



Acute subclavian artery pseudoaneurysm after closed fracture of the clavicle

José A. SERRANO, Pedro RODRÍGUEZ, Luis CASTRO, Pilar SERRANO, Pedro CARPINTERO

A sixty-year-old woman was admitted with an acute subclavian artery pseudoaneurysm after a closed fracture of the middle third of the right clavicle. This manifested itself a few days after the injury as a slowly growing, pulsatile and purple tumour-like mass in the right supraclavicular fossa. The distal pulses were normal, but this observation does not exclude a vascular trauma. This is an uncommon but potentially dangerous complication as it jeopardises both the extremity and the life of the patient.

INTRODUCTION

Vascular complications in closed clavicular fractures are very uncommon (3, 4, 6). In a series published by Graham *et al* (8) only two out of 93 patients with an injury of the subclavian vessels had a clavicular fracture. Several cases of pseudoaneurysm of the subclavian artery have been published in the literature as a late complication (2, 5, 10, 12, 13), but only three were acute, like our case.

CASE REPORT

A 60-year-old woman was seen in the Emergency Department after a fall on the right shoulder. The patient had poorly controlled hypertension, sclerodermia, peripheral vasculopathy and chronic alcoholic intoxication. Clinical examination revealed pain, clinical deformity and inability to move the right arm. The radiographs showed a displaced fracture of the middle third of the right clavicle. It was decided to treat the patient conservatively with a figure-of-eight-bandage for four weeks.

A few days after the fall, the patient noticed a mass in the right supraclavicular fossa which was progressively growing. Two months after the fracture, a pulsatile tumour-like mass was palpated, with a diameter of 8 cm. The skin was purple, and there was a profuse collateral venous circulation in the shoulder area and in the upper part of the right hemithorax (fig 1). The distal pulses and the neurological examination were normal. Arteriographic examination of the supra-aortic trunks and selective angiography of the innominate trunk showed a pseudoaneurysm of the right subclavian artery; the contrast material filled a large cavity occupying the whole supraclavicular fossa (fig 2). The patient was operated upon under general anaesthesia in the beach-chair position. A double surgical approach was used: a middle sternotomy up to the fourth intercostal space, to allow dissection of the innominate trunk, right common carotid and right subclavian artery, and a subclavian incision to free the axillary artery.

From the University Hospital Reina Sofia, Cordoba, Spain.

J.A. Serrano, Orthopaedic Surgeon.

P. Rodríguez, Orthopaedic Surgeon.

L. Castro, Orthopaedic Surgeon.

P. Serrano, Orthopaedic Surgeon.

P. Carpintero, Professor and Chairman.

*Department of Orthopaedic Surgery and Traumatology,
University Hospital Reina Sofia 14004-Córdoba (Spain).*

Correspondence: Jose Antonio Serrano Trenas. Avenida de los Almogávares, 29, 1º, 3, 14007. Córdoba. España. E-mail: serranot@teleline.es.

© 2003, Acta Orthopædica Belgica.



Fig. 1. — Tumour-like mass in the right supraclavicular fossa and profuse collateral venous circulation.



Fig. 2. — Angiographic image showing contrast material passing towards a large cavity occupying the total of the right supraclavicular fossa.

After heparinisation and provisional clamping of the subclavian artery, dissection of the pseudoaneurysm was undertaken. It was incised longitudinally, and a 2-mm wide communication with the subclavian artery was found. This was closed with 5/0 monofilament nylon wire, obtaining total haemostasis. After that, osteosynthesis was undertaken using the AO technique (plate and screws). A third clavicular fragment, probably responsible for the vascular lesion, was removed. There was an uneventful recovery and the patient was discharged home 15 days after the operation.

DISCUSSION

Neurovascular complications after clavicular fractures are determined by the anatomical proximity of the subclavian vein and artery, as well as the brachial plexus. The anatomical space between the clavicle and the first rib, where these neurovascular structures exit from the thorax towards the upper extremity, can be narrowed by exuberant callus formation, pronounced fracture displacement or pseudarthrosis of the clavicle. Aneurysms and pseudoaneurysms of the axillary artery (2, 5, 10, 12, 13) can be acute (6) or chronic. Only three cases of acute pseudoaneurysm of the subclavian artery have been published until now (1, 9, 15). These three cases, together with a pseudoaneurysm of the brachial artery after a humeral fracture (7) and a

pseudoaneurysm of the ulnar artery after a distal radius and ulna fracture (14), are the only pseudoaneurysms described as acute complications of a fracture in the upper extremity.

A subclavian artery pseudoaneurysm can clinically present as a palpable, pulsatile and sometimes visible mass in the supraclavicular fossa. This mass can compress the subclavian vein, making the venous return difficult and causing a notorious venous collateral net through the thoracoscaphular system (transverse cervical and internal mammary vessels). This collateral vascular system is able to supply, on its own, the whole upper extremity (11). Distal pulses can be normal, as in other vascular lesions (4). The brachial plexus, in close relationship with the subclavian vessels, can also be affected; in fact, the neurological symptoms can be noticed first (1, 9). In other cases there may be distal ischaemic arterial symptoms in the extremity due to embolic episodes coming from the pseudoaneurysm (7, 11). When there is clinical suspicion of a subclavian pseudoaneurysm it is mandatory to perform angiographic studies to confirm the diagnosis and to estimate the size.

Among the possible complications the worst is rupture of the pseudoaneurysm, as it threatens the life of the patient. In the series of Pairolo *et al.*, this happened in 10% of all cases (13). Arterial ischemia and even cerebral ischemia (due, probably, to retrograde embolisation) are other possibili-

ties. It is to be concluded that subclavian artery pseudoaneurysm can jeopardise both the extremity and the life of the patient.

Treatment must be surgical, using a double surgical approach : median sternotomy, to control the proximal part of the pseudoaneurysm, and infra-clavicular incision, to deal with its distal part. The pseudoaneurysm is either removed, bridging the arterial defect along its length with an end-to-end anastomosis or with a graft, or opened longitudinally and closed with an angioplasty or a simple suture (11, 13). The latter option was the one used in this case.

REFERENCES

1. **Aycock TM, Isom W, Crenshaw CA, Rehfeldt FC.** Monoplegia and false aneurysm – Case report. *South Med J* 1971 ; 64 : 1165-1171.
2. **Barra JA, Le Saout J, Gaultier Y.** Manifestations tardives des complications vasculaires des traumatismes fermés de l'épaule. *J Chir (Paris)* 1978 ; 115 : 151-157.
3. **Berga C, Prat S, Ninot S, Sanjuán MA, Mulet J.** Complicaciones arteriales de los traumatismos cerrados de la cintura escapular. *Angiologia* 1992 ; 44 : 139-143.
4. **Chervu A, Quinones-Baldrich WJ.** Vascular complications in orthopedic surgery. *Clin Orthop* 1988 ; 235 : 275-288.
5. **Coulier B, Mairy Y, Etienne PY, Joris JP.** Delayed diagnosis of a traumatic subclavian pseudoaneurysm. *J Belge Radiol* 1996 ; 79 : 26-28.
6. **Craig EV.** Fractures of the clavicle. Rockwood CA, Matsen FA III editors. *The Shoulder*. WB Saunders, Philadelphia, 1998, pp 428-482.
7. **Dolibois JM, Matrka PJ.** False aneurysm of the brachial artery complicating closed fracture of the humerus. A case report. *Clin Orthop* 1975 ; 113 : 150-153.
8. **Graham JM, Feliciano DV, Mattox KL, Beall AC Jr, DeBakey ME.** Management of subclavian vascular injuries. *J Trauma* 1980 ; 20 : 537-544.
9. **Hansky B, Murray E, Minami K, Körfer R.** Delayed brachial plexus paralysis due to subclavian pseudoaneurysm after clavicular fracture. *Eur J Cardiothorac Surg* 1993 ; 7 : 497-498.
10. **Howard FM, Shafer SJ.** Injuries to the clavicle with neurovascular complications. A study of fourteen cases. *J Bone Joint Surg* 1965 ; 47-A : 1335-1346.
11. **Johnson B, Thursby P.** Subclavian artery injury caused by a screw in a clavicular compression plate. *Cardiovasc Surg* 1996 ; 4 : 414-415.
12. **Mellièrè D, Escourrou J, Becquemin JP, Danis RK.** Ischémies aiguës des membres. Complications tardives de calcs hypertrophiques et de pseudarthroses. *J Chir (Paris)* 1981 ; 118 : 641-645.
13. **Pairolero PC, Walls JT, Payne WS, Hollier LH, Fairbairn JF II.** Subclavian-axillary artery aneurysms. *Surgery* 1981 ; 90 : 757-763.
14. **Wang AA, Strauch RJ, Moore JA.** Pseudoaneurysm of the ulnar artery occurring after fracture of the distal radius and ulna : a case report. *J Hand Surg*, 1998 ; 23-A : 933-937.
15. **Yates DW.** Complications of fractures of the clavicle. *Injury* 1976 ; 7 : 189-193.