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Case Report

Surgical treatment for fracture of the medial end of the clavicle associated with ipsilateral acromioclavicular dislocation

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ABSTRACT

The combination of an acromioclavicular joint dislocation and an ipsilateral medial end clavicle fracture is extremely rare. We report an acromioclavicular joint dislocation type IV associated with ipsilateral medial end clavicle fracture. The clavicular fracture was surgically treated with a locking plate and a non-operative treatment was conducted for the acromioclavicular joint dislocation. The results were clinically excellent for this 48-year-old, right-handed and sportive male patient at 3 months follow-up, with pain free full of range of motions and return to sports activities obtained.

Case report

A 48-year-old, right-handed male patient presented himself at the emergency department following a middle/high velocity bike accident with a direct fall onto his right shoulder. The patient was stable with no hemodynamic or respiratory complication. Clinically, he presented with an anterior deformity regarding the medial end of the clavicle and pain regarding the acromioclavicular joint (ACJ). There was no neurovascular deficit of the right upper limb.

The imagery complements including AP (Fig. 1A), axial X-rays (Fig. 1B) and CT-scan (Fig. 2) showed a complex extra-articular Allman type III fracture of the clavicle with no posterior luxation associated with a Rockwood type IV ACJ dislocation.

Considering the two injuries and the displacement of the fracture, surgical treatment was decided. Surgery was performed one day after the trauma. Under general anesthesia, the surgery was conducted in a beach chair position with the elbow and the forearm supported by an arm board attached to the operating table. We used a direct approach with a 6 cm horizontal skin incision following the clavicle and regarding the fracture site, incised the subcutaneous tissue and erased the muscles subperiosteally. We reduced the fracture and fixed it with a Stryker variAx locking supero-lateral clavicle plate which seems the best suited to fit the anterosuperior shape of the medial extremity of the clavicle and allows best fixation. Before incising onto the acromioclavicular site, we tested the ACJ which was reduced and stable when applying vertical stress upon physical examination and per-operative dynamics X-rays. Therefore, we decided not to perform surgical treatment of the ACJ dislocation. The post-operative X-rays (Fig. 3) showed satisfying reduction of both injuries.

Post-operatively, the patient was immobilized 45 days with a Dujarier's splint and then begin progressive physiotherapy. At the 3 months follow-up visit, the patient had excellent results, with no leftover pain and full range of motions. He had already resumed sports activity (cross-country skiing). The comparative dynamics X-rays (Fig. 4) showed no instability. However, there was already noted early radiographic signs of acromioclavicular arthritis and the radiographic bone healing aspect was not fully satisfying until the 6

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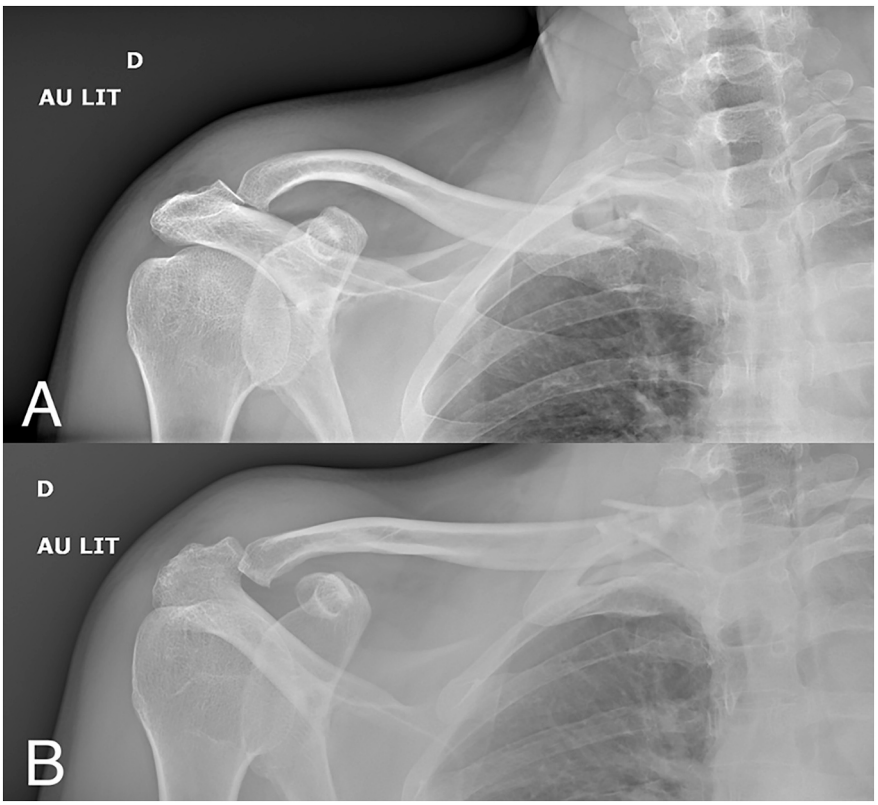

Fig. 1. Pre-operative AP (A) and axial (B) X-rays showing a medial end clavicle fracture and an ipsilateral acromioclavicular dislocation type IV.

months visit (Fig. 5).

This anonymous case report was published with the consent of the patient.

Discussion

Association of ACJ dislocation and medial third fracture are extremely rare [1–3] and so, only a few cases have been reported in the literature. To our knowledge, this is the first case reporting diagnosis and treatment of a stage IV ACJ dislocation associated to a medial end clavicle fracture. Therefore, there is a lack of consensus about the best way to treat these lesions. Gao et al. [4] recently published a short review of cases associating mid-clavicle fracture with dislocation of the ipsilateral ACJ, summarizing all the surgical treatment options existing for both clavicular fractures (plates or intramedullary nailing) and ACJ dislocation (TightRope fixation system, dog bone button, reconstruction with tendon allograft, preloaded suture fixation, Kirschner wires associated or not with tension band, clavicular hook plate, or screw fixation). The 26 reported cases showed almost exclusively good results regardless of the choice of treatment even when non-operative.

In our case, it seemed logical to us to treat the medial fracture first with a locking plate to maintain stability before dealing with the acromioclavicular lesion. Since we did not do a surgical approach of the ACJ, we could not explore and objectify the ligaments lesions. During stress examination, we had relative horizontal instability while we had no vertical instability, resulting in a pseudo-type IV injury. We hypothesize that there was a disruption of the acromioclavicular ligaments and the trapezoid ligament, and an intact or sprained conoid ligament. Indeed, since the two ligaments responsible for controlling posterior translation are the acromioclavicular ligament and the trapezoid ligament [5], the disruptions of those two can explain the horizontal instability, while the integrity of the conoid ligament would have been sufficient to insure vertical stability.

Since the best treatment of ACJ dislocation is still debated [6] today, we did not take an aggressive approach and decided not to perform a surgical treatment of this second injury. The excellent results at mid-term follow-up comfort us in this strategy and are consistent with other few cases of non-operative approach reported in the literature [7–10]. However, while the clinical outcomes in this case are satisfying, the radiographic aspects of delayed bone healing and early acromioclavicular arthritis already noted at 3 months (Fig. 5) may be consecutive to a minor persistent ACJ instability.

We found only one other case [9] to report the association of a non-operative treatment of the ACJ dislocation associated with surgical treatment of the clavicular fracture, regardless of the fracture's location. Davies et al. reported a 10-week-old association of a type VI ACJ dislocation with ipsilateral midshaft clavicle fracture. They surgically treated the clavicular fracture with a locking plate and found the ACJ to be stable intra-operatively. They also had excellent results at mid-term follow-up. In a similar way to our own,

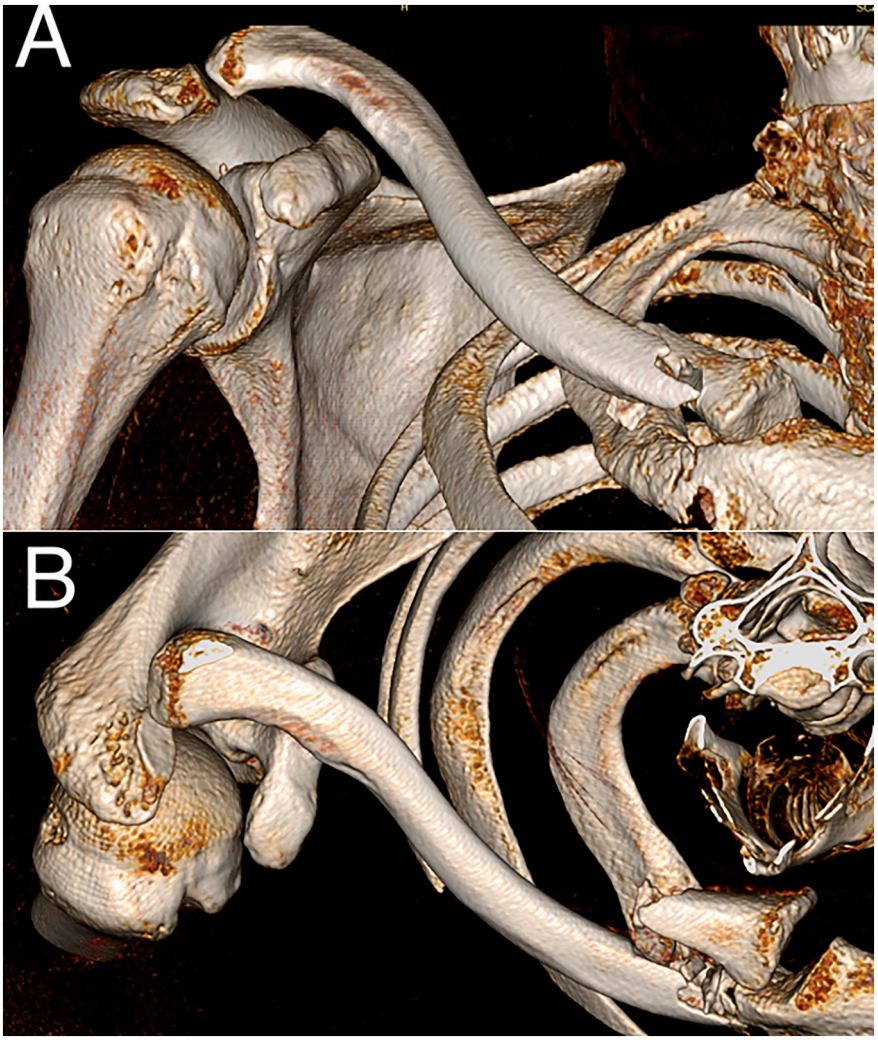

Fig. 2. Pre-operative CT-scan with a coronal (A) and a transverse (B) view showing a medial end clavicle fracture and an ipsilateral acromioclavicular dislocation type IV.

they hypothesize that in this type VI subacromial supracoracoid dislocation of the ACJ, the acromioclavicular ligaments were disrupted while the coracoclavicular ligaments were at least partially intact.

Conclusion

The combination of an ACJ dislocation and an ipsilateral medial end clavicle fracture is extremely rare and has his specificities. The ACJ lesion in those cases seems to not always follow the usual known injury mechanism of ACJ dislocation and even in seemingly advanced stage injury, the actual ligaments lesions can be incomplete. Therefore, we would propose to not systematically escalate in the surgical strategy. Although it seems difficult to not surgically stabilize at least one the lesions, the two of them should not necessarily be treated this way. A reasonable approach would be in a first time to surgically treat the clavicle fracture before reassessing the injury of the ACJ, and only treat these last one if it remains unstable. The excellent clinical results of the case we present here comfort us in that strategy.

Declaration of competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

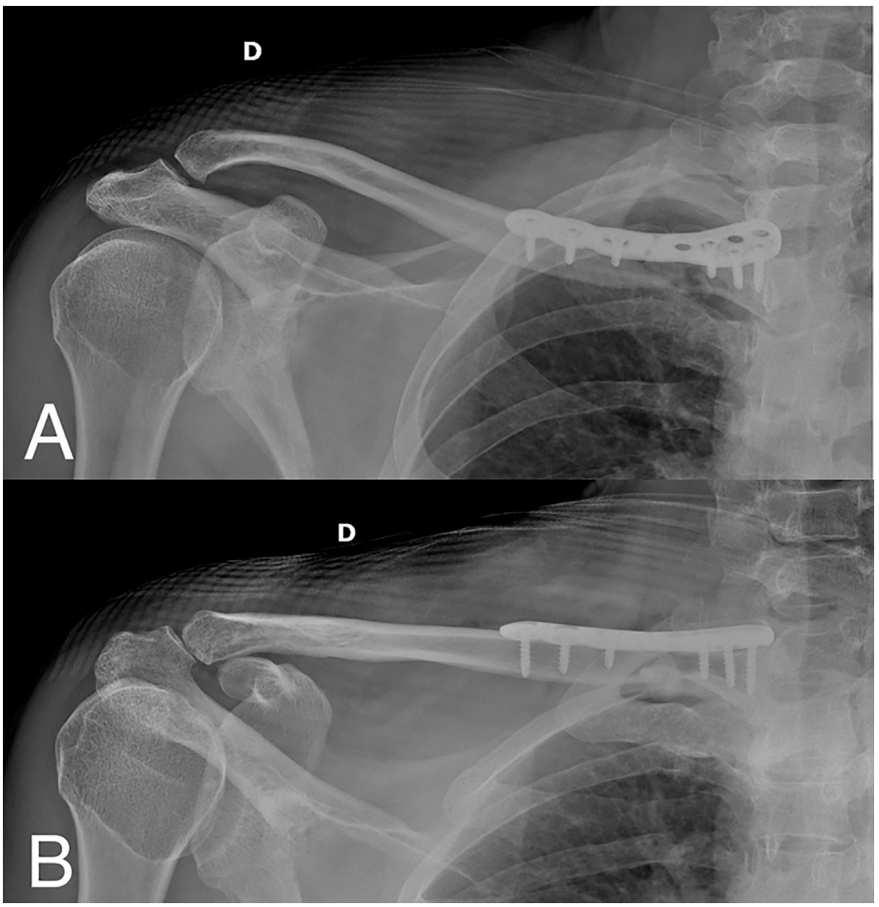

Fig. 3. Post-operative AP (A) and axial (B) X-rays showing the osteosynthesis of the medial end clavicle fracture and a reduced acromioclavicular joint.

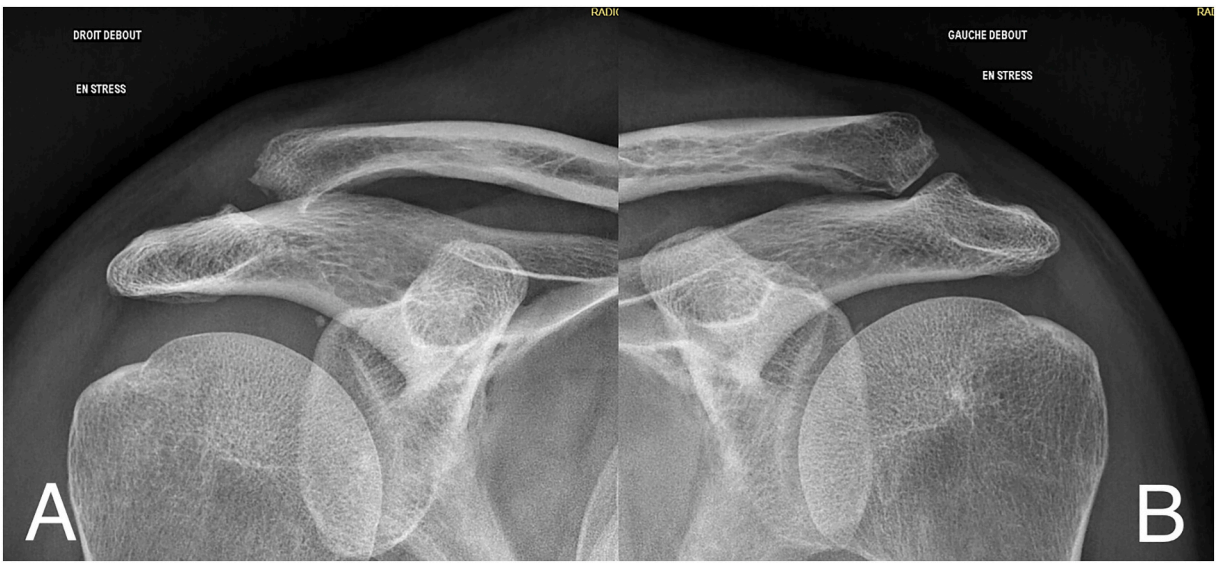

Fig. 4. Comparatives dynamics X-rays at 3 months follow-up showing the absence of instability of the acromioclavicular joint.

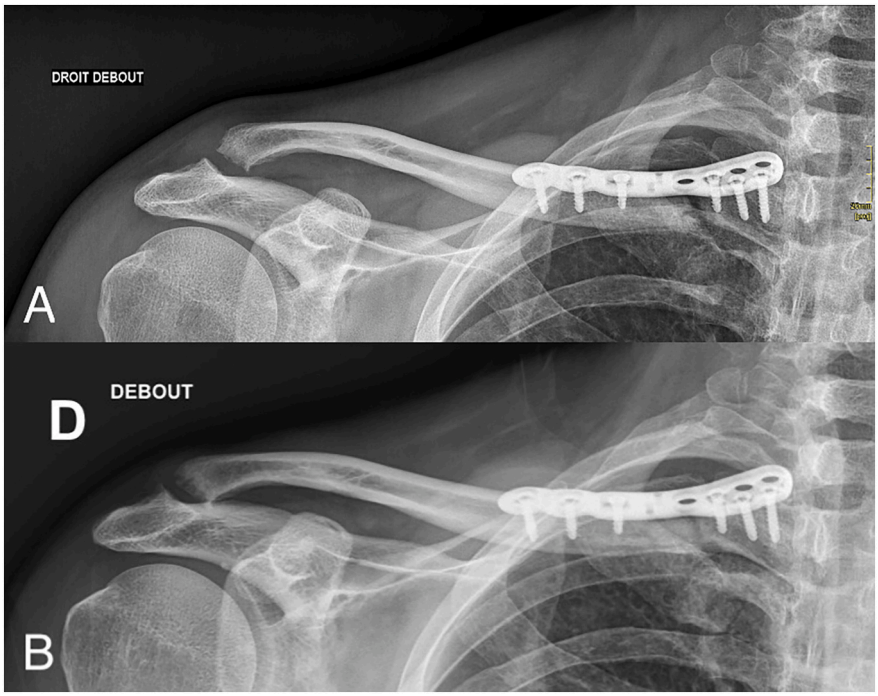

Fig. 5. AP X-ray at 3 months (A) and 6 months follow-up (B) showing a delayed bone healing of the fracture and early signs of acromioclavicular arthritis.

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