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Case Report

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Splenic Artery Aneurysm Rupture In Children: Imaging Findings And Treatment Protocols

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ABSTRACT

Splenic artery aneurysm, although rare, is the third most common intra-abdominal aneurysm and follows aortic and iliac artery aneurysms. Although the prevalence of splenic artery aneurysm in the general population is not known clearly, studies show that splenic artery aneurysms occur in 1-10% of health individuals and the incidence increases with age. The importance of splenic arteryaneurysm is the potential rupture and life-threatening bleeding risk of 10-25% in non-pregnant patients and up to 70% in pregnancy. There are few reports on the incidence and rupture of splenic artery aneurysms in children. Pediatric arterial aneurysms are rare and underlying processes are frequently associated with liver failure, infection, connective tissue diseases, non-infectious arteritis, and congenital malformations. Early detection of splenic artery aneurysms is important because of the spontaneous rupture and life-threatening bleeding. Splenic artery aneurysms, although rarely seen in pediatric patients, are a serious life-threatening condition in case of rupture and can occurarious reasons. Children with hepatic insufficiency should be monitored closelydue to the possibility of rupture and inability to apply elective treatment methods in case of delay, and it should be kept in mind in the differential diagnosis of hypovolemic children admitted to the emergency department with abdominal pain. Here, a cesepresenting with spontaneous rupture of splenic artery aneurysm and imaging findings and treatment options of splenic artery aneurysm will be discussed.

Keywords: *Aneurysm, child, rupture, imaging*

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Introduction

The splenic artery is the third most common intra-abdominal aneurysm formation site after the abdominal aorta and iliac arteries[1] . Splenic artery aneurysm (Sa-A) is a rare condition with a prevalence of 1% and accounts for 60% of all visceral artery aneurysms. This is followed by hepatitis artery with 25% and superior mesenteric artery with 5% [2] .

Although the prevalence of Sa-A in the general population is not known clearly, studies show that Sa-A occurs in 1-10% of healthy individuals and the incidence increases with age [3].

In children who underwent selective angiography before liver transplantation, the incidence of Sa-A was reported to be 4% [4] . Although the pathogenesis is still unclear, many factors have been identified that play a role and contribute to the development of Sa-A, including medial fibrodysplasia, pregnancy, portal hypertension, splenomegaly, liver cirrhosis, liver transplantation, degenerative atherosclerosis, vasculitis, and congenital anomalies [5].

Case Presentation

A 16-year-old mentally retarded male patient without known comorbidity presented to the emergency service with complaints of sudden abdominal pain and widespread abdominal tenderness. Physical examination revealed pallor, sweating, and widespread defense. The patient had no urine output and hemoglobin was 5.1 g/dL. In the abdominal ultrasonography examination, the patient, who had widespread free fluid in the abdomen, was referred to a contrast-enhanced abdominal CT examination with a pre-diagnosis of intra-abdominal bleeding. In abdominal CT , diffuse hemorrhagic fluid reaching 10 cm in thickness in the thickest part of the abdomen and an aneurysm of approximately 26x32x38 mm in the middle part of the splenic artery , hematoma reaching 14 mm in the thickest part around the aneurysm and splenic parenchyma reaching a rate of approximately 50 -70 % hypodense areas that did not show contrast staining in favor of infarction were detected (Figure 1) .

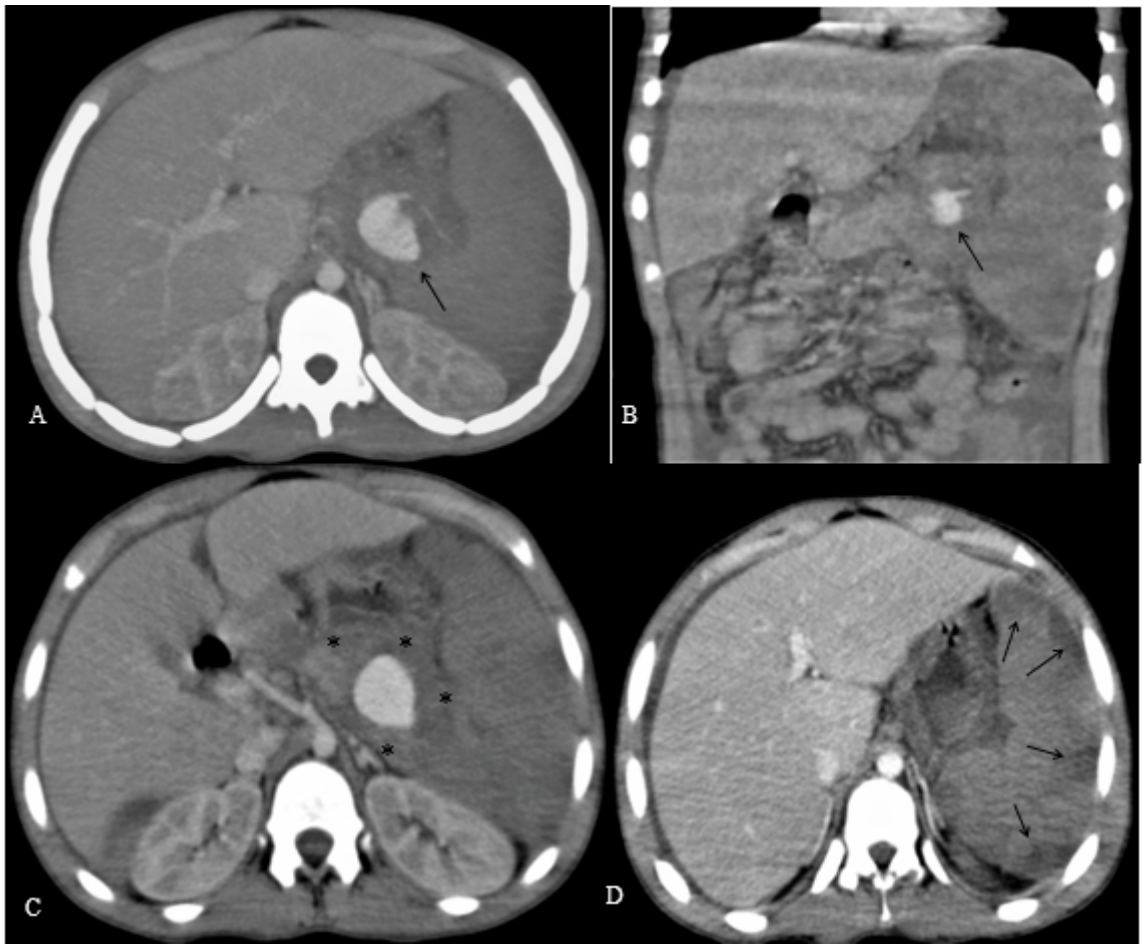
The patient was taken to an emergency operation with the diagnosis of splenic artery aneurysm rupture . The necrotic-looking spleen was surgically removed, an active bleeding splenic artery was ligated , and approximately 6500 cc of bleeding was aspirated inside the abdomen. During the operation, 8 units of erythrocyte suspension and 3 units of fresh-frozen plasma support given to the patient .

After operation, the patient taken to the intensive care unit and he was extubated on the postop 2nd day. Encapsulated bacterial vaccines were administered on the 3rd day , postop. On the 6th day, 3 mg/kg aspirin was started due to the high platelet level and the follow-up was continued. Postop. The patient, who underwent control CT angiography on the 7th day, had a locular fluid of approximately 65x45x107 mm in the splenic lodge, and a free fluid with a thickness of up to 9 cm in the abdominal cavity. In addition, effusion up to 3.5 cm thick in the left hemithorax and atelectasis changes in the lower lobe of the left lung were observed. The pathology report of the patient was reported as diffuse bleeding, congestion and ischemic necrosis in the splenectomy material. The patient was discharged with full recovery after treatment and follow-up .

Discussion

Splenic artery aneurysm is rare, but it follows aortic and iliac artery aneurysms, the third most common intra-abdominal aneurysm. The importance of Sa-A is the potential risk of rupture and life- threatening bleeding up to 10-25% in non-pregnant patients and 70% during pregnancy[5]. The rupture may open directly to the peritoneal cavity, become associated with the gastrointestinal system,

Figure 1. Axial(A) and coronal(B)) contrast-enhanced CT images



Axial(A) and coronal(B)) contrast-enhanced CT images show the aneurysm associated with the splenic artery (black arrows). In the axial image at aneurysm level(C) the hematoma around the aneurysm is observed (asterisk). In the section at the spleen level (D), There are hypodense areas in the splenic parenchyma that do not show any enhancement (black arrows).

or with the development of splenic arteriovenous fistula may open into the splenic vene[7]. Developing high blood flow in splenic arteriovenous fistulas can lead to mesenteric steal syndrome and this causes intestinal ischemia may be[5].

There are few reports on the incidence and rupture of Sa-A in children. Pediatric artery aneurysms are rare and underlying processes are often associated with infection, trauma, connective tissue diseases, non-infectious arteritis, and congenital malformations[8]. Especially in children with chronic liver disease, the incidence of Sa-A is likely to increase due to advances in treatment and the resulting increase in the survival of children with cirrhosis. In the risk factors for rupture of Sa-A, symptomatic, large or expanding aneurysms, portal hypertension, portocaval shunt and liver transplantasyo is there [6] . In our case, there was no predisposing factor known or detected previously.

Early detection of Sa-A is important because of the spontaneous rupture and the risk of life-threatening bleeding. Ultrasonography (USG), doppler ultrasonography, computed tomography (CT), magnetic resonance in the

diagnosis of Sa-A. In diagnosis, USG and Doppler USG are used as non-invasive and easily applicable imaging methods. Can be determined aneurysm these methods, intraabdominal fluid and splenic paranchim heterogeneity due to enfarct thriving can be displayed. Because of this methods person dependent, patient incompatibility without additional findings (hemorrhage, infarction, etc), intraabdominal gas and pronounced calcification of the aneurysm wall such cases anevrism may not be detected[2]. Although the USG examination of our case was also large, aneurysm was not detected on the first examination and the spleen could not be clearly visualized. CT examination was planned as a result of detection of extensive intra-abdominal fluid.

Multidetector CT and CT angiography examinations are non-invasive imaging methods used to detect vascular pathologies such as stenosis, thrombosis, fistula and aneurysms. With multidetector CT, the splenic artery and its parenchymal branches can be detected clearly and non-invasively by making multi-planar reconstruction, calcifications can be displayed with precontrast images, the relationships of vascular structures can be evaluated, active bleeding after rupture can be detected and aneurysm localization can be accurately displayed [(7)]. Although it has been reported in the literature that Sa-A is most commonly located in the distal third of the splenic artery, in a study conducted in children with chronic liver disease, it was reported that Sa-A's were seen multiple and most frequently formed in the intraparenchymal branches of the splenic artery[(9)] . In our case, the definitive diagnosis was made by contrast-enhanced CT examination and the size and localization of the aneurysm were determined, high density fluid was observed in the abdomen and was evaluated as rupture. In our case, the aneurysm originated from the middle third of the splenic artery.

Treatment options for Sa-A are endovascular or surgical treatments. The treatment method is decided by evaluating the patient's suitability for surgery, the presence of rupture, and the general condition of the patient. Endovascular treatment is generally considered for patients who cannot undergo surgery and who are elective. It includes different techniques such as coilembolization, placement of closed stents, gag insertion and endoluminal thrombin, polyvinyl alcohol or gel foam injection. Surgical options include with or without splenectomy aneurysm excision, ligation, and revascularization is[(10)]. In case of rupture, surgical intervention is preferred primarily[(11)]. Surgical splenectomy and excision were performed in our case due to the development of rupture and extensive splenic parenchymal necrosis .

In conclusion, although splenic artery aneurysms are rarely seen in pediatric patients, they are a serious life-threatening condition that can occur for various reasons and in case of rupture. Especially in children with hepatic insufficiency, due to the possibility of rupture and the inability to apply elective treatment methods in case of delay, it should be followed closely and it should be kept in mind in the differential diagnosis of hypovolemic children with abdominal pain.

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