—Case Reports—

A Case of Anomalous Congenital Band that Was Difficult to Differentiate from Omphalomesenteric Duct Anomaly

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Anomalous congenital band (ACB) is rare and difficult to identify preoperatively. Here we report a pediatric ACB case that was preoperatively suspected using computed tomography and was difficult to differentiate from omphalomesenteric duct anomaly. ACB should be considered in the differential diagnosis of acute abdomen. (J Nippon Med Sch 2017; 84: 304–307)

Key words: anomalous congenital band, abdominal pain, intestinal obstruction, intestinal gangrene

Introduction

Pediatric cases of small bowel obstruction associated with past intra-abdominal procedures/problems, such as laparotomy and peritonitis, are sometimes encountered. However, cases associated with malrotation, internal hernia, and anomalous congenital band (ACB), which have no relationship with medical history, are rare. ACB is difficult to diagnose preoperatively with any examinations[1–17]. Here we report a rare case of ACB preoperatively suspected using computed tomography (CT). It extended from the umbilicus to the right lower quadrant of the abdomen, and it was difficult to differentiate from an omphalomesenteric duct preoperatively.

Case Report

A 13-year-old boy with right lower quadrant abdominal pain and vomiting was referred by another hospital because of suspicion of appendicitis. He had a history of chronic abdominal pain, but no history of laparotomy or peritonitis. He was admitted to our hospital for assessment and management of the symptoms.

On physical examination, his body temperature was 36.3℃, and his abdomen was distended with mild tenderness and muscular resistance. No mass was palpable. His blood cell count, C-reactive protein level, and other laboratory data were all within the normal ranges. An abdominal radiograph showed little bowel gas. CT revealed that the appendix was normal and showed a band extending from the umbilicus to the right lower quadrant of the abdomen, which caused intestinal torsion (**Fig. 1a, b**). There was no strangulation or ischemic change of the intestine. We suspected that the intestinal torsion was caused by Meckel's diverticulum, omphalomesenteric duct anomaly, or ACB. He was diagnosed with small bowel obstruction caused by intestinal torsion and was going to be prepared for emergency operation. However, his condition improved after starting conservative therapy. Therefore, elective laparoscopic surgery was scheduled. After discharge, he underwent technetium-99m pertechnetate radionuclide study and we assessed the study findings and noted negative results for Meckel's diverticulum.

Two weeks later, single-port laparoscopic surgery was performed through the umbilicus. An anomalous band was laparoscopically detected. It was approximately 4 mm in diameter and 10 cm in length, and it extended from the mesentery of the terminal ileum to the umbilicus (**Fig. 2**). Therefore, we considered a diagnosis of ACB. Neither ischemic change of the intestine nor intra-abdominal inflammation was observed. The band was laparoscopically removed. The postoperative course was uneventful, and no complication has been observed for 11 months. On histopathological examination, the band was found to be composed of loose connective tissue containing arteries, veins, and nerve fibers. There was no evidence of an omphalomesenteric duct (**Fig. 3**). There-

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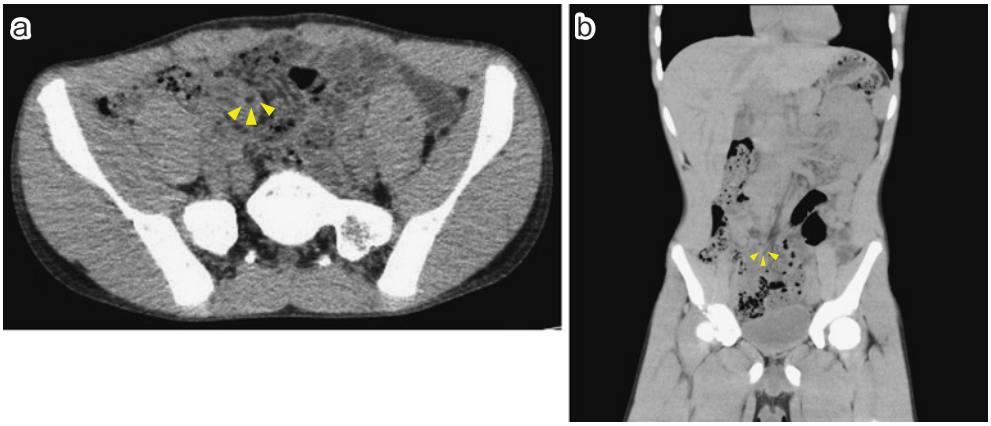

Fig. 1 (a, b) Computed tomography showing the band that caused intestinal torsion

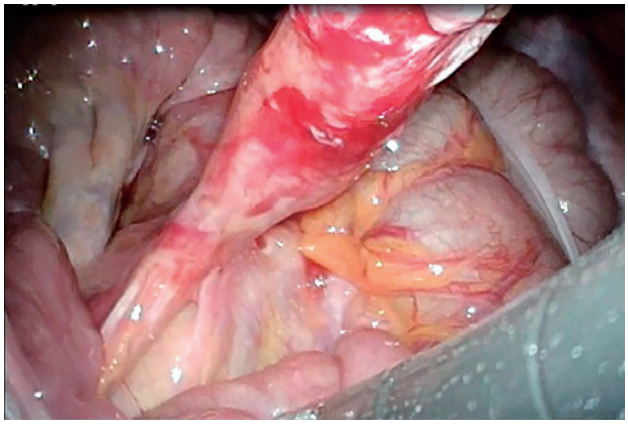

Fig. 2 Laparoscopy showing that the band extended from the mesentery of the terminal ileum to the umbilicus

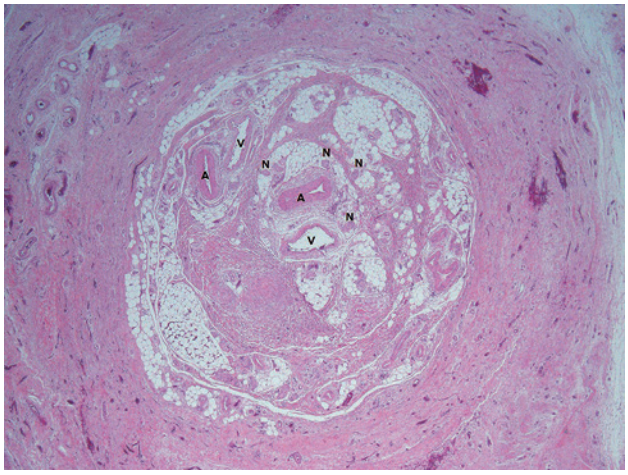

Fig. 3 Histopathological findings showing that the band was composed of loose connective tissue containing arteries (A), veins (V), and nerve fibers (N)

fore, the diagnosis of ACB was confirmed.

Discussion

ACB is extremely rare, and there are a few reports in the literature[1–17]. Most cases of ACB were diagnosed in children, although some were diagnosed in adults[2–8]. The mean age at ACB diagnosis has been reported to be 4.9 years, and the condition is more common in males (84%) (**Table 1**)[1,9–17]. In the literature, all reported patients had no history of laparotomy or peritonitis[1–12]. The symptoms of ACB, including abdominal pain, vomiting, fever, and abnormal bowel movement, occur because of compression of the intestine by the band or entrapment of an intestinal loop between the band and mesentery[1]. Six cases (19%) of ACB with intestinal gangrene were reported (**Table 1**).

ACB is difficult to identify preoperatively, and almost all cases are diagnosed intraoperatively[1–17]. In the literature, although imaging modalities, such as CT and ultrasonography, showed intestinal dilatation caused by the band preoperatively, these modalities did not show the band itself preoperatively. To our knowledge, the present case report is the first to mention CT detection of the band itself preoperatively. We should consider the possibility of ACB when CT is performed in pediatric patients with abdominal symptoms. This could make it possible to detect the band itself preoperatively.

Various anatomic locations of ACB have been reported in children (**Table 1**). The location between the ileum or ileal mesentery and the ascending colon is the most frequent, although some bands occurred at other locations. The etiology of ACB has not been elucidated; however, its localization is not similar to that of well-known embryogenic remnants, such as vitelline vessels and omphalomesenteric ducts. Akgur et al.[1] speculated that ACB originates from mesenteric anomalies rather than from gastrointestinal anomalies. For about 28 days in the embryonic period, the dorsal mesentery and ventral mesen-

Table 1 Pediatric cases of anomalous congenital band

Author	Age	Sex	Episode	IG	Location of the band	Postoperative course
Akgur	6 d	M	IO	(+)	AC-TI	Favorable
	10 m	F	IO	(–)	AC-TI	Favorable
	3 m	M	IO	(+)	AC-TI mesentery	Favorable
	4 y	M	IO	(–)	AC mesentery-TI	Favorable
	2 y	M	IO	(–)	Treitz-TI mesentery	Favorable
	6 y	M	IO	(–)	Treitz-TI mesentery	Favorable
	5 m	M	IO	(–)	Liver-TI mesentery	Favorable
	9 d	M	IO, perforation	(–)	Liver-AC mesentery	Died
Liu	2 y	M	IO	(–)	Treitz-PJ mesentery	Favorable
Etensel	7 y	M	IO	(–)	SC mesentery-ileum	Favorable
Tsukuda	14 y	M	Bleeding	(–)	Cecum-TI mesentery	Favorable
Chang	3 y	M	IO	(–)	Meckel-ileal mesentery	Favorable
	5 y	M	IO	(–)	Cecum-TI mesentery	Favorable
Andrea	7 y	M	IO	(+)	Right lower abdomen	MOF
Nouira	3 y	M	IO	(–)	Jejunum-mesentery	Favorable
Maiese	4 y	Unknown	IO	(+)	Mesentery at four locations	Died
Galvan	1 y	M	IO	(–)	Jejunal mesentery-mesentery	Favorable
Basak	4 d	M	IO	(–)	AC-TI	Unknown
	1 m	F	IO	(+)	TI-ileum	Unknown
	3 y	F	IO	(–)	Jejunum-jejunum, ileum-ileum	Unknown
	3.5 y	M	IO	(–)	AC-TI	Unknown
	4 y	M	IO	(–)	AC-TI	Unknown
	5 y	M	IO	(–)	Jejunum-TI	Unknown
	5 y	F	IO	(+)	AC-TI	Unknown
	5 y	M	IO	(–)	Ileum-TI	Unknown
	6 y	M	IO	(–)	Treitz-jejunum	Unknown
	10 y	F	IO	(–)	Jejunum-TI	Unknown
	10 y	M	IO	(–)	Meckel-ileum	Unknown
	10 y	M	IO	(–)	Treitz-TI mesentery	Unknown
	10 y	M	IO	(–)	Duodenum-duodenum	Unknown
	12 y	M	IO	(–)	Jejunum-TI	Unknown
Our case	13 y	M	IO	(–)	Umbilicus-TI mesentery	Favorable

y: year-old, d: day-old, m: month-old, IO: intestinal obstruction, IG: intestinal gangrene, AC: ascending colon, TI: terminal ileum, Treitz: Treitz's ligament, PJ: proximal jejunum, SC: sigmoid colon, Meckel: Meckel diverticulum, MOF: multiple organ failure

tery temporarily divide the abdominal cavity into right and left halves. The ventral mesentery soon degenerates, except around the liver and in front of the stomach. As the intestines participate of their final position, the mesenteries are passed against the posterior abdominal wall. Then, the dorsal mesentery of the ascending colon integrate with the parietal peritoneum and disappears. It has been reported that the bands located between the right colon and the terminal ileum mesentery might be formed through fusion of a part of the right colon mesentery with medial structures instead of the posterior abdominal wall[1]. In our case, the band extended from the mesentery of the terminal ileum to the umbilicus and might have resulted from a mechanism similar to that proposed by Akgur et al.

In our case, on histopathological examination, the band was found to be composed of loose connective tissue containing arteries, veins, and nerve fibers but no mucosal layer. On the other hand, an omphalomesenteric duct contains a mucosal layer[18]. Therefore, we confirmed the diagnosis of ACB.

In conclusion, we reported a rare case of ACB suspected using CT preoperatively, which extended from the mesentery of the terminal ileum to the umbilicus and was difficult to differentiate from an omphalomesenteric duct. In children with abdominal pain having no history of laparotomy or peritonitis, the possibility of ACB should be considered, although it is rare. CT might help detect the band itself and aid in the diagnosis of the band preoperatively.

Conflict of Interest: The authors declare that they have no conflict of interest.

References

1. Akgur FM, Tanyel FC, Buyukpamukcu N, Hicsonmez A: Anomalous congenital bands causing intestinal obstruction in children. J Pediatr Surg 1992; 27: 471–473.
2. Maeda A, Yokoi S, Kunou T, Tsuboi S, Niinomi N, Horisawa M, Bando E, Uesaka K: Intestinal obstruction in the terminal ileum caused by an anomalous congenital vascular band between the mesoappendix and the mesentery: Report of a case. Surg Today 2004; 34: 793–795.
3. Albert AA, Nolan TL, Weidner BC: Sigmoid volvulus in 16-year-old boy with an associated anomalous congenital band. Am Surg 2013; 79: 1140–1141.
4. Habib E, Elhadad A: Small bowel obstruction by a congenital band in 16 adults. Ann Chir 2003; 128: 94–97.
5. Sozen S, Emir S, Yazar FM, Altinsoy HB, Topuz O, Vurdem UE, Tukenmez M, Keceli M, Uzun AS, Cetinkunar S, Ozkan Z, Guzel K: Small bowel obstruction due to anomalous congenital peritoneal bands-case series in adults. Bratisl Lek Listy 2012; 113: 186–189.
6. Low SF, Ngiu CS, Sridharan R, Lee YL: Midgut malrotation with congenital peritoneal band: a rare cause of small bowel obstruction in adulthood. BMJ Case Rep 2014. doi:10.1136/bcr-2013-202690.
7. Nicolas G, Kfoury T, Shimlati R, Koury E, Tohme M, Gharios E, Wakim R: Diagnosis and treatment of small bowel strangulation due to congenital band: Three cases of congenital band in adults lacking a history of trauma or surgery. Am J Case Rep 2016; 17: 712–719.
8. Abdelwahed Y, Saber R, Imen BI, Hakim Z, Ayoub Z: A case report of small bowel obstruction secondary to congenital peritoneal band in adult. Int J Surg Case Rep 2017; 30: 23–25.
9. Liu C, Wu TC, Tsai HL, Chin T, Wei C: Obstruction of the proximal jejunum by an anomalous congenital band-a case report. J Pediatr Surg 2015; 40: E27–29.
10. Etensel B, Ozkisacik S, Doger F, Yazici M, Gürsoy H: Anomalous congenital band: a rare cause of intestinal obstruction and failure to thrive. Pediatr Surg Int 2015; 21: 1018–1020.
11. Tsukuda K, Watanabe K, Nakahara S, Tada A, Takagi S, Ikeda E, Hirai R, Tsuji H, Tanaka T, Kunitomi T: A case of a pediatric intraabdominal hemorrhage caused by anomalous congenital band. Jpn J Gastroenterol Surg 2009; 42: 1626–1630.
12. Tang CY, Hsiun CB, Hung SH, Mei HY, Shu CC: Laparoscopy in children with acute intestinal obstruction by aberrant congenital bands. Surg Laparosc Endosc Percutan Tech 2010; 20: e34–37.
13. Fang AC, Carnell J, Stein JC: Constipation in a 7-year-old boy: Congenital band causing a strangulated small bowel and pulseless electrical activity. J Emerg Med 2012; 42: 283–287.
14. Nouira F, Sarrai N, Charieg A, Jlidi S, Chaouachi B: Small bowel obstruction by an anomalous congenital band. Acta Chir Belg 2012; 112: 77–78.
15. Maiese A, Bonaccorso L, Aquila MD, Gitto L, Bolino G: Anomalous congenital band and intestinal obstruction: report of a fatal case in a child. Forensic Sci Med Pathol 2013; 9: 588–590.
16. Montano AG, Avila MT, Moreno SG, González AP: Congenital anomaly band, a rare cause of intestinal obstruction in children. Case report. Cir Cir 2016; 15: 261–263.
17. Erginel B, Soysal FG, Ozbey H, Keskin E, Celik A, Karadag A, Salman T: Small bowel obstruction due to anomalous congenital bands in children. Gastroenterol Res Pract 2016. doi:10.1155/2016/7364329.
18. Coran AG, Adzick NS, Krummel TM, Laberge JM, Shamberger RC, Caldomone AA: Pediatric surgery, 7th edition volume 2, 2012; pp 1086–1087, Elsevier, Philadelphia.

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