

CASE REPORT

## 십이지장 계실에서 저류된 캡슐 내시경 1예

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### Capsule Endoscopy with Retention of the Capsule in a Duodenal Diverticulum: A Case Report

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Capsule endoscopy is being increasingly recognized as a gold standard for diagnosing small bowel disease, but along with the increased usage, capsule retention is being reported more frequently. We report a case of capsule endoscopy retention in a diverticulum of the duodenal proximal third portion, which we treated by esophagogastroduodenoscopy. A 69-year-old male visited hospital with hematochezia. He had hypertension and dyslipidemia for several years, and was taking aspirin to prevent heart disease. CT and colonoscopy revealed a diverticulum in the third portion of the duodenum, rectal polyps, and internal hemorrhoids. Capsule endoscopy was performed but capsule impaction occurred. The capsule was later detected by CT in the diverticulum. Endoscopy was performed a day later and the capsule was removed using a net. A small bowel series was conducted after capsule removal, and no stenosis was found. The patient fully recovered and no recurrence of hematochezia was observed at his one month exam. This is the first case in Korea of capsule retention in a duodenal diverticulum, with successful removal by endoscopy. (*Korean J Gastroenterol* 2016;67:207-211)

**Key Words:** Duodenum; Diverticulum; Retention; Capsule endoscopy

### INTRODUCTION

Capsule endoscopy (CE) is a noninvasive, reliable diagnostic tool for examination of the small intestine,<sup>1</sup> especially for making a diagnosis of gastrointestinal bleeding or Crohn's disease (CD). In such cases, CE can detect small-bowel lesions more effectively than CT angiography.<sup>2</sup>

CE is the most important diagnostic tool for diagnosing small bowel disease, but it has many disadvantages, including high cost, inability to perform tissue biopsies, a high incompletion rate (15-30%), the risk of capsule retention

(2.6%), and aspiration.<sup>3</sup> Several reports note problems of capsule retention due to impaction in patients with intestinal stenosis or Meckel's diverticulum, leading to side effects such as diverticulitis, appendicitis, or pancreatitis.

Capsule retention is defined as the existence of a capsule in the intestine for over two weeks after ingestion, and requires medical endoscopy or surgery.<sup>4</sup> Some authors report that capsule impaction can indicate significant intestinal stenosis suitable for surgical management.<sup>5</sup> CE retention is uncommon but most cases of retention are caused by small bowel stenosis or Meckel's diverticulum.<sup>6,7</sup>

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Here, we report a case of capsule retention by small bowel diverticulum. We removed the capsule endoscopically.

## CASE REPORT

A 69-year-old male was admitted to our hospital complaining of a five-day history of hematochezia with loose stools but without abdominal pain. He had painless hematochezia of about 30 mL per day, noting bright red blood in the toilet after normal defecation. He experienced the same symptoms about five months previously, and was examined at another local hospital where he underwent colonoscopy. At the time, minimal colon polyps were found but no actively bleeding lesions were detected. The symptoms disappeared several days after colonoscopy but recurred five months later, resulting in admission to our hospital. The patient had been taking aspirin, an angiotensin-converting-enzyme (ACE) inhibitor, and atorvastatin for hypertension and dyslipidemia, but had stopped taking aspirin about five days following recurrence of hematochezia. At admission, the patient's vital signs were stable. In physical exam, the distal rectal exam was negative and there was no active bleeding or old blood clot in Levin tube irrigation. His hemoglobin level was 11.6 g/dL (five months prior it was 15.2 g/dL) and hematocrit level was 36.6% with the mean corpuscle volume of 92.1 fL, BUN level was 18.9 mg/dL, and fecal occult blood test level was 2.0 mg/mL. Blood test results were normal except for a de-

pressed hemoglobin level 4 points lower than five months prior. We could not rule out gastrointestinal bleeding, because there were no significant symptoms of hemorrhoid bleeding, there was painless hematochezia, and he had been taking long-term aspirin. Therefore we planned further examinations to detect gastrointestinal bleeding.

Esophagogastroduodenoscopy (EGD) and colonoscopy revealed atrophic gastritis, rectal polyps, and second degree internal hemorrhoids. CT angiography revealed fluid and gas filled small bowel loops and the diverticulum in the proximal third duodenal portion of size 4.5 cm (Fig. 1). Based on EGD, colonoscopy, and CT findings, we diagnosed internal hemorrhoid bleeding but hematochezia recurred the following day, about 20-30 mL with normal painless defecation. The patient was nervous and wanted further examination. The lab and findings suggested hemorrhoid bleeding, but we could not rule out small bowel bleeding. We concluded by EGD findings that the diverticular orifice was not large enough to retain the capsule, so CE was performed to diagnose the obscure small intestinal bleeding.

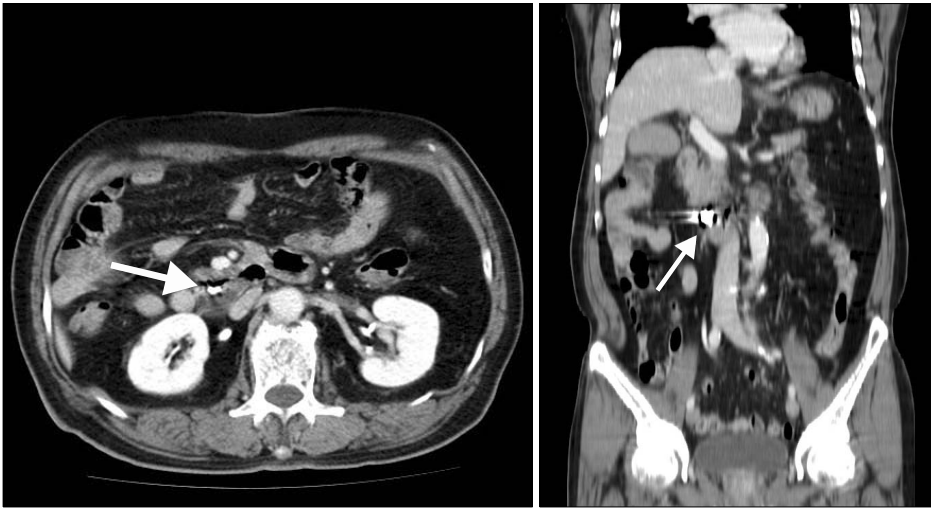
CE (MiroCam; IntroMedic Ltd., Seoul, Korea) was performed using a capsule measuring 11×24 mm with a battery life of over 11 hours. At three hours after ingestion, the video sequence showed the capsule stopped in the small intestine, which contained multiple enteroliths (Fig. 2). No significant lesions of active bleeding were observed during this three hour period. Abdominal X-ray and CT located the capsule in



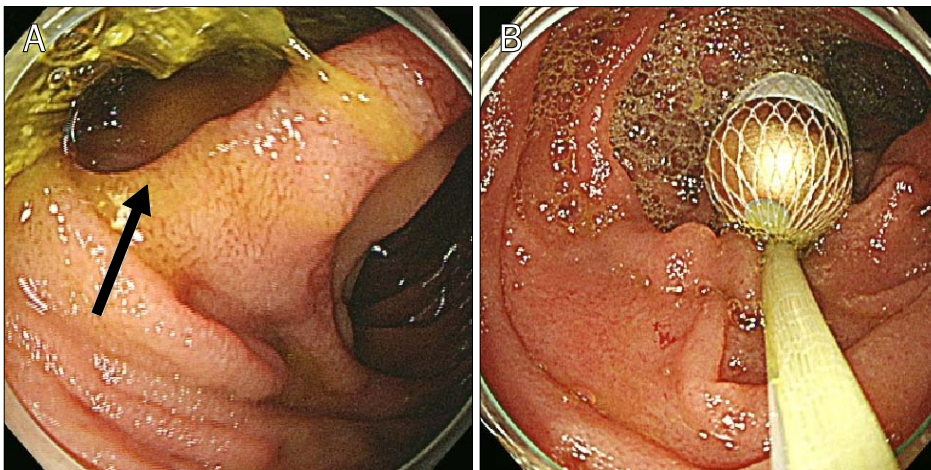
**Fig. 1.** Initial CT finding. The diverticulum in the proximal 3rd portion of duodenum was detected and its largest diameter was 4.5 cm (arrow).



**Fig. 2.** Capsule endoscopy findings. The capsule was impacted in the diverticulum, which contained multiple enteroliths at 3 hours after ingestion.



**Fig. 3.** Abdominal CT findings. Capsule retention in the diverticulum of duodenal 3rd portion (arrows).



**Fig. 4.** Esophagogastroduodenoscopy findings. (A) The capsule escaped the diverticulum naturally and was located on 3rd portion of duodenum (arrow). (B) Capsule removed using the net.



**Fig. 5.** Small bowel series finding after removing the capsule. Malrotation of small bowel and enlarged diverticulum are revealed, size was about 6.5 cm because of gas and barium fluid retention (arrows).

a duodenal diverticulum (Fig. 3). We allowed the patient to change position many times, but he had abdominal discomfort the next day. There were no significant signs of infection, including diverticulitis, but we planned EGD to examine the diverticulum and remove the capsule, because the diverticulum existed in the proximal third duodenum, which could be approached by EGD. We performed EGD and used a net (Retrieval Basket; SH Meditech Ltd., Seoul, Korea). The capsule was found in the duodenum around the diverticulum orifice; presumably a positional change had allowed it to escape the diverticulum. The capsule was removed easily using the net (Fig. 4).

A small bowel series was performed immediately after capsule removal to examine the small bowel stenosis and other lesions. The transit time was about six hours, and though malrotation of the small bowel was found, bowel obstruction was not evident (Fig. 5). Subsequently, hematochezia subsided

and his hemoglobin level normalized (11.7 g/dL). The patient was diagnosed as having internal hemorrhoid bleeding and discharged two days after the small bowel series. He fully recovered and resumed aspirin one week later after hospital discharge. One month later the hematochezia and melena had not recurred and he was doing well.

## DISCUSSION

CE is an important diagnostic tool and is being increasingly used to examine many disorders of the small bowel, such as suspected CD, obscure gastrointestinal bleeding, enteropathy with chronic diarrhea or losing protein, and intestinal stenosis.<sup>8</sup> CE is more effective than radiographic examinations and push enteroscopy (PE) for the diagnosis of intestinal diseases, especially for investigations of gastrointestinal bleeding or CD.<sup>9-12</sup> In obscure gastrointestinal bleeding, the detection rate with CE is greater than that of angiography or CT. Furthermore, compared with wired small bowel endoscopies, such as PE or Sonde endoscopy, which may not allow evaluation of entire small bowel,<sup>1</sup> CE is safe and effective at determining etiologies and detecting stenosis of the small bowel, such as an intestinal tumor or obstructive CD.<sup>8</sup>

However, CE is not always the best choice for investigating small bowel disorders, and its use is contraindicated in patients suspected of having a stricture or obstructing disease, and thus, in some cases, radiologic findings may be helpful to rule out the existence of strictures.<sup>13</sup> CT imaging or bowel series are considered substitutes for CE in known bowel obstruction cases and may also be used in cases of capsule retention. CT angiography is a valuable diagnostic technique for evaluating sites of stenosis or retention, and when a lesion is detected, another enteroscopy or surgical treatment can be scheduled to resolve the obstruction or remove the capsule. CT is also used to detect other complications of capsule retention, such as diverticulitis, appendicitis, pancreatitis, or bowel perforation that all require emergent surgery.

In the described case, the capsule was removed by EGD rather than enteroscopy, because the site of retention was identified by CT to be the diverticulum of the duodenal proximal third portion, close to the pylorus rather than Meckel's diverticulum in the distal ileum. Fortunately, before EGD the patient moved several times, the capsule escaped from the diverticulum naturally, and was removed using a net without

difficulty. Although we did not examine the gastric transit time (GTT) and small bowel transit time (SBTT) exactly, but estimated based on the results of the small bowel series, we supposed that malrotation and a diminished small bowel transit rate enabled the capsule to enter the orifice of the diverticulum. Ben-Soussan et al. reported that delayed gastric emptying can easily lead to gastric retention, and this disadvantage is the one of major limitations of CE.<sup>14</sup>

Obscure gastrointestinal bleeding is the most common indication for CE because of its high detection rates.<sup>3</sup> We suggest CT be considered for evaluating bowel anatomy and degree of obstruction before CE. When a diverticulum or severe stenosis is detected, and CE is contraindicated, that wired small bowel endoscopy, such as PE, Sonde endoscopy, or balloon-assisted enteroscopy, be used despite limitations regarding whole small bowel evaluation. Angiography is recommended in favor of CE when massive bleeding is expected.

No guidelines have been issued regarding the duration of medication treatment and when surgical treatment should be considered. However, Ordubadi et al.<sup>7</sup> suggested, even in asymptomatic patients, if a capsule is retained in intestinal diverticulum and not excreted within ~3 weeks, it should be removed by wired enteroscopy or surgical treatment in order to prevent complications, such as, diverticulitis, perforation, or pancreatitis. Some case reports have described capsules spontaneously passing stricture at six months in patients treated conservatively,<sup>8</sup> but many authors recommend using scope examinations or surgery to remove capsules retained for three weeks because of elevated risks of infection and small bowel perforation.

We report a rare case of capsule retention in the diverticulum of the proximal third portion of the duodenum. We keenly regretted some errors in this case. First, we finally diagnosed hemorrhoid bleeding, but the diagnosis was difficult and complicated because he previously suffered a second-degree internal hemorrhoid without pain, and hematochezia did not recur for about two months. He was then not seen for two months after discharge because of his newly diagnosed lung mass. Second, we should have waited for natural resolution of capsule retention with positional changes, but we performed EGD a day after insertion because of the patient's abdominal discomfort. We did not follow published suggestions, but we had a good result in that the capsule was removed early by EGD. Third, we should check GTT or SBTT.

We discovered the malrotation and a diminished small bowel transit rate, but we did not chart the result, so we could not definitively compare our result with other cases of gastric retention.

In conclusion, CT is the best tool for locating retention sites before CE. A small bowel series is also useful to check GTT and SBTT for judging delayed gastric emptying. When GTT and SBTT are prolonged, CE may be contraindicated because of its retention risk, and may be replaced with wired enteroscopy. If CE retention occurs, positional change, especially right decubitus position may be helpful. As in this case, EGD may be helpful when the retention site is near the proximal duodenum. Intervention is needed three weeks after CE retention. Laboratory tests for infection and abdominal radiography should be done periodically during retention.

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