ABSTRACT

A 58-year-old man underwent plate fixation of clavicle for displaced midschaft fracture. At 22 months of follow-up, we performed a removal of the clavicle plate. At this time, we found a clavicle nonunion preoperatively and we performed a new osteosynthesis with locked plate associated to the bone autograft. Three weeks later, he was admitted to the emergency department for the right upper limb edema with progressive hypoesthesia (C8-D1).

We diagnosed a thoracic outlet syndrome. We removed the clavicle plate and performed a costoclavicular decompression space. After rehabilitation, he improved his functional scores Quick DASH and Constant score respectively 60/100 and 74/100 at 17 months after the last surgery.

Keywords: Thoracic outlet syndrome, clavicule, fracture, nonunion

INTRODUCTION

Thoracic outlet syndrome (TOS) is a rare complication of non operative treatment of
Clavicle fracture(1). Current therapeutic trends is plate fixation when the clavicle fracture is displaced(2). Surgical treatment can lead often to the dramatic complications. Indeed, we report a case of TOS following surgical revision of clavicle nonunion discovered during a removal of clavicle plate procedure at 22 months after primary clavicle fixation.

CASE PRESENTATION

A 58-year-old man, right-hand dominant, waiter, operated in 1998 for right Latarjet, presented after a fall on his right shoulder, a displaced clavicle midschaft fracture (Figure 1).

He underwent an osteosynthesis with a reconstruction plate with lag screws on the upper face of the clavicle. At 45 days’ post operative control, a secondary displacement with a decline of three proximal screws of the plate without any concept of effort was noted (Figure 2).

The clinical and radiological control showed a consolidation. The prominence of the medial edge of the plate causing discomfort during his return to activities.

A removal of the clavicle plate was performed at 22 months post-operative (Figure 3). At this time, was found a clavicle non-union. We performed a new osteosynthesis with locked plate associated with bone autograft after decortication (Figure 4). Two systematic bacteriological samples came back positive to Propionibacterium acnes. Specific antibiotic therapy was introduced for three months.

Fig 1: X-ray showing clavicle midshaft fracture with a bone screw his 1998 Latarjet

Fig 2: X-ray showing clavicle plate fixation with a secondary screw displaced at 6 weeks post operative.

Fig 3: X-ray showing bone consolidation at 22 months after primary plate fixation

Fig. 4: post operative X-ray of revision surgery of clavicle nonunion by new plate fixation

Three weeks later, he was admitted to emergency department for the right upper limb oedema, with a progressive right hypoesthesia (C8-D1) without any concept of new trauma. Chandelier’s and Allen’s tests were positive. Electromyogram was in favour of TOS with C8-D1 low syndrome. The spinal Magnetic Resonance Imaging eliminated a cervical lesion and the Doppler Echo excluded thrombophlebitis of the upper limb and vascular compression. He underwent a removal of
the lock plate associated with an osteoplasty of the clavicle to decompress the costoclavicular space (Figure 5). Systematic bacteriological samples were negatives. It was therefore left in intentional pseudarthrosis (Figure 6).

**DISCUSSION**

Fracture of the clavicle represent 5% of fractures of the adult of which 80% are clavicle midshaft and more than half are displaced(3,4).

TOS following the clavicle midschaft fracture would be consecutive early compression by a hematoma under clavicle, a hypertrophic callus or nonunion practicing responsible for fracture instability of a compression of the nerve effects plexus in the costoclavicular space(5). In our case, the TOS is probably due to the compression of generous bone autograft and postoperative hematoma.

The incidence of pseudoarthrosis of clavicle significantly more important ($p = 0.042$) in the non-surgical (15%) than in the treatment surgical treatment of clavicle midschaft fracture (2.2%) (4).

The incidence of TOS depended on the studies. It was 13% in the Canadian Orthopaedic Trauma Society study(6), 7% and 4% according respectively to Ferran(7) and Bostman(8). There was no significant difference ($p = 0.690$) in the occurrence of TOS between surgical and non-surgical treatment (12.9% versus 14%)(6).

The incidence of surgical infection was on average less than 10%(3,6,9). Propinobacterium acnes is most found(2). The association between TOS and clavicle pseudarthrosis is found in certain studies especially after conservative treatment(10). In fact, Kitsis(11) in serie of 17 patients with late complications of clavicle fracture by trauma to high energy 12 patients had a neuro vascular syndrome. John G. Skedros(10) reported a case of TOS post operative after multiple surgical times that would be closer to our case but there was no pseudoarthrosis nor infection.

**CONCLUSION**

The TOS after a plate fixation of clavicle midschaft fracture is a rare complication but serious. In fact, its treatment and its evolution can be unpredictable with poor results. While this fracture of clavicle is
Thoracic outlet syndrome complicating a revision surgery of clavicle nonunion

the preserve of the young, active and often
sports topic with major socio-professional
implications.

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