Case Report

Traumatic Pseudoaneurysm of the Subclavian Artery Following Anterior Dislocation of the Shoulder: A Report of a Surgical Case

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Vascular complications associated with simple anterior dislocation of the shoulder joint are rare. We report on a patient with a pseudoaneurysm of the right subclavian artery following anterior dislocation of the right shoulder. Complaints of progressive neurological deficit and swelling in the right upper extremity were initially attributed to hemarthrosis of the right shoulder joint, but pseudoaneurysm of the right subclavian artery was identified during an emergent operation on the right shoulder. Uncontrollable arterial hemorrhaging from the skin incision erupted during the operation and was treated using a double surgical approach. (Ann Thorac Cardiovasc Surg 2006; 12: 74–6)

Key words: anterior dislocation, vascular injury, subclavian artery pseudoaneurysm

Introduction

Traumatic injury of the subclavian artery associated with anterior dislocation of the shoulder joint is a rare complication, but lack of awareness regarding this complication could result in severe consequences, including a slowly growing hematoma, brachial plexus deficits, ischemia of the upper extremities due to thrombosis, arteriovenous fistula, or even life-threatening rupture of a pseudoaneurysm.

Case

A 52-year-old male patient was referred to the Department of Orthopedics in our hospital complaining of numbness and inability to move the entire right arm, which was swollen. The patient had a history of anterior dislocation of the right shoulder joint after falling on the right shoulder 3 weeks earlier. The dislocation was reduced at another hospital without any difficulty. A few days after the fall, the patient noticed a mass in the right side of the chest and shoulder region, and swelling throughout the entire right arm, both of which were progressively expanding. Motor and sensory dysfunction gradually developed throughout the entire right arm. Shoulder roentgenography showed elongation of the distance between the humeral head and the glenoid fossa of the scapula (Fig. 1). Magnetic resonance imaging (MRI) revealed an 8-cm hyperintense nodular mass including an area of hypointensity, which seemed to originate from the articular capsule of the right glenohumeral joint, on T1-weighted imaging (Fig. 2). These findings were suggestive of hemarthrosis of the right glenohumeral joint. Preoperative angiography was not performed, as the possibility of pseudoaneurysm was not considered. Surgical intervention, including drainage of the clot into the articular capsule of the right shoulder, was selected by the Department of Orthopedics in our hospital. Soon after making the skin incision on the right subclavian area, uncontrollable arterial hemorrhaging erupted and the patient was referred to our division. Pseudoaneurysm of the right subclavian artery was suggested based on the medical history, clinical findings and a review of preoperative MRI. An attempt was initially made to dissect a proximal portion of the right subclavian artery distant from the bleeding point, through another skin incision into the right subclavian area, but this could not be achieved due to the presence of the right clavicle. A second approach includ-

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Fig. 1. Radiography of the right shoulder joint shows elongation of the distance between the humeral head and glenoid fossa of the scapula. No dislocation or fracture is apparent in the right shoulder joint.

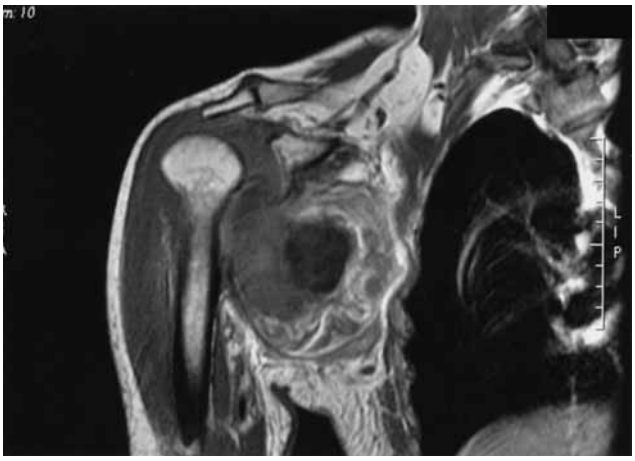

Fig. 2. Preoperative MRI showing a hyperintense nodular mass including an area of hypointensity, apparently originating from the right glenohumeral joint, on T1-weighted imaging.

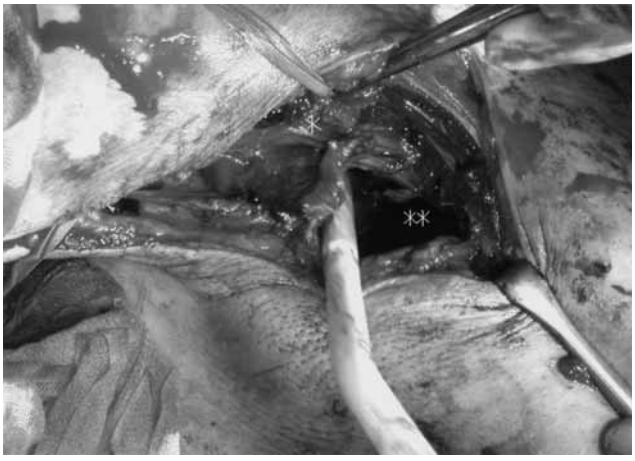

Fig. 3. Intraoperative photograph showing a large skin incision involved in the initial incisions, parallel to the lower border of the right clavicle, and extended toward the right axilla. Proximal and distal part of the right subclavian artery was encircled with tape. A large pseudoaneurysmal cavity was identified under the major and minor pectoral muscles.
*Right subclavian artery; **pseudoaneurysmal cavity.

ing partial median sternotomy up to the fourth intercostal space was therefore performed. A region from the brachiocephalic trunk to the proximal portion of the right subclavian artery was dissected to achieve vascular control. After the completion of dissection at the proximal portion of the right subclavian artery, the distal portion of the right subclavian artery was dissected via a newly placed axillar incision, distant from the bleeding point. Following completion of the dissection, heparinization and provisional clamping were performed at both proximal and distal sites of the right subclavian artery distant to pseudoaneurysm. These previous skin incisions placed between the right subclavian area and the right axilla were unified, and the pseudoaneurysm was fully opened longitudinally (Fig. 3). After removal of the clot, a small communication was found at the posterior aspect of the right subclavian artery corresponding to the location of the humeral head. This communication was closed using 4-0 monofilament mattress sutures with pledgets, obtaining complete hemostasis. The postoperative course was uneventful without infection. Although partial sensory nerve recovery occurred, motor power was lost in the right arm. Long-term rehabilitation was anticipated with neurological recovery.

Discussion

Neurovascular complications after dislocation of the shoulder may result from anatomical proximity between the shoulder joint and subclavian vein, artery, and brachial plexus. The anatomical tract in which these neu-

rovascular structures run from the thorax to the arm is narrow and surrounded by clavicle, scapula, humerus and ribs, meaning that these neurovascular structures are easily compressed. Moreover, these surrounding skeletal structures contribute to difficult access for vascular control during operations. Enlargement of a pseudoaneurysm in the subclavian artery can induce acute or chronic neurovascular complications such as numbness, paralysis, thrombotic events of the arm or even life-threatening rupture.[1-5] However, pseudoaneurysm of the subclavian artery related to the anterior dislocation of the shoulder is rare.[1-3] Lack of awareness of concomitant arterial injuries associated with anterior dislocation of the shoulder could thus easily occur. Vascular injury associated with dislocation of the shoulder occurs usually at the time of dislocation, but may arise from rough reduction. A previous dislocation with periarterial scarring, old age, and violence of trauma represent predisposing factors for such injury. Subclavian artery pseudoaneurysm may be clinically suspected if a patient initially displays normal results on neurovascular examination following anterior dislocation of the shoulder joint, then develops signs of brachial plexus deficits, distal pulselessness, and progressive swelling on follow-up. In such cases, angiography should be performed to confirm the diagnosis and estimate the size of the lesion. In the present patient, a correct diagnosis could not be obtained from preoperative MRI. Computed tomography using contrast medium or angiography should have been performed preoperatively. MRI findings may not always indicate the nature of the lesion.[6] A double surgical approach was therefore utilized, with partial median sternotomy to control the proximal part of the subclavian artery distant to the pseudoaneurysm, and an infraclavicular incision to deal with the distal portion of the subclavian artery. This method is considered to be the most reliable and safe procedure in such an operation. Regarding the pathogenesis of this injury, the dislocated humeral head seems likely to have pushed the subclavian artery against the pectoralis minor muscle, causing disruption by a pincer-like action.[5] Delayed recognition of this complication may lead to permanent neurological deficits as seen in the present case, despite adequate vascular repair of the subclavian artery. Several reasons are considered to contribute to the difficulty in identifying concomitant subclavian artery injuries following anterior dislocation of the shoulder. First, injuries to the shoulder such as dislocation cause considerable pain, swelling, and muscle spasm, obstructing the correct diagnosis of neurovascular damage. Second, and probably more importantly, doctors who treat trauma around the shoulder may often be unaware of the possibility of subclavian artery injuries associated with anterior dislocation of the shoulder. A coordinated vascular and orthopedic approach and prompt surgical treatment may result in full recovery of arm function. Although endovascular treatment for subclavian artery injuries may seem attractive, an open surgical approach should be considered depending on the extent and type of injuries and condition of the patient, as this approach allows simultaneous treatment of the frequent concomitant injuries and decompression of neurovascular structures affected by the large hematoma.

Conclusion

We reported a rare case of traumatic pseudoaneurysm of the right subclavian artery following anterior dislocation of the right shoulder. Treatment was provided in an emergent operation using a double surgical approach. This complication is potentially dangerous, jeopardizing both the limb and the life of the patient. Prompt, accurate diagnosis and restoration of the vascular system are required for treatment.

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