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■ Case report ■

Perianastomotic ulceration presenting with long-term iron deficiency anemia and growth failure: A case report and review of the literature

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= Abstract =

Perianastomotic ulceration (PAU) rarely occurs after small bowel resection in infancy. Since the understanding of its pathogenesis is incomplete, an effective method of treatment has not yet been discovered. We report the first case in Korea of a 10-year-old girl with chronic iron deficiency anemia (IDA) and growth failure who was diagnosed with PAU at colonoscopy. Seven years were required to identify the cause of IDA. After surgical resection and revision of anastomosis, a close follow-up is being conducted due to the risk of recurrence. Here, we also review reports on 25 pediatric patients with PAU derived from a search of the English-language literature and describe the clinical features of PAU along with the results of treatment. (Korean J Pediatr 2010;53:89-92)

Key Words : Perianastomotic ulceration, Iron deficiency anemia, Growth failure, Colonoscopy

Introduction

The number of infants that have survived massive small-bowel resection has increased during recent decades[1, 2]. Perianastomotic ulceration (PAU) in these survivors was first reported[3] in 1988, and has been presented as a rare disorder in subsequent case reports. Previously reported PAU articles[4, 5] have revealed some common clinical features; namely, an early diagnosis is difficult because PAU is a rare disease and its occurrence takes a long time after bowel resection. In terms of treatment, medical therapy proved not to be so satisfactory, and surgery cannot effectively prevent its recurrence. We report firstly in Korea the case of a 10-year-old girl with PAU who was described as having chronic iron deficiency anemia (IDA) and growth failure. We also reviewed reports on 25 pediatric patients with PAU after searching the English-language literature[1, 3-12] for cases similar to ours. Here, we describe the clinical features of PAU along with the results of treatment, and discuss practical treatment measures.

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Case report

A 10-year-old girl was admitted suffering from chronic severe anemia and growth failure. She had been born full term with ileal atresia, which was accompanied by perforation. On the 2nd day of life, she underwent ileocolic anastomosis, during which 100 cm of small bowel, including the ileocecal valve, was excised at other hospital. Thereafter, she has been admitted with refractory IDA of unknown origin for 7 years. No gross bloody stool was observed, but stool occult blood was intermittently positive. Vitamin B_{12} serum level was normal in repeated tests.

Her vital signs were normal. Even though she was at the third percentile for height, the growth hormone stimulating test was normal. Her hemoglobin was 7.6 g/dL with severe microcytosis (MCV, 64.9 fl). Heme in stool was positive, and serum albumin was 4.4 g/dL. Other laboratory tests

(liver function, coagulation, C-reactive protein) were normal. Gross endoscopic findings of the upper gastrointestinal tract were nonspecific. Colonoscopy showed a 1.0 cm ulcer with an irregular margin on the hepatic flexure of the colon (Fig. 1). Due to long-term severe IDA and growth failure, she underwent laparotomy, during which a single ulcer was discovered in the colonic side of the ileocolic anastomotic site. A pouch (5 cm in length) had developed near the anastomosis due to bowel adhesion to liver. The anastomosis was resected and revised, and the histology of ulcerative lesion showed ischemic change and chronic inflammation with moderate infiltration of lymphocytes, plasma cells or eosinophils in surrounding mucosa. Pyloric metaplasia of the adjacent mucosa was observed (Fig. 2), but no definite evidence was obtained of a distinct organism or virus, gastric parietal or chief cells, lymphoid hyperplasia, crypt abscesses, granuloma, and malignancy. She received oral iron supplementation and fat-soluble vitamins. Three weeks later, her hemoglobin was maintained at 12.5 g/dL. Eighteen months later, the patient's height was 137 cm (10th percentile) and her weight was 29.7 kg (5-10th percentile), and the anemia did not recur.

Discussion

The present case concerns a 10-year-old girl with the consistent state of low hemoglobin and growth failure despite 7 years of adequate iron supply after an initial diagnosis of IDA at 3 years of age. Although the condition of the patient notably improved after re-surgery, she is being closely followed up due to the risk of recurrence.

We reviewed the cases of 25 pediatric patients by searching the English-language literature for cases similar to ours[1, 3-12] (Table 1). According to the original diagnoses, the major causes of PAU were necrotizing enterocolitis, gastroschisis, ileal atresia, and volvulus. Twenty one (84%) underwent intestinal resection during the newborn period or the first postnatal year. Ileo/jejunocolic anastomosis was performed in 22 cases (88%) and ileoileal anastomosis in 3 (12%). Mean symptom-latency in 19 observed cases after original operation was 8.0±3.4 (2-14) years[1, 3-11]. Five (29%) of 17 cases were diagnosed immediately[1, 5-7, 10], and the remaining 12 (71%) took 2.3±2.6 (0.5-10) years until diagnosis[3, 4, 7-9, 11]. In our case diagnosis took 7 years. Accordingly, we advise that PAU must be suspected in patients with ill-defined IDA or GI bleeding long after ileo/jejunocolic resection during newborn period or infancy.

Although colonoscopy most aids diagnosis, complications such as bowel adhesion may make an endoscopic approach difficult in some cases. Three (21.4%) of the 14 cases, in which growth was described, showed growth failure[1, 4-6], as was observed in our case. Thus, it should be considered that growth failure is an uncommon but possible disorder in PAU. Ten (44%) of 23 identified ulcers were single[1, 3-8, 10], and 13 (56%) were double or more[1, 3-6, 8-11]. Diagnosis for one ulcer, discovered in the distal 10 cm of remaining

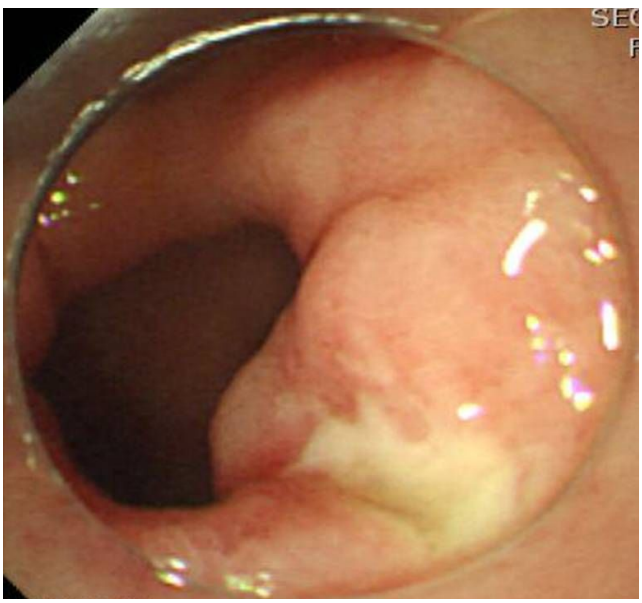

Fig. 1. Colonoscope with outer cylinder shows a 1.0 cm ulcer with an irregular margin on the hepatic flexure of the colon.

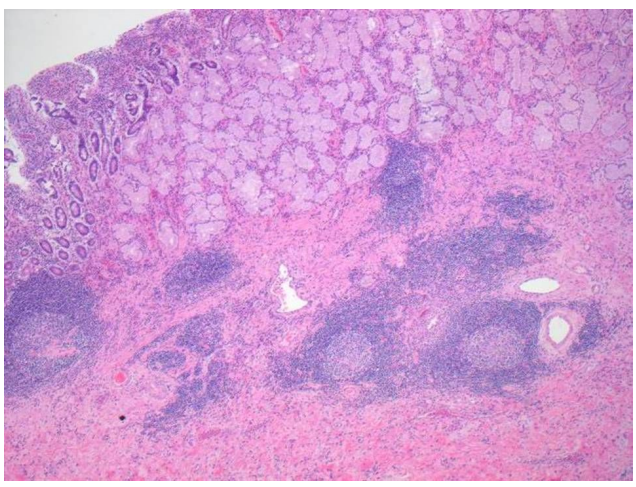

Fig. 2. The histology of the ulcerative lesion shows ischemic changes and chronic inflammation with pyloric metaplasia (hematoxylin and eosin, original magnification ×200).

Table 1. Major Clinical Features of 25 Pediatric Patients with Perianastomotic Ulceration (PAU) from a Review of the Literature

Authors	Original diagnosis	Age at original bowel resection	Age at symptom onset (years)	Age of PAU diagnosis (years)	Treatment	Recurrence
Parashar et al.[3]	Volvulus	1 month	ND	4	Surgical	No
	Intussusception	4 months	ND	13	Medical	No
	Colonic atresia	2 days	ND	12	Surgical	No
	NEC	18 months	ND	11	Medical	ND
	Gastroschisis	4 months	2.4	3.3	ND	ND
Couper et al.[1]	Gastroschisis	Infancy	8.4	8.4	Surgical	Yes
	Ileal atresia	Infancy	9.8	ND	Surgical	No
	Gastroschisis	Infancy	5	ND	ND	ND
	Ileal atresia	Infancy	11.8	ND	Medical	ND
Paterson et al.[7]	Volvulus	3 years	13	13	Surgical	No
	NEC	9 months	8	9	Medical	No
Bhargava et al.[8]	NEC	1 month	14.5	16	Surgical	No
	Internal hernia	9 years	13	14	Surgical	No
Sondheimer et al.[4]	NEC	10 months	13	16.5	Surgical	Yes
	NEC	15 months	13.3	16	Medical	Yes
	NEC	Newborn	12.5	13.3	Surgical	Yes
	NEC	3 months	9.5	10	Surgical	Yes
	NEC & D. hernia	Infancy	8.8	11.8	Surgical	No
	NEC	1 month	4.5	6	Surgical	Yes
Arnbjornsson et al.[9]	Gastroschisis & ileal atresia	9 months	6.5	8	Surgical	Yes
Chari et al.[10]	Ileal atresia	6 months	11	11	Surgical	Yes
	Omphalocele & malrotation	1 day		28	Medical	Yes
Ceylan et al.[5]	NEC	4 months	7	7	Surgical	Yes
	Gastroschisis	Newborn	5	5	Surgical	Yes
Weersma et al.[11]	Ileal atresia	Infancy	13	23	ND	ND

Abbreviations : NEC, necrotizing enterocolitis; D, diaphragmatic; ND, no data

ileum, required close observation by colonoscopy[4]. We recommend, in terms of diagnosis and surgical treatment, that ulcer identification be undertaken carefully.

All cases were placed on oral iron supplementation, and this was followed by medications such as metronidazole, H_2 antagonist, sulfasalazine, sucralfate, cholestyramine, and prednisolone. However, no recurrence was observed in only two (14.3%) of 14 medically treated cases[3, 7]. A case[9], in which PAU recurred after surgery, was treated with ranitidine and at follow-up for two years no recurrence was evident. As this review makes obvious, medical therapy is associated with a low success rate and long-term medication is required. A surgical resection and anastomosis revision was required in 16 cases[1, 3-10], and 9 (56.3%) of these recurred[1, 4-6, 9, 10]. Hence, in the situation, where there is no consensus on effective treatment, surgical measures should be limited to patients with massive GI bleeding, anemia refractory to oral iron therapy, and growth failure during the pediatric period. Of the 9 cases that recurred, seven (78%) did so within 6 months after anastomosis resection and revision[1, 4-6, 10]. These findings indicate that the first six months of follow- up is critical after re-surgery.

The characteristic pathologic appearances of PAU are; pyloric metaplasia and abnormal blood vessels in submucosa adjacent to the ulcer[1, 5, 8]. These findings were also observed in our case. But, the pathogenesis of PAU has not been elucidated. In the present case, minor stasis induced by the pouch may have lead to bacterial overgrowth and mucosal lining damage. Other hypothetical causes include; relative ischemia at the anastomotic site secondary to scar tissue, reaction to a foreign body injected by a suture or staple, and exposure to injurious substances. Thus, to prevent and effectively treat PAU, a comprehensive inve-

stigation of its pathogenesis is required.

In conclusion, because of its delayed presentation, clinicians should be aware of the clinical features of PAU and that some internal bleeding is likely to come from a newly developed bowel ulceration. Since PAU cannot be easily recovered despite proper medical treatment, invariably requires surgery, and even then recurs frequently, its pathogenesis must be systematically understood.

한 글 요 약

장기간의 철 결핍 빈혈 및 성장부전으로 발현된 장문합부위 궤양 1예

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장문합부위 궤양은 영유아기에 장 절단과 문합 후 발생하는 합병증으로 발병기전은 아직 정확하게 밝혀져 있지 않으며, 효과적인 치료법도 아직 개발되어 있지 않다. 저자들은 10세 된 여아의 만성 철 결핍 빈혈과 성장부전의 원인을 찾기 위하여 실시한 대장내시경검사에서 장문합부위 궤양을 발견하고, 궤양이 있는 부위의 수술적 제거와 문합부 재교정 이후 증상의 호전을 경험하였기에 문헌고찰과 함께 국내 처음으로 보고하는 바이다. 장 절단술 후 증상의 발현이 늦어 진단이 어렵기 때문에 영유아기에 수술을 받은 환자의 경우 추적관찰을 통해 장문합부위 궤양의 발병 가능성을 예의주시해야 한다.

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