Case report - Vascular thoracic

Traumatic pseudoaneurysm located at distal descending aorta

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Abstract

Traumatic pseudoaneurysm is usually located at the aortic isthmus. We undertook surgical repair of a traumatic pseudoaneurysm located at the distal part of the descending aorta.

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1. Case report

The patient was a 19-year-old boy of height 179 cm and body weight 66 kg. He was a helmeted victim of a motor vehicle collision; he did not lose consciousness, but he was transferred to the other hospital as an emergency. Chest radiography revealed no dilatation of the mediastinum shadow, and no hemothorax or rib fracture. Enhanced computed tomography revealed rupture of the spleen, injury of the left kidney, and pseudoaneurysm of the distal descending aorta. Follow-up enhanced computed tomography 1 year after injury showed enlargement of the diameter of the pseudoaneurysm on the distal descending aorta, and he was referred to our hospital.

Angiography at the time of admission revealed that a saccular type aneurysm was present 10 cm above the diaphragm (Fig. 1). Its diameter was 30 mm. Magnetic resonance angiography revealed that the intercostal artery was occluded at the level of the aneurysm. The aneurysm was located 10 cm above the diaphragm, at the level of T9–T10 (Fig. 2). After general heparinization (3 ml/kg), cannulae were inserted into the left common femoral artery and vein. Then, partial cardiopulmonary bypass was established and the aorta was clamped. The intima of the aneurysm was incised. The intima of the aneurysm was defected, and graft replacement was performed using a 20 mm knitted Dacron graft. During the procedure motor evoked potential of the lower extremities did not change. No blood transfusion was needed.

2. Comment

The location of traumatic pseudoaneurysms is normally around the aortic isthmus, other sites on the aorta being very rare. As Rabinski et al. [1] described, only 11 previous cases of successful repair were revealed in the world literature prior to 1990; after 1990, only three cases have been reported. They also reported that the incidence of isthmus lesions was 96.7\%, while that of lesions below Th7 was only 1\% in the clinical series and 15.7\% in the autopsy series.

The reason for the occurrence of traumatic aneurysm in the aortic isthmus is that the aortic arch and the diaphragm are fixed points in the thorax and there are only two sites that anchor the heart and descending thoracic aorta during rapid deceleration. In blunt trauma caused by traffic accidents, patients usually suffer from acceleration or deceleration injury. Thus, the most frequent site of traumatic aneurysms is on the isthmus. On the other hand, cause of injury in mid to distal part of the descending aorta might be direct trauma to the aorta itself or secondary injury by spinal fracture or extreme extension of the spine. Our patient had suffered from injury to the left kidney and the spleen, and his body was very thin, therefore, his aorta might be directly injured.

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With regard to clinical diagnosis, chest radiography is useful for initial diagnosis of thoracic traumatic pseudoaneurysm located at the isthmus, by revealing dilatation of the mediastinum shadow. But, if an aneurysm were present at the distal descending aorta, no particular findings would be seen because the aneurysm would be obscured by the heart. Therefore, computed tomography is necessary for the patient with blunt chest trauma, and three-dimensional computed tomography is considerably better.

A chronic traumatic aortic aneurysm will naturally rupture. Without surgical treatment, mortality is worse than that of operative cases. Bennet et al. [2] reported cases of rupture 20 years after injury. They also reported that these cases had symptoms before rupture. Katsumata et al. [3] reported that cases in which the aneurysmal wall was well calcified at the chronic stage had a low risk of rupture. It is important to carefully follow-up patients, observing the occurrence of symptoms or the changes of radiological findings by computed tomography. In our case, 1 year had passed since injury and the diameter of the aneurysm had increased so that operation was indicated.

The most important complication of the surgical treatment for traumatic thoracic aneurysm is spinal cord injury, which showed to be cared if the aneurysm is located on the distal descending aorta. In this case, we preoperatively searched for the Adamkiewicz artery by magnetic resonance angiography, however, the Adamkiewicz artery was not defined. Actually all of the intercostal arteries at T9 and T10 level arising from the aneurysm were occluded so that we did not reconstruct any intercostal arteries. Furthermore, during the repair, the motor evoked potential was also checked to monitor the spinal cord function. It did not change eventually.

The endovascular stent-grafting was less invasive and useful procedure for aneurysm repair. We think nowadays this aneurysm is able to have an indication for this procedure. However, we did not think that aneurysm had an indication at that time, because we concerned about spinal ischemia. At operation, all the intercostal arteries which arose from the aneurysm were occluded. However, there were intact intercostal arteries at just proximal site of aneurysm. We preserved the arteries with beveling technique. This preservation was quite difficult by endovascular stenting.

We experienced a rare case of chronic traumatic aneurysm located at the distal descending aorta. Graft replacement was successfully performed using a 20 mm knitted Dacron graft with partial cardiopulmonary bypass.

References