Surgical approach to left subclavian artery aneurysm in Marfan syndrome

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Abstract

We present a case of left subclavian artery aneurysm in a 48-year-old man with Marfan syndrome. Aneurysmectomy and interposition with an artificial graft were successfully performed through an infraclavicular incision by dividing the clavicle at its midshaft. The clavicle bone was reconstructed with a steel plate, and the postoperative course was uneventful. Because the arterial wall is fragile in cases of connective tissue disorders such as Marfan syndrome, our surgical approach was considered to be helpful for gentle maneuvering in an adequate operative field.

Key words

Subclavian artery aneurysm · Marfan syndrome

Introduction

Subclavian artery aneurysm (SAA) is relatively rare. It reported to account for <1% of all peripheral aneurysms. The most common etiologies of true SAA are atherosclerosis, thoracic outlet syndrome, infection, and traumatic injury. Connective tissue disorders such as Marfan syndrome, with cystic medial necrosis of the arterial wall, are less frequent causes, representing <10% of all SAAs. Various clinical and operative methods have been proposed for the management of SAA. We present a case of SAA with Marfan syndrome and consider the optimal surgical approach.

Case report

A 48-year-old man with Marfan syndrome complained of a pulsatile left infraclavicular mass. His father was also suspected of having Marfan syndrome. The 48-year-old man’s height was 181 cm, and his weight was 63.0 kg. His past medical history included surgery for pectus excavatum at age 14 years and four episodes of surgical repair for a right inguinal hernia. Physical examination revealed a pulsatile, elastic, hard mass at a site under the left clavicle. Mild chest deformity and the operative scar from the pectus excavatum surgery were observed. Chest radiography showed extreme scoliosis. Echocardiography revealed normal cardiac function with mild regurgitation of the aortic valve. Computed tomography (CT) demonstrated a left SAA that measured 3.5 × 6.0 cm in the middle portion of the left subclavian artery (Fig. 1). He also had an ascending aortic aneurysm with a maximum diameter of 4.0 cm.

The patient underwent an elective operation through a left infraclavicular incision. Although the pectoralis major muscle was split as far as possible, the proximal side of the aneurysm was hidden under the clavicle and was not adequately visualized. The clavicle was divided at one-third of its full length from the sternoclavicular joint and mobilized to the cranial side. After that procedure, the proximal artery of the aneurysm was fully exposed, allowing gentle clamping (Fig. 2). The distal side of the aneurysm and axillary artery were revealed with division of the pectoralis minor muscle. The aneurysm was resected and interposed with an 8-mm ringed polytetrafluoroethylene graft. The arterial wall was extremely thin and fragile, and the prosthesis was covered with the remaining vessel wall of the resected aneurysm. The divided clavicle was reconstructed with a steel plate.
His left arm was placed in a sling for 2 weeks after surgery. The postoperative course was uneventful, and no neurological deficit or ischemic symptoms in the arm were noted. Postoperative CT showed good patency of the prosthesis (Fig. 3). Histopathological examination of his subclavian arterial wall revealed cystic medial necrosis.

**Discussion**

It has been reported that SAA has a significant risk of rupture, embolization, or thrombosis; therefore, surgical treatment is usually recommended. The operative approach for treatment of SAA has been usually dependent on its location. Detailed information of the position and structure of SAA is usually acquired with three-dimensional CT. For extrathoracic SAA, the combined supra/infraclavicular incision has been reported to be feasible. The axillary approach is also recommended for management of a distal aneurysm. In the present case, it was not possible to see the whole aneurysm from the infraclavicular incision alone because the proximal edge of the aneurysm was located deep between the clavicle and the first rib. Tabata et al. reported that they resected a right extrathoracic SAA successfully with a combined supra/infraclavicular approach. However, it seemed to be difficult to deal gently with the proximal artery from the supraclavicular incision. Because the arterial wall was expected to be fragile as a result of Marfan syndrome, it was thought that the artery should be treated as safely as possible so as not to have complications such as arterial dissection. Therefore, we decided to cut the clavicle at the midshaft for its upper retraction. This procedure allowed excellent exposure to treat the proximal vessel safely, rather than making an additional supraclavicular incision. Moreover, there are few complications associated with dividing the clavicle at its midshaft. For the divided clavicle, plate fixation is often performed, with an extremely low rate of nonunion.

Usually, intrathoracic SAAs have been reached through a median sternotomy or a left posterolateral thoracotomy. Smythe and Reznik have noted that the transmanubrial approach with sparing of the clavicle can also provide maximal exposure of the subclavian vessels of the thoracic inlet. In their procedure, an L-