

## A Case of Traumatic Pseudoaneurysm of the Ascending Aorta occurring in a Postoperative Patient who underwent Arch Replacement and Bentall's Operation

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### ABSTRACT

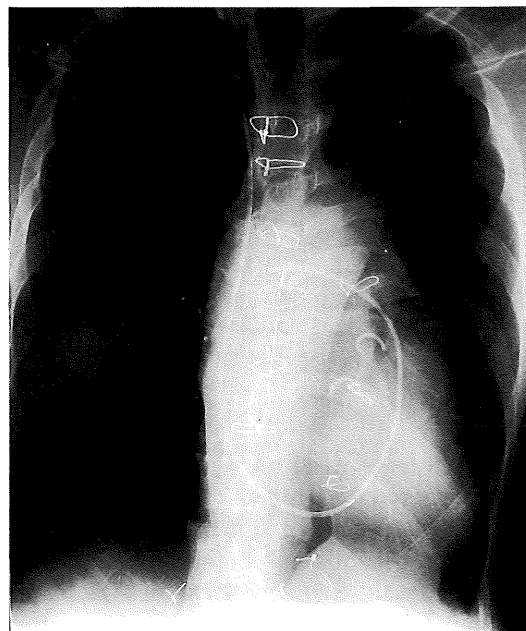
A case of traumatic pseudoaneurysm of the ascending aorta occurring in a postoperative patient who underwent an arch replacement and Bentall's operation was reported. A bleeding point was clear at the graft of the ascending aorta, and a pseudoaneurysmal formation was suspected following an echocardiogram. An aortogram demonstrated the presence of an aneurysm approximately 8 cm by 4 cm in size originating 5 cm above the right coronary ostia. An emergency operation was carried out. A Trans-femoral bypass was established before sternotomy. The Operative findings showed that adhesive connective tissue covered a pseudoaneurysm 8 cm by 4 cm in size, and that there was a tear in the anastomosis of the grafts between the ascending aorta and the arch 5 cm above the coronary ostia. Direct suture was performed, using hypothermic circulatory arrest. In this paper, We discuss the mechanism, classification, and operative strategy of traumatic pseudoaneurysm.

**Key words:** *Traumatic Pseudoaneurysm*

The mortality rate of acute traumatic aortic rupture remains high in spite of the progression of cardiovascular surgery. We report a case of traumatic pseudoaneurysm of the ascending aorta occurring in a postoperative patient who had undergone an arch replacement and Bentall's operation.

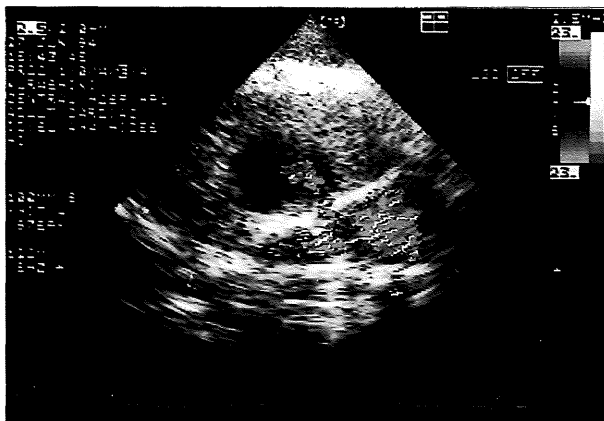
### CASE REPORT

A 20-year-old man was admitted to the hospital complaining of chest pain after a blunt injury to the chest caused by a fall on June 24, 1994. His past history showed that Bentall's operation, arch replacement, and mitral valve replacement had been carried out for ascending aortic aneurysm, aortic arch aneurysm, and mitral valve regurgitation respectively. In addition deformity of the sternal bone was pointed out, though its repair had been carried out 10 years earlier. Marfan's syndrome was diagnosed by means of a postoperative pathohistological examination. A chest roentgenogram showed a slightly widened mediastinum (Fig. 1). A bleeding point was clear at the graft of the ascending aorta, and a pseudoaneurysmal formation was suspected following an echocardiogram (Fig. 2). An aortogram demonstrated the presence of an aneurysm approximately 8 cm by 4 cm in size originating 5 cm



**Fig. 1.** A chest roentgenogram showed a slightly widened mediastinum.

above the right coronary ostia (Fig. 3). The Clinical diagnosis was acute traumatic pseudoaneu-



**Fig. 2.** A bleeding point was clear at the graft of the ascending aorta, and pseudoaneurysmal formation was indicated by suspected following an echocardiogram.



**Fig. 4.** A tear was found at the anastomosis of the grafts between the ascending aorta and the arch, 5cm above the right coronary ostia (arrow).



**Fig. 3.** An aortogram demonstrated the presence of an aneurysm, approximately 8 cm by 4 cm in size, originating 5 cm above the coronary ostia.

rysm of the ascending aortic graft.

An emergency operation was carried out on June 27, 1994. A Transfemoral cardiopulmonary bypass was established before sternotomy. The pseudoaneurysm, 8 cm by 4 cm in size, was seen in the substernal space. The adhesive connective tissue surrounding the pseudoaneurysm was detached. The surface of the aneurysm was a prosthetic pericardium used in the previous operation. The aneurysm had entered under the hypothermic circulatory arrest. A tear was found at the anastomosis of the grafts between the ascending aorta and the arch 5 cm above the coronary ostia (Fig. 4). The repair of the tear was performed using 4-0 prolene (Ethicon) sutures.

There was no complication in the postoperative

course and the patient has been well since surgery.

#### DISCUSSION

The mortality rate of acute traumatic aortic rupture remains high in spite of the progression of cardiovascular surgery. In recent reports from Western countries, 80 to 90 % of cases of acute traumatic rupture of the aorta die instantly<sup>6</sup>). Only 10 to 20 % of the patients survive temporarily, but the prognosis of these patients depends on accurate diagnosis and prompt treatment in the emergency room<sup>4</sup>).

The most common site of acute traumatic rupture of the aorta is the isthmus, with as high a possibility as 80 to 90 % in literatures<sup>5,7</sup>). The isthmus is fixed at the posterior part of the mediastinum, and has some flexibility at the arch vessels and fulcrum. Thus, an aortic tear caused by traumatic stress could occur at the flexible points of the isthmus<sup>2</sup>). In this case, the aortic tear was observed at the anastomosis of the grafts between the arch and the ascending aorta. The deformity of the sternal bone caused high traumatic stress on the anastomotic site of the previous operation.

A pseudoaneurysmal formation is the mechanism of temporary hemostasis of acute traumatic rupture in temporary survivors. The growth pattern takes two forms. One is a rapidly enlarging type for which prompt diagnosis and treatment should be carried out in order to prevent rupture of the aneurysm. The other is a slowly enlarging type taking longer than 3 months which is known as a chronic posttraumatic aneurysm<sup>1</sup>). Our case belongs to the first type. Adhesive connective tissue around the graft makes pseudoaneurysmal formation easy.

The diagnosis of cardiac tamponade and the

estimation of the relationship between the aneurysm and the coronary artery is the first step to determine the surgical strategy of the ascending aortic rupture. The risk of cardiac death will increase by coronary injury and massive intrapericardial bleeding. As far as the operative technique is concerned, a femoral bypass should be established before sternotomy against massive hemorrhage in the process of detaching the pseudoaneurysm<sup>3</sup>). In this case, the postoperative adhesion was so severe that a massive hemorrhage occurred during the sternotomy, but the femoral bypass was effective as a circulatory support against the massive bleeding.

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