

## Surgical images: musculoskeletal

### Scapulothoracic dissociation

A 9-year-old boy was helping his father on the farm when a heavy piece of equipment (200–400 kg) fell onto his left shoulder. He had a brief loss of consciousness at the scene. When transported to his local hospital for assessment, he complained of back and left shoulder pain, and decreased sensation to his left hand. Motor function was intact.

Physical examination revealed a large hematoma in the left upper chest and shoulder area. His left hand was cool, with decreased sensation globally. His radial pulse was palpable.

The chest radiograph showed a distracted left clavicle fracture with the medial border of the left scapula displaced laterally (Fig. 1, left). A computed tomographic (CT) scan

confirmed this finding and also revealed a fracture through the middle of the scapula but not entering the glenoid, with notable soft-tissue disruption (Fig. 1, right). Angiography established spasm of the left brachial artery without evidence of major vessel injury.

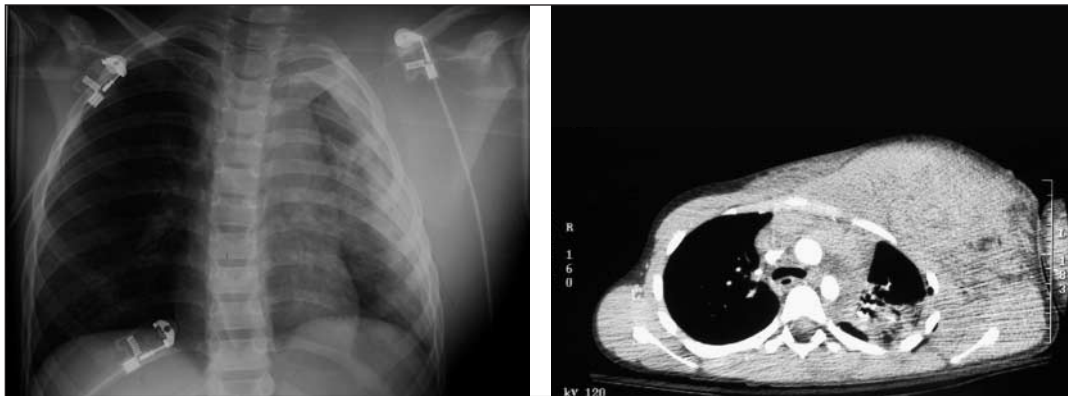
The patient underwent open reduction and internal fixation of the left clavicle within 24 hours of injury (Fig. 2). Afterward, the patient's left hand regained normal sensation. Motor function was not compromised. He currently is asymptomatic and not restricted from any activities.

Scapulothoracic dissociation (STD) or closed, traumatic forequarter amputation has been described as “complete closed separation of the scapula

from the thoracic attachments.”<sup>1</sup> It is caused by a severe force directed over the shoulder accompanied by traction applied to the upper extremity.<sup>2</sup> Any bones and articulations of the shoulder complex can be disrupted. This injury occurs with high-energy trauma, often with a delayed diagnosis.

STD is associated with other severe injuries of the upper extremities, chest and neck.<sup>3</sup> Frequently, the brachial plexus is involved or avulsed and the patient may have a flail, anesthetic limb or Horner's syndrome.<sup>3,4</sup> Vascular injury is possible and may present as a pulseless extremity. Angiography will show occlusion or avulsion of the subclavian artery.<sup>3</sup>

A well-centred chest radiograph aids the diagnosis. A widely displaced



**FIG. 1.** Left, a chest radiograph showing a wide mediastinum, widely displaced clavicular fracture, lateral displaced scapula and subcutaneous emphysema. Right, computed tomographic (CT) scan demonstrating severe soft-tissue swelling, a large chest-wall hematoma, small mediastinal hematoma and laterally displaced scapula.

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**FIG. 2.** Intraoperative photographs depicting the widely displaced clavicle fracture and its subsequent fixation with plate and screws.

clavicular fracture with displacement of the medial border of the scapula (Fig. 1) are key findings.<sup>3,5</sup> Further investigations can include CT, magnetic resonance imaging, electromyography and angiography.

Treatment is dictated by the spectrum of injuries present.<sup>4</sup> Surgical repair of a vascular injury is recommended,<sup>2,5</sup> and exploration of a documented brachial plexus injury is war-

ranted.<sup>2,4,5</sup> Operative treatment of the displaced clavicular fracture can stabilize the shoulder girdle, avoid delayed or nonunion of the clavicle fracture and protect the brachial plexus and axillary artery from further distracting forces.<sup>2</sup> Support of soft-tissue structures with immobilization for 6 weeks is appropriate before physical therapy to return range of motion.<sup>2</sup> Outcomes depend on the state of the

brachial plexus and other injuries that are present, and can range from normal function to a flail limb requiring fusion or amputation.

**Competing interests:** None declared.

#### References

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