

CASE NOTE

## Intrathoracic scapular impaction: an unusual complication of scapular fractures

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Scapular fractures make up 5% of shoulder fractures and require significant force to occur. Patients often have associated injuries, leading to a mortality of 10% for this patient population.<sup>1,2</sup> Most scapular fractures can be treated conservatively with sling immobilization and early range-of-motion (ROM) exercises.<sup>2</sup> We report the case of a woman who presented with a scapular fracture that eventually required surgical correction.

### CASE REPORT

A 30-year-old woman presented to hospital following an all-terrain vehicle crash. Primary and secondary surveys revealed a left scapular fracture involving the glenoid fossa and scapular body. The inferior scapular fragment was impacted in the fourth intercostal space (Fig. 1). Additional injuries included bilateral rib fractures, left pneumothorax, pleural effusion and chest wall subcutaneous emphysema.

Initially, the patient had good shoulder ROM, and we took a conservative management approach. At 3 weeks postinjury, however, the patient's decreasing ROM and impaction seen on computed tomography (CT) scanning prompted surgical intervention. The patient was also experiencing neuropathic pain over the left scapula; we informed her that surgery likely would not alleviate this pain.

With the patient in the right lateral decubitus position, we made a 5-cm transverse incision over the inferior scapular angle. We grasped the impacted fragment with a bone clamp and applied traction until the fragment was felt to give way and ROM improved. We performed no further surgery at this time. Unfortunately, the patient's active ROM slowly deteriorated. A repeat CT scan revealed that the scapular fragment remained impacted. We scheduled a second surgery.

With the patient's left arm abducted, extended and rotated forward, we performed a left posterolateral thoracotomy through the fifth intercostal space. Significant scarring and bone formation surrounded the fracture site, and her left lung was deflated as a double lumen endotracheal tube had been placed. We identified the impacted fragment within the fourth intercostal space. The fragment was firmly ossified to the adjacent ribs and to the scapular body. We felt that this ossification to the scapular body was limiting shoulder motion. We divided the scapular body from the impacted fragment, which was left in situ. We noted excellent passive ROM. To prevent bone bridging between divided fragments, we placed a composite mesh between the scapula and chest wall, with prolene facing internally (Fig. 2). We confirmed passive ROM again before closure.

Postoperatively, the patient maintained good ROM. She required intensive physiotherapy and is being followed by an anesthesiologist for neuropathic pain, which is presently well controlled. At 22 months postoperatively, the patient continued to have excellent active ROM.



**Fig. 1.** A reconstructed view showing the lateral column of the inferior scapular fragment impacted through the fourth intercostal space.

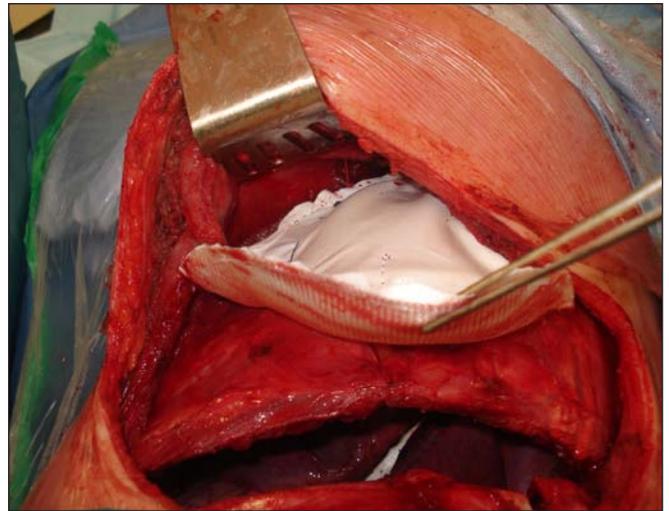
## DISCUSSION

There are 3 published cases of intrathoracic scapular impaction.<sup>3-5</sup> The first involves an 11-year-old boy who fell from a moving car and impacted the inferior scapular angle without fracture.<sup>3</sup> Through a 10-cm incision over the fourth intercostal space, surgeons released the serratus anterior and subscapularis from the inferior 3 cm of the scapula to maintain reduction. The patient regained normal ROM.

The second case involves a 13-year-old boy struck by a truck while cycling.<sup>4</sup> He sustained a scapular fracture with inferior fragment impaction. With the patient in a lateral decubitus position, surgeons made an incision paralleling the lateral scapular border, midway between the lateral border and posterior process of the spine. They reduced the scapula and interdigitated the fracture edges but did not fixate them. The patient regained normal ROM.

In the final case, a 72-year-old pedestrian was struck by an automobile.<sup>5</sup> She sustained a comminuted scapular fracture with intrathoracic impaction of the inferior fragment. Through a Judet posterior approach, surgeons reduced the fragments under fluoroscopy and performed internal fixation along the medial and lateral scapular border with a central buttress. There was full ROM and strength 3 months postoperatively.

Two of the previous cases involve thoracic impaction of the lateral aspect of the inferior scapular fragment.<sup>4,5</sup> Schwartzbach and colleagues<sup>5</sup> suggest that the variable thickness between the scapula centre (thin) and periphery (thick) facilitates this fracture pattern. Along the inferior fragment, the thickness of the inferior scapular angle



**Fig. 2.** Intraoperative placement of the composite mesh between the scapula and chest wall with the prolene mesh facing internally.

inhibits complete sagittal fracturing, creating 2 vertical columns. These columns can pivot or twist on each other, permitting impaction.

In our patient's case, initial conservative management of her injury was unsuccessful. The risk of ossification of the impacted fragment and decreasing ROM prompted our surgical approach to these fractures. Posterolateral thoracotomy provided good access and visualization of the fracture site; it was the ideal approach in this case. In the absence of bone bridging, a Judet approach should be considered, as it has been shown to provide adequate exposure and avoids the additional morbidity associated with thoracotomy in this high-risk patient population. The need for fixation can be determined on a case-by-case basis. Normal, pain-free ROM can be regained through surgical intervention.

**Competing interests:** None declared.

## References

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