

Acute traumatic subclavian artery thrombosis and its successful repair via resection and end-to-end anastomosis

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【Abstract】 Subclavian artery thrombosis is a rare complication of clavicle fractures. We reported a 20-year-old man who was admitted to the emergency room after a road traffic accident. He was a pedestrian who was initially hit by a bus and after he fell down on the road, he was run over by a car. On evaluation, he was found to have multiple facial and rib fractures, distal right humerus and right clavicle fracture. Significantly, right radial pulse was absent. After further evaluation including Doppler studies and an angiography which revealed complete obstruction of right subclavian artery just distal to its 1st portion, the patient was urgently taken to the operation room. A midclavicular frac-

ture was adjacent to the injured vessel. We established proximal and distal control, removed damaged part. After mobilizing the subclavian artery, an end-to-end anastomosis was made. Then open reduction and internal fixation of right distal humerus was performed. The rest of the postoperative course was unremarkable. To prevent complications of subclavian artery thrombosis, different treatment modalities can be used, including anticoagulation therapy, angioplasty, stenting and bypass procedures.

Key words: *Carcinoma, renal cell; Intra-bronchial mass; Pulmonary atelectasis*

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Clavicle fractures occur frequently in adults because of many reasons and the most common reasons are road traffic accidents and sports. Zhu et al¹ reported that in 2004, 52.1% of clavicle fractures were caused by traffic injuries. The most common site of fracture is usually the middle third of the clavicle. A study in Italy in 2002 in order to identify the epidemiological features of clavicular fractures showed that almost 81% fractures occurred in the middle third of the clavicle, usually caused by road traffic accidents.² Various complications can arise such as neurovascular damage, subclavian artery pseudoaneurysm and thoracic outlet syndrome. A thorough vascular examination should be done to prevent these complications.³ Subclavian artery thrombosis is a rare complication of clavicle fractures. Other causes leading to subclavian thrombosis include atherosclerosis and hypercoagulability.⁴

CASE REPORT

A 20-year-old man without known comorbidities pre-

sented to the emergency room after a road traffic accident. He was a pedestrian who was initially hit by a bus and after he fell down on the road, he was run over by a car moving at a speed of 50 km/hour. He was vitally stable at arrival. On evaluation, he was found to have multiple facial, distal right humerus, multiple ribs and right clavicle fractures. The right radial pulse was absent. Doppler studies of the upper extremity showed no brachial flow on the right side. A right upper limb angiography revealed complete obstruction of right subclavian artery just distal to its 1st portion.

The patient was urgently taken to the operation room and via infraclavicular incision, the 2nd portion of the subclavian artery was exposed. Intraoperatively, intimal injury was noticed at 1 cm of the subclavian artery just distal to the origin of right internal mammary artery and was completely thrombosed (Figure 1). A midclavicular fracture was adjacent to the injured vessel. We established proximal and distal control and damaged part was removed. After mobilizing the subclavian artery, an end-to-end anastomosis was made, followed by open reduction and internal fixation of right distal humerus. The intraoperative angiogram showed perfect flow through the repaired subclavian artery. The right clavicle fracture was managed conservatively. The postoperative course was unremarkable and the patient was discharged 8 days later.

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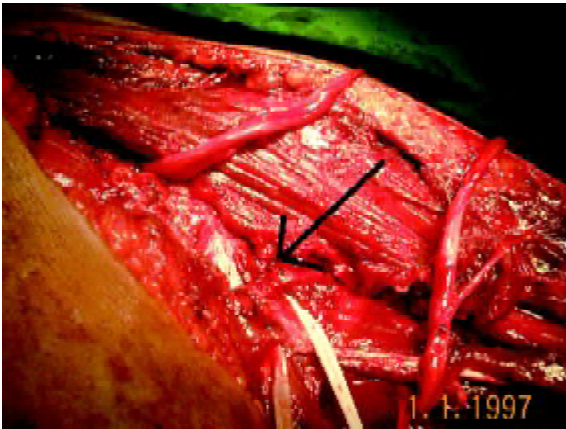


Figure 1. Intraoperative photograph of the thrombosed subclavian artery.

DISCUSSION

Following acute penetrating trauma of subclavian artery, in most cases, the first two thirds of the vessel are injured; the intima of the artery is damaged, which leads to obstruction of blood flow and can result in symptoms.⁴ About 1% of subclavian artery thrombosis present with symptoms. Manifestations include claudication due to lack of blood flow to the upper extremity, lack of upper limb pulses and cold extremities. Symptoms of subclavian steal syndrome include visual disturbances, vertigo and hemisensory dysfunction.⁴ Sometimes patients have limb pain.⁵ In our case, the second part of subclavian vein was thrombosed, leading to absent radial pulse. However, no other symptoms were present. For the diagnosis, Doppler can be used either as an initial test to screen for the obstruction followed by arteriography or be performed alone. In this case, Doppler was followed by angiography, and both confirmed the diagnosis of obstruction of the subclavian artery.

Complications of subclavian artery thrombosis can include stroke and embolization.⁴ Due to obstructed blood flow, there can also be damage to the upper limb due to ischemia. The treatment for subclavian artery thrombosis include both medical and surgical approaches. Medical options include anticoagulation therapy and catheter-directed thrombolytic therapy. Surgical interventions include stenting, angioplasty and bypass of the obstructed artery. The patency rate of bypass intervention is approximately 90% at the end of five years as compared to the stenting procedures (82%).⁴ Another study in 2008 showed encouraging results for stent-graft placement in penetrating subclavian

artery injuries.⁶ In cases of operative intervention, the bypass can be made from subclavian to subclavian, axillary or carotid. In our case, the anastomosis was made from subclavian to subclavian.⁴

In cases where subclavian obstruction occurs secondary to acute trauma like traffic injury, either the orthopedic repair of fractured bones or the surgical repair of occluded subclavian artery can be done.⁷ This is a controversial decision for the operating team to make. Cakir et al⁸ pointed out that vascular repair before fracture repair would result in less ischemia. However, another study demonstrated the advantages of orthopedic repair. It showed that early fracture repair actually promotes vascular repair later as it stabilizes the limb. Moreover, consequent risk of thrombosis is decreased if vascular repair is carried out later on and there would be less manipulation of the limb.⁷ In our case, as the upper limb angiography showed complete obstruction of the subclavian artery, in order to decrease the risk of ischemia and associated complications, vascular repair was firstly made, followed by fracture repair.

REFERENCES

1. Zhu X, Li W, Chen Z. Analyses of epidemiology in 363 cases of clavicle fractures. *Chin J Reparation Reconstr Surg* 2004;18(4): 275-276.
2. Postacchini F, Gumina S, De Santis P, et al. Epidemiology of clavicle fractures. *J Shoulder Elbow Surg* 2002; 11(5): 452-456.
3. Coulier B, Mairy Y, Etienne PY, et al. Late diagnosis of a traumatic pseudo-aneurysm of the subclavian artery. *J Belge Radiol* 1996;79(1): 26-28.
4. Wang KQ, Wang ZG, Yang BZ, et al. Long-term results of endovascular therapy for proximal subclavian arterial obstructive lesions. *Chin Med J* 2010, 123(1):45-50.
5. Katras T, Baltazar U, Rush DS, et al. Subclavian arterial injury associated with blunt trauma. *Vasc Surg* 2001;35(1): 43-50.
6. Cohen JE, Rajz G, Gomori JM, et al. Urgent endovascular stent-graft placement for traumatic penetrating subclavian artery injuries. *J Neurol Sci* 2008; 272(1-2): 151-157.
7. Boulis S, Samad S. Subclavian artery injury following isolated clavicle fracture, which to repair first? *Internet J Orthop Surg* 2006;3:2.
8. Cakir O, Subasi M, Erdem K, et al. Treatment of vascular injuries associated with limb fractures. *Ann R Coll Surg Engl* 2005; 87(5): 348-352.

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