

INJURY TO THE BRACHIAL PLEXUS BY A FRAGMENT OF BONE AFTER FRACTURE OF THE CLAVICLE

O. BARBIER, J. MALGHEM, O. DELAERE, B. VANDE BERG, J. J. ROMBOUITS

From the Cliniques Universitaires Saint-Luc, Brussels, Belgium

Clavicular fractures are occasionally responsible for lesions of the brachial plexus. The symptoms are usually delayed and due to compression by hypertrophic callus, nonunion or a subclavian pseudoaneurysm.

We describe a patient in whom a displaced bone fragment was pressing on the retroclavicular part of the brachial plexus, leading to early symptoms of a lesion of the posterior cord. Internal fixation of the clavicle and external neurolysis of the brachial plexus gave an almost full recovery.

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Fig. 1

Anteroposterior radiograph of the right clavicle, three weeks after injury, showing a displaced multisegmental fracture of the middle third.

CASE REPORT

A 32-year-old, right-handed man sustained a closed comminuted fracture of the right clavicle in a fall. He was treated conservatively with a figure-of-eight bandage and sling. Three weeks later he was referred to us, complaining of continuous pain in the shoulder and right arm. He reported that immediately after the injury he had been aware of numbness in the distribution of the radial nerve in the forearm and hand, with weakness of the deltoid, triceps and wrist extension. These observations were confirmed by clinical examination, but there was no evidence of vascular

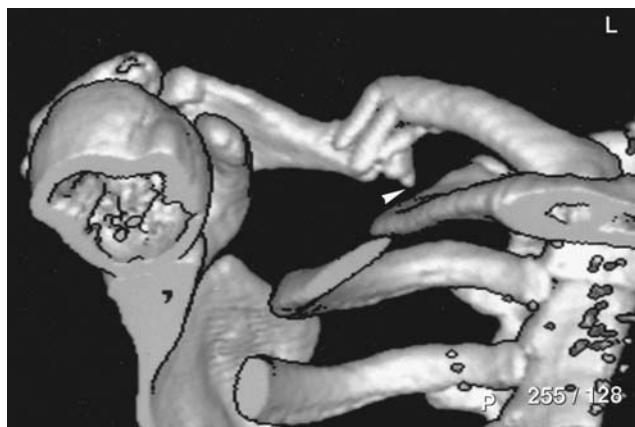


Fig. 2

Three-dimensional reconstruction of a CT scan of the right clavicle showing the displaced bone fragment (arrow) narrowing the costo-clavicular space.

O. Barbier, MD
O. Delaere, MD
J. J. Rombouts, MD, Professor and Chairman
Department of Orthopaedics
J. Malghem, MD
B. Vande Berg, MD
Department of Radiology
Cliniques Universitaires Saint-Luc, Avenue Hippocrate 10, 1200 Brussels, Belgium.

Correspondence should be sent to Professor J. J. Rombouts.

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injury. A plain radiograph (Fig. 1) and CT (Fig. 2) showed a sagittally orientated, intermediate bone fragment, and narrowing of the costo-clavicular space. MRI confirmed impingement of the clavicular lesion on the brachial plexus (Fig. 3). EMG showed a lesion of the posterior cord, with signs of denervation in the radial and axillary nerves. Operation was undertaken one week later. A sharp fragment of bone, 2.5 cm long, was found to be pressing directly on the proximal part of the posterior cord (Fig. 4).

Since there was no obvious sign of perineural injury,



Fig. 3a



Fig. 3b

Figure 3a – Sagittal T1-weighted spin-echo MRI at the mid-level of the clavicular shaft (C). The mass associated with the fracture (arrow) impinges on the anterior aspect of the brachial plexus (P). Figure 3b – MRI of the left clavicle at the same level showing the normal appearance.

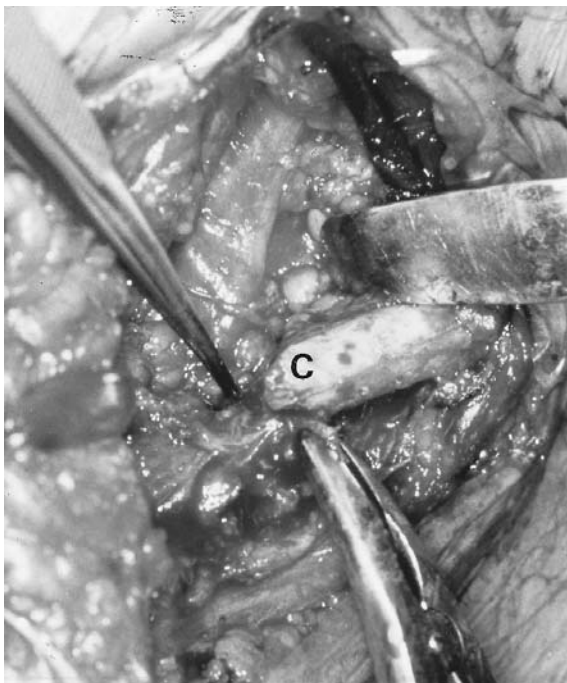


Fig. 4

At operation the bone fragment (c) can be seen pressing directly on the brachial plexus (tip of the forceps). It was carefully removed.

only external neurolysis of the brachial plexus was carried out. The bone fragment was removed and the clavicle stabilised by an eight-hole reconstruction plate and an autologous corticocancellous bone graft from the iliac crest. The shoulder was immobilised for 15 days after which physiotherapy was undertaken. The pain in the upper limb and numbness in the radial area disappeared within a few weeks. The patient returned to work six weeks after operation and clinical examination at ten weeks after surgery showed full recovery, except for a slight deficit in shoulder abduction. Radiographs indicated that the clavicular frac-

ture had united (Fig. 5) and EMG studies showed recovery of the nerve lesion.

DISCUSSION

Most palsies of the brachial plexus are due to high-energy traction injuries, which are usually associated with acute supraclavicular lesions of poor prognosis. In such cases, the occasional presence of a clavicular fracture is incidental.¹ Much less often the clavicular fracture itself is responsible for nerve lesions, usually at a retro- or infraclavicular level.



Fig. 5

Anteroposterior radiograph of the right clavicle, ten weeks after osteosynthesis and bone grafting.

Most of the reported cases had a delayed onset of symptoms, usually due to direct compression from hypertrophic callus,^{2,3} nonunion³⁻⁵ or rarely from a subclavian pseudoaneurysm.^{3,5} Involvement of the medial and posterior cords has been reported most frequently.^{2,3} The prognosis is usually good after adequate surgery.^{2,3}

The incidence of lesions of the brachial plexus due to clavicular fractures is very low. In the series of Della Santa et al,³ it represented about 1% of lesions seen over a period of 20 years in two surgical units dealing with such cases.

Early and direct compression of the brachial plexus by a fragment of clavicular bone is exceptional, and has rarely been reported. Reichenbacher and Siebler⁶ and Della Santa et al³ described cases of palsy of the brachial plexus secondary to direct compression by a bone fragment. Open reduction and internal fixation of the clavicle led to good results. Rumball et al¹ described the onset of palsy of the brachial plexus a few days after a displaced fracture of the clavicle; the lesion resolved gradually after realignment of the injury with a figure-of-eight sling.

This rare complication should be borne in mind in the

presence of marked comminution or displacement of a fracture of the clavicle. Early diagnosis and adequate treatment usually lead to excellent results.

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