Juvenile Angiodysplasia of Gut

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= Abstract =   **Angiodysplasia or arteriovenous malformation of the gastrointestinal tract in younger patients is different from "classic" angiodysplasia in older patients, by age of onset, clinical presentation, location of the lesion and diverse histologic features. We report two cases of juvenile angiodysplasia of the gut. The diagnosis was suspected by radionuclide blood pool scan and was confirmed by resection and pathological examination. Both cases were girls of 5 years and 12 years of age, and the lesions were in the jejunum and ileum. Grossly, one case showed multiple petechiae and another case showed a hemorrhagic polypoid mass. Microscopically, the lesions were composed of irregularly dilated vascular channels in mucosa and submucosa with abnormal proliferation of arteries and veins in submucosa. Both cases are free of recurrence after local resection.**

Key Words : *Angiodysplasia, Arteriovenous malformation, Childhood, Intestine, Juvenile angiodysplasia*

INTRODUCTION

Although very rare, angiodysplasia has been found to be common cause of idiopathic gastro-intestinal (GI) bleeding (Alfidi *et al.* 1971 ; Sheedy *et al.* 1975; Moore *et al.* 1976; Marx *et al.* 1977; Richardson *et al.* 1978; Meyer *et al.* 1981 ; Hemingway and Allison 1982). It has also been called vascular dysplasia (Genant and Ranniger 1972), telangiectasia (Cunningham 1981 ; Dave *et al.*

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1984), vascular ectasia (Boley *et al.* 1979; Mitsudo *et al.* 1979), vascular malformation (Richardson *et al.* 1978; Morteo *et al.* 1986), arteriovenous malformation (Moore *et al.* 1976; Meyer *et al.* 1981; Cooperman *et al.* 1972), and telangiopathy (Farup *et al.* 1981). With the advent of selective angiography (Margulis *et al.* 1960), radionuclide blood pool scintigraphy (Velasquez *et al.* 1984), and fiberoptic endoscopy, the detection rate of angiodysplasia has increased, but it still remains as a missed cause of GI bleeding (Clouse *et al.* 1985; Tung and Millar 1987).

Angiodysplasia of the GI tract has seldom been reported in childhood (Garty *et al.* 1991). The GI angiodysplasia especially of the younger is generally accepted as a form of congenital malformation, and it has been estimated that its incidence is far less compared with that of the colon

in the elderly (Moore et al. 1976). A review of the literature revealed approximately 20 cases of juvenile angiodysplasia (Showalter et al. 1970; Alfidi 1974; Moore et al. 1976; Richardson et al. 1978; Allison and Hemingway 1981; Hemingway and Allison 1982; Velasquez et al. 1984; Jesudason et al. 1985; Waselhoeft et al. 1986; Marwick and Kerlin 1986; Sasaki et al. 1991; Kim et al. 1992).

We report two cases of juvenile angiodysplasia of the small intestine diagnosed after postoperative histopathologic examination and treated by a segmental resection.

Case Reports

Case 1

A 12-year-old girl presented with melena of 40 days duration. She was diagnosed as having subacute bacterial endocarditis 10 days before the episode of melena. It was managed successfully by supportive care. On physical examination, the child was pale and small for her age. The conjunctiva was anemic, and systolic ejaculatory murmur (grade II-III/VI) was heard on the apex. There was no angiomatous lesion in skin or mucosa. Laboratory findings showed hemoglobin 5.8 g/dL, hematocrit 17.2%, white blood cells 6,100/mm³, platelet 264,000/mm³, prothrombin time 87%, activated partial thromboplastin time 25 second (normal 21~32), iron 24 μg/dL (normal 50~170), and total iron binding capacity 463 μg/dL (normal 280~400). Gastroscopy revealed hemorrhagic gastritis but biopsy was nonspecific. Colonoscopy and 99mTc-O4 Meckel's scan were also normal. Small bowel series was suspicious for inflammatory process, and radionuclide bleeding scan showed a bleeding focus in the right lower quadrant of abdomen (Fig. 1). An exploratory laparotomy revealed a few ill-defined vascular lesions in the terminal ileum, for which ileocecectomy was performed. Grossly, the lesion appeared as several points of petechiae associated with mucosal erosions in the terminal ileum, 2.5 cm apart from the ileocecal valve (Fig. 2A). Cut sections showed multiple punctate hemorrhage in the mucosa extending to the submucosa. Microscopically, irregular and tortuous vessels with perivascular fibrosis were noted in the submucosa (Fig. 3A).
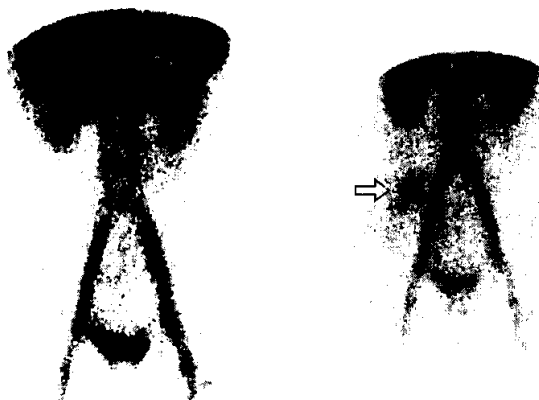

Fig. 1. Radionuclide bleeding scan shows a bleeding focus (arrow) in the ileocecal area after 27 hour-delay.

These vessels had smooth muscle wall of varying thickness. Lamina elastica interna was noted in these vessels on elastic stains, indicative of arteries (Fig. 3B). The endothelial cells were not proliferative. Intervascular space was loose and contained red cells together with a few inflammatory cells. Mucosal and submucosal vascular lakes were also accompanied with a mild mononuclear cell infiltration and erosion of the overlying mucosa.

Postoperative course was uneventful, and the laboratory data 6 months after surgery showed hemoglobin 12.7 g/dL, hematocrit 38.5%, iron 61 μg/dL, and total iron binding capacity 457 μg/dL with no evidence of further bleeding.

Case 2

A 5-year-old girl presented with melena of one month duration. She was diagnosed as having a common cold one week before the episode of melena. On physical examination, the child was unremarkable except for a mild facial pallor. There was no vascular lesion in skin or mucosa. Laboratory findings showed hemoglobin 7.9 g/dL, hematocrit 25.1%, white blood cells 5,800/mm³ and erythrocyte sedimentation rate 5 mm/hr. Endoscopy, selective angiography and 99mTc-O4 Meckel's scan were normal. Radionuclide bleed-
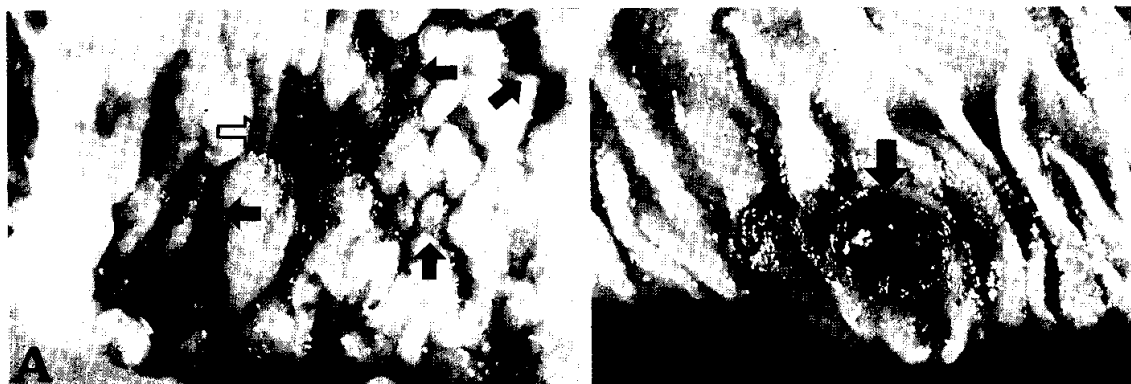
Fig. 2. A. Multiple petechial hemorrhage (arrows) is found in the terminal ileum of case 1. B. A dome-shaped elevation of hemorrhagic mass (arrow) is noted in the jejunum of case 2.
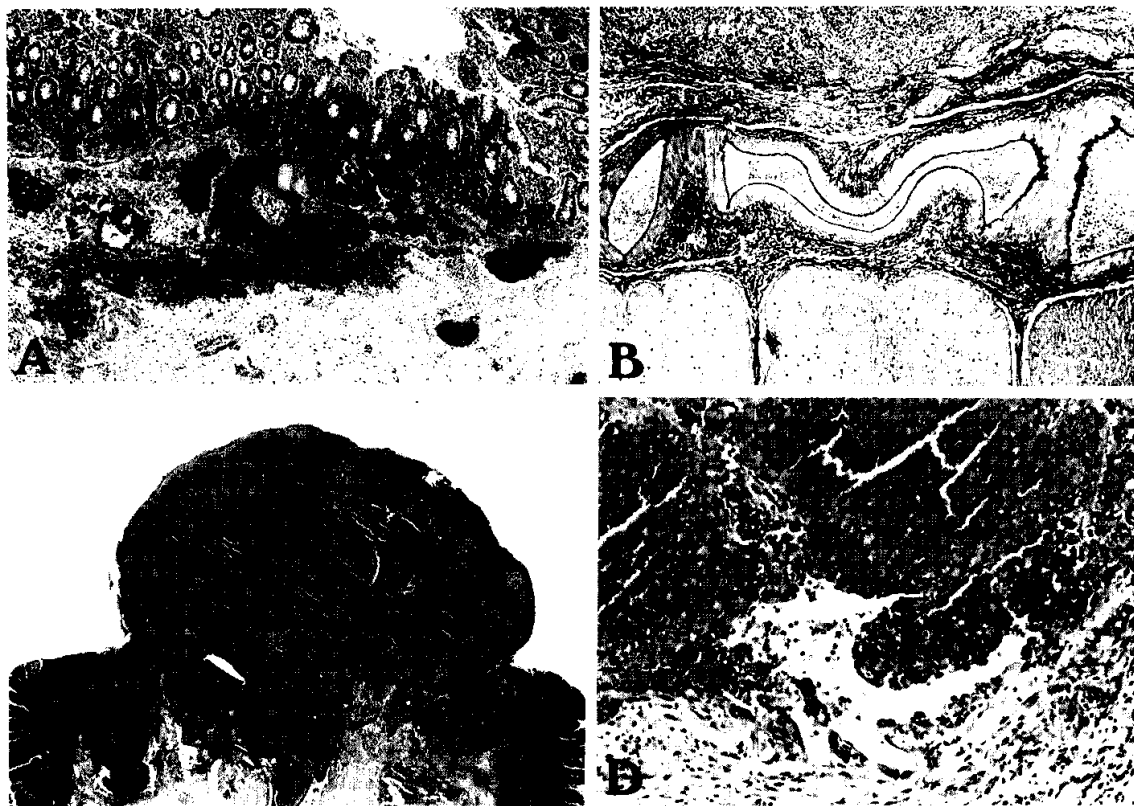

Fig. 3. A. Irregular and tortuous vessels are noted in the mucosa and submucosa of case 1. B. Elastic stain demonstrates lamina elastica interna in the abnormal and tortuous submucosal vessels of case 1. C. Low power photomicrograph shows hemorrhagic mass consisting of large blood filled spaces in the mucosa and submucosa of case 2. D. Endothelial cells of case 2 shows papillary configuration resembling Masson's hemangioma.

ing scan showed a bleeding focus in the left lower quadrant of abdomen. Intraoperative colonoscopy showed blood clots and fresh blood throughout the entire colonic mucosa. Transillumination disclosed a bleeding focus in the jejunum 30 cm distal from the Treitz ligament. A segmental resection of the jejunum was performed. Grossly, there was a dome-shaped elevation, measuring $0.8 \times 0.6 \times 0.5$ cm, in the jejunum (Fig. 2B). The mucosal surface was slightly eroded and hemorrhagic. Cut sections showed hemorrhagic lesion involving the mucosa and submucosa. Microscopically, the mass consisted of large blood-filled spaces lined by prominent endothelial cells (Fig. 3C). Endothelial cells often showed papillary configuration reminiscent of Masson's hemangioma (Fig. 3D). Adjacent mucosa and submucosa that looked normal grossly also contained abnormal proliferation of small arteries and veins along with ectatic capillaries. Mucosal denudation and chronic inflammatory cell infiltration were also found. Postoperatively the patient is uneventful.

DISCUSSION

Angiodysplasia has been described predominantly in the elderly and thought to be an acquired lesion (Galloway et al. 1974; Boley et al. 1977; Richardson et al. 1978; Mitsudo et al. 1979). However, its occurrence in young individuals raised a question of its possible congenital origin (Allison and Hemingway 1981; Hemingway and Allison 1982). This lesion was also found to be more common in different areas, namely some tropical countries (Jesudason et al. 1985). Above findings provide a necessity of review on this entity.

The term, "juvenile angiodysplasia", was introduced by Garty et al. in 1991, although the suggestion of such name was made by Moore et al. in 1976. Juvenile angiodysplasia is different from classical angiodysplasia in its atypical location, no association with cardiovascular or pulmonary diseases, amenability to local resection, rare recurrence and short clinical history (Garty et al. 1991). Our cases certainly meet these criteria for the diagnosis of juvenile angiodysplasia. Both of our cases had an onset in childhood, short dur-

'ation of symptoms, location in the small bowel instead of large bowel, and no recurrence. We could find a total of 23 cases of angiodysplasia occurring in children and young adults in the literature (Table 1). They consisted of 12 males and 5 females, and the age ranged from 7 months to 22 years. The duration of symptoms was usually less than one year. Anatomical locations were the small intestine in 9, cecum in 4 and the remainder were in colon, gastroesophageal junction and diffuse. These patients had neither recurrence nor history of hemodialysis or cardio-pulmonary disease. Meckel's diverticulum was associated in 5 patients (Hemingway and Allison 1982).

Since the histological characteristics of juvenile angiodysplasia has not been fully elucidated in the literature, it is difficult to define its difference from classic angiodysplasia. However, based on our cases and some cases with pathology descriptions in the literature, it seems justified that juvenile angiodysplasia is a distinct entity both clinically and pathologically. Histologically, our cases showed abnormal arteries and veins mainly located in the submucosa. Ectatic capillaries in case 2 formed a conglomerated lesion mimicking cavernous or Masson's hemangioma. All these features are clearly different from classical histology of angiodysplasia or telangiectasia of adults. Two additional cases of juvenile angiodysplasia that we had after we prepared this article also showed vascular lesion characterized by ectatic channels instead of hemangiomatous feature. No evidence of arteriovenous communications were noted in our cases. All these features favor the term angiodysplasia over telangiectasia and arteriovenous malformation. Dysplasia is defined as "abnormality of development; in pathology, alteration in size, shape and organization of adult cells", and angiodysplasia is defined as "small vascular abnormalities, especially of the intestinal tract (Taylor 1988)". Diagnostic criteria of angiodysplasia have been strict by some authors. They required vascular abnormalities involving only the veins, venules and capillaries without associated ulcer or inflammation (Mitsudo et al. 1979; Pounder et al. 1982). However, remaining authors defined angiodysplasia as microvascular abnormalities in the bowel which could cause gastrointestinal

Table 1. Summary of juvenile angiodysplasia reported in the literature

Case	Sex	Age	Duration of symptoms	Location	Follow-up	Reference
1	F	14y	—	I-C	—	21
2	—	19y	—	—	—	22
3	M	7m	4m	D, J	2y	3
4	M	17y	2m	J	4y	3
5	F	19y	5m	C	14m	23
6	M	13y	4m	C	3y	7
7	M	17y	4 y	I	6m	7
8	M	20y	1m	col.	2m	7
9	M	20y	1 y	I	3y	7
10	M	21y	9 y	C	—	7
11	M	11y	5 y	diffuse	—	17
12	M	22y	5 y	J	—	27
13	F	16y	9m	D, J, I	1y	24
14	M	4y	—	I	4m	20
15	M	22y	7m	GEJ	expired	25
16	—	3y	—	—	—	5
17	—	<20y	—	—	—	5
18	—	<20y	—	—	—	5
19	—	<20y	—	—	—	5
20	—	18y	—	—	—	26
21	M	8y	1d	col.	3y	28
22	F	12y	40d	I	6m	present case
23	F	5y	1m	J	1m	present case

GEJ: Gastroesophageal junction, D: Duodenum, J: Jejunum, I: Ileum, C: Cecum, col.: Colon, y: Years, m: Months, d: Days

bleeding (Anon 1974; Allison and Hemingway 1981). Therefore, it seems true that vessel size, presence of abnormal artery, and overlying ulcers and inflammation do not limit the diagnosis of angiodysplasia. Since various histologic features shown in our cases are seen mostly in childhood, it provides enough reason for the separation of juvenile type from the adult type. Furthermore the term "angiodysplasia" seems more suitable for this condition rather than arteriovenous malformation or telangiectasia. We also have to take into consideration that juvenile angiodysplasia could be developmental anomaly rather than acquired lesion. Occurrence in childhood, multiplicity of the lesion, disease pattern and course, and microscopic features are all suggest that it could be a developmental abnormality.

Most cases of angiodysplasia or arteriovenous malformation could be detected by selective angiography or endoscopy, although our cases failed to be detected by conventional diagnostic methods. For the detection of these lesions, radionuclide blood pool scan seems to be a test of choice especially in childhood because of its high detectability and non-invasiveness. Its application to the intestinal vascular lesion was introduced by Velasques et al. in 1984. In our case 1, angiography was not performed. In case 2, however angiography was done but was negative although we had a strong suspicion of angiodysplasia based on the experience of the case 1. We believe that radionuclide blood scan should be done as a screening procedure for the evaluation of any intestinal bleeding lesions including juvenile angiod-

ysplasia before any invasive method such as angiography is elected.

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