

Diagnosis and Treatment of Sustain Occult Gastrointestinal Bleeding after Appendectomy by Angiography and Arterial Embolization

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Our patient was a 26-year-old man who was admitted to the hospital with complaints of abdominal pain. The patient had a medical history of propranolol and corticosteroid use. The diagnostic tests were done with suspicion of appendicitis. Under general anesthesia with McBurney's incision appendectomy was performed. We found perforated appendicitis and localized peritonitis. The perforated appendix was excised after ligation of its base. On the day after surgery, the patient's body temperature increased to 39 °C accompanied by mild tachycardia and hypertension (BP= 170/90 mmHg) but after 4 days, the patient was discharged with a good general condition. 20 days after discharge, the patient returned to the hospital with weakness and rectorrhagia. The onset of rectorrhagia was 3-4 days before the admission. The

patient's vital sign was stable. He reported dizziness and cold sweating. He fainted one time and had jaundice with pale conjunctiva and also complained from epigastric tenderness.

The patient's laboratory finding showed severe anemia (Hb: 5.5 gr/dL, RBC: 2.16 10⁶/μl) with high WBC count and coagulopathy.

Ultrasonic abdominopelvic examination and colonoscopy did not show any specific findings. Ultrasonic evaluation could not detect any fluid in peritoneal or pelvic space but increased thickness of the cecum, ascending and transverse colon was reported (figure 1).

The second colonoscopy was considered for

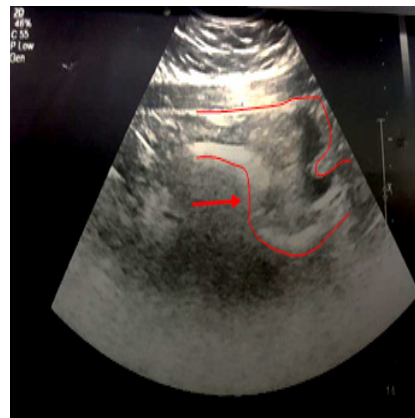


Fig.1: The ultrasound image showing an increase in the thickness of the cecum, and ascending and transverse colon

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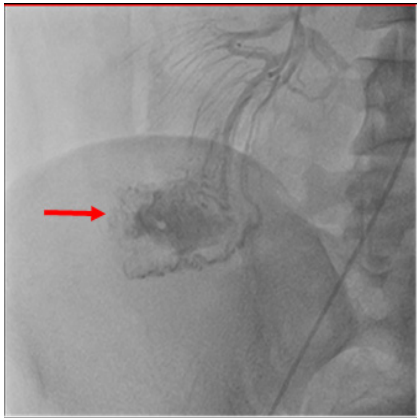


Fig.2: Angiographic view of the branch of the cecal artery in which the contrast agent is released into the intestine via AVF



Fig.3: Angiographic view after complete AVF remobilization using coil

further evaluation and detection of the bleeding site, but the origin of bleeding was not determined, in spite of continuous lower gastrointestinal (GI) bleeding and decrease in patient's hemoglobin, the source of the bleeding was still unknown so we decided to perform angiography in the 3rd day of admission.

What is your diagnosis?

Answer: Invert one of the vessels of the appendix into the intestine

Angiography was performed through the right femoral artery. The upper and lower mesenteric arteries and their branches were evaluated by contrast injection and arteriovenous fistula (AVF) was seen in its cecal branch (figure 2). The embolization of the feeding artery of AVF was performed successfully (figure 3). 30 minutes after finishing the procedure, angiography by injection of the contrast agent was repeated and no extravasation was observed. The patient was transfused six units of packed cell and two units of fresh frozen plasma during hospital admission. Finally, two days after angiography, the serum hemoglobin increased from 5.5 to 10.5 mg/dL, rectorrhagia stopped, and the patient was discharged with good general conditions.

DISCUSSION

In the present case report, we illustrated lower GI bleeding from the previous site of appendectomy, which was detected by angiography and was treated using arterial embolization by a coil through the

femoral artery access. Previous studies showed that our report could be one of the rare ones (table 1).(1)

There are four types of GI bleeding with the obscure source; upper, lower, occult, and overt bleeding(2).Acute appendiceal stump bleeding is one of the rare conditions of lower GI bleeding. There are different methods for the treatment and diagnosis of lower GI bleeding including colonoscopy, radionuclide red cell scan, and visceral angiography(3).

Moderate or severe lower GI bleeding is detected and treated by colonoscopy, whereas in the sustain occult lower GI bleeding, multidetector-row computed tomography (MDCT) and visceral angiography are commonly performed as the most important diagnostic techniques (4,5). Oakland and colleagues in 2018 examined 2528 patients with lower GI bleeding and used flexible sigmoidoscopy as the common diagnostic method and reported that only 2.1% of those patients were successfully treated using colonoscopy. In their study, they used embolization (0.8%) and surgery (0.2%) as very rare techniques for controlling the patients' bleeding (6). Baek and others in 2010 reported a 42-year-old man who suffered from hematochezia, without signs of nausea, vomiting, and abdominal pain. They used MDCT in the lower GI system as the first diagnostic technique and showed the extravasation of the contrast agent at the distal region of the appendix. An emergency appendectomy was done by laparoscopic technique. They reported the successful combination of MDCT and colonoscopy for the diagnosis of acute lower GI bleeding and laparoscopic appendectomy (4). Kyokane and co-workers reported a case of appendiceal stump bleeding,

Table 1: Reported cases of appendiceal stump bleeding(1)

Authors	Year	Age	Sex	Anticoagulant or antiplatelet drug	Diagnostic method	Treatment	Pathologic diagnosis
Tamvakopoulos	1969	40	M		Not described	Conventional appendectomy	Diverticulitis
Tamvakopoulos	1969	43	F		Barium enema	Conventional appendectomy	Diverticulitis
Geerken and Gibbons	1974	17	M		Barium enema	Conventional appendectomy	Crohn's disease
Brewer and Wangenstein	1974	24	F		Barium enema	Ileocecal resection	Intussusception
Brown and Peter	1976	19	M		Barium enema	Right hemicolectomy	Crohn's disease
Milewski	1977	14	M	Aspirin tablet taken on the night of admission	Not described	Ileocecal resection	Appendicitis, abscess
Mullen	1979	63	M		Barium enema	Right hemicolectomy	Diverticulum, mucocele
Norman et al	1980	48	M		Angiography	Conventional appendectomy	Diverticulum
McIntosh et al	1990	18	F		Colonoscopy, CT	Conventional appendectomy	Intussusception
Jevon et al	1992	32	F		Colonoscopy	Partial cecectomy	Intussusception
Shome et al	1995	33	F		Colonoscopy	Ileocecal resection	Endometriosis
So et al	1995	42	M		Colonoscopy	Laparoscopic appendectomy	Angiodysplasia
Morales et al	1997	60	M		Colonoscopy	Laparoscopic appendectomy	Diverticulitis
Gupta et al	2000	9	M		Colonoscopy	Partial cecectomy	Intussusception
Kyokane et al	2001	76	F		Angiography	Transcatheter arterial embolization, conventional appendectomy	Angiodysplasia
Monaghan and Cogbill	2002	66	M		Sonography, CT	Conventional appendectomy, AAA resection	Primary aortoappendiceal fistula, appendicitis
Lima et al	2004	16	M	Aspirin 200mg/day	Colonoscopy	Conventional appendectomy	Crohn's disease
Rivera-Irigoin et al	2005	51	M		Colonoscopy	Conventional appendectomy	Aspirin-induced ulcer
Yamazaki et al	2006	53	F		Colonoscopy, CT	Laparoscopic appendectomy	Appendicitis
Ogi et al	2006	44	M		Colonoscopy	Laparoscopic appendectomy	Hematoma
Kim et al	2007	56	M	Few tablets of NSAID	Colonoscopy	Right hemicolectomy	GIST
Kuntanapreeda	2008	20	M		Colonoscopy	Conventional appendectomy, partial cecectomy	Tuberculosis
Cho SC et al	2008	33	F		CT, Colonoscopy	Laparoscopic appendectomy	Erosion
Ki young yoon et al	2010	48	M		Colonoscopy	Conventional appendectomy. Partial cecectomy	Appendicitis
Baek	2010	42	M		CT, Colonoscopy	Laparoscopic appendectomy	Mucosal erosion
Chung and Kim	2011	70	M		Colonoscopy	Endoscopic clipping	
Konno et al	2013	71	M	Ticlopidine hydrochloride	CT, Colonoscopy	barium enema, laparoscopic appendectomy	Ulcer
Marta Magaz-Martinez et al	2016	22	M		Colonoscopy. CT	Conventional appendectomy. Partial cecectomy	Chronic granulomatous appendicitis
Kim et al	2019	49	M		Colonoscopy. CT	Appendectomy- partial cecal resection	Acute suppurative appendicitis
Our case	2019	26	M		Colonoscopy. CT- Angiography	Transcatheter arterial embolization	

which was diagnosed with angiography. They used angiography for diagnosis and embolization for stopping the bleeding similar to what we did. In their study, they recommended angiography as a proper diagnostic procedure(7).

Rivera and colleagues in 2005 reported a 51-year-old woman with a history of smoking, systemic hypertension, type IIa hyperlipidemia, and hysterectomy who was referred to the hospital because of rectorrhagia without abdominal pain or other GI signs. No problem was seen in the radiography and endoscopy of the upper GI system. Emergency colonoscopy revealed fresh blood in the colon in addition to active bleeding from an ulcer in the base of the appendix. The appendix was removed through a McBurney's incision and the bleeding was controlled(8).

Kathryn Oakland and colleagues in 2019 emphasized that patients with lower GI bleeding should undergo emergency laparotomy unless there were certain conditions such as unstable hemodynamic parameters, heart failure, and occult active hemorrhage (like our patient) in which angiography could be considered as the choice and the least invasive treatment method(9).

Most of the patients with lower GI bleeding from the appendix origin were diagnosed by barium enema and colonoscopy. Angiography and arterial embolization were considered as the last choice and advanced method for this purpose (table 1). All the similar articles reported appendiceal stump bleeding in healthy patients before appendectomy, while our patient had bleeding after appendectomy.

In our report, a rare complication was reported, which was diagnosed using angiography as an advanced method and the bleeding was controlled using arterial embolization with minimal invasion and side effects.

Managing sustained occult lower GI bleeding with attention to the recent abdominal operation could be a challenging problem. When managing this type of bleeding, conventional strategies like colonoscopy or barium enema have little advantages and could potentially be dangerous. We recommend using advanced techniques like angiography and arterial embolization in an early stage for a better outcome and less complication.

CONFLICT OF INTEREST

The authors declare no conflict of interests related to this work.

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