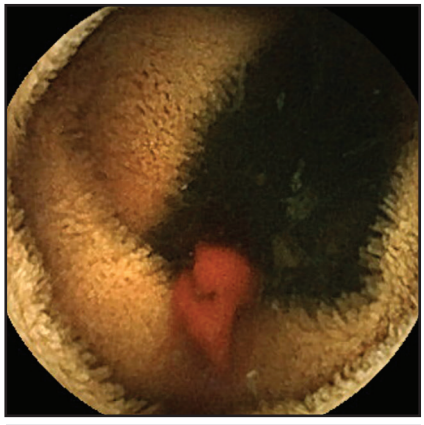

Figure 2 Active bleeding in a patient with angiodysplasia of jejunum.

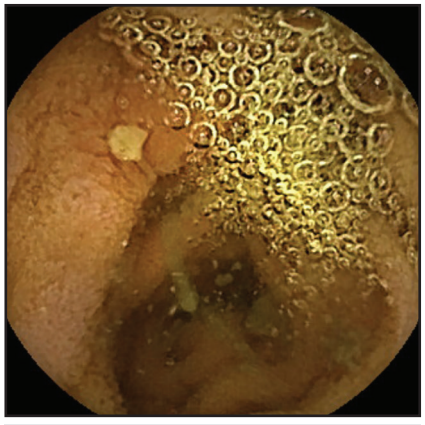

Figure 3 Aphtous ulcer in ileum of a Crohn's disease patient.

Figure 4 Adenocarcinoma of jejunum detected in a patient evaluated for iron deficiency anemia.

DISCUSSION

This retrospective study was planned with the aim of reflecting our single-center experience of a relatively uncommon diagnostic modality utilized in daily gastrointestinal practice, capsule endoscopy. The study findings revealed that overt bleeding with suspicion of small bowel bleeding and IDA were the most common clinical indications for CE as per literature. In a quarter of the patients in the study group, no CE findings related to the clinical indication were detected.

CE was first developed back in 1981, mainly for small bowel examination as the primary indication (11). Over the years, capsule devices have improved tremendously in line with developments in mechanical and optical technology, with 360° fields of view, cameras up to 4 in numbers, frame rates up to 35 per second and longer battery life (12). Recently, incorporation of artificial intelligence into CE is being studied on to further improve the performance of CE (13,14).

CE is being utilized for a wide array of indications in gastroenterology practice. Suspected small bowel bleeding and IDA are the leading indications for CE examination. Patients who are at risk for invasive procedures also benefit from CE as first-line diagnostic modality (1). For the investigation of suspected small bowel bleeding, CE is the gold-standart diagnostic technique following upper GI endoscopy and colonoscopy (15).

CE has been available for a few decades and papers in the literature reflect experiences from different centers around the world. A study by Kav et al. reported obscure GI bleeding as the main indication for CE (57.5% of cases), with 22.5% of patients resulting in normal CE findings in a study population of 120 patients (16). 26% of patients enrolled in our study were reported to have normal CE findings, which is a finding parallel to this study. A pioneer study from 2002 by Scapa and colleagues reported a diagnostic yield rate of 62.9% for CE (17). This diagnostic yield rate is similiar to a recent study published by Singla et al., whom reported a diagnostic yield rate of 61.9% and 51.8% for patients above and below age of 60 respectively, in a study population of 1155 patients (18). Another study from India also backed this finding, with a positive diagnosis in two-thirds of the patients investigated by CE (19). Lately, artificial intelligence-assisted technology is being investigated in assessing CE images, with promising results (20,21).

The two absolute contraindications to CE examination are obstruction of the GI tract and dysmotility. The most serious complication of CE is capsule retention which may occur in patients with GI tract obstruction secondary to malignancies or ulcers and in patients with underlying dysmotility (22). Inadequate bowel preparation has also been linked to capsule retention (23).

Aside from the accessibility and affordability of CE, training of gastroenterologists for CE is also an important point. Training centers for CE are suggested to be performing 75 to 100 CE examinations per year (24). A minimum of 50 CE cases evaluated with a trainer is recommended in the training process (25,26). Stemming from these statements, in Türkiye, it would be feasible to have referral centers for CE examination to gather enough cases for training of gastroenterologists interested in CE before widespread utilization of CE in relatively small provinces or hospital settings.

The two major limitations of the study were the retrospective nature of design and low number of patients enrolled in the study. A prospective study evaluating the detailed clinical aspects and outcomes of a greater pool of patients would give more valuable information on the importance of CE as a diagnostic tool.

In conclusion, CE is a valuable tool in evaluating gastrointestinal disorders ranging from suspected small bowel bleeding to IBD. Accessibility of CE devices and training of gastroenterologists will help the healthcare team with diagnostic challenges in gastroenterology practice.

Ethics Committee: *This study protocol was approved by Ethics Committee of University of Health Sciences, Antalya Training and Research Hospital with the date of 23.05.2024 and number 7/4 2024-134. The study was complied with The World Medical Association Declaration of Helsinki.*

Conflict of Interest: *There is no conflict of interest with any institution or person.*

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