CASE REPORT

Delayed pneumothorax following an isolated clavicle injury

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SUMMARY

Isolated fractures of the clavicle have been rarely reported to be complicated by a pneumothorax. However, a delayed pneumothorax following this injury has not yet been reported in the literature. This case report describes a 19-year-old man who developed a left-sided apical pneumothorax from an ipsilateral fractured clavicle 5 days after his initial motorbike accident. Initial chest examination and radiographs showed no evidence of a pneumothorax in the accident and emergency department but a repeat radiograph in fracture clinic to assess the clavicle diagnosed an ipsilateral apical pneumothorax. He was then promptly treated with a chest drain which resolved the pneumothorax within 2 days. The clavicle fracture was treated non-operatively and after 6 weeks the patient had full function in his upper limb. Clinicians should therefore be aware of this rare complication from displaced clavicle fractures both immediately after the initial trauma and also on follow-up.

BACKGROUND

A pneumothorax following an isolated clavicle fracture is a rare complication and should always be assessed for on initial presentation both clinically and radiologically. However, clinicians should also be aware that this complication can have a delayed presentation and should be vigilant for this problem on follow-up as it can have serious consequences if not treated appropriately.

CASE PRESENTATION

A 19-year-old, fit and healthy, right hand dominant man with no medical history, lost control of his motorbike at approximately 30 mph. This accident resulted in a direct fall onto his right shoulder. He was promptly transferred to accident and emergency and underwent a full primary survey which revealed no cervical spine injury and no cardio-respiratory compromise. The patient had equal lung air entry bilaterally, normal breath sounds and no shortness of breath. Oxygen saturations were maintained at 97% on room air. The secondary survey highlighted pain, bruising and a deformity over the right clavicle with intact skin. The shoulder was not dislocated and there were no upper limb neurovascular deficits. An isolated comminuted fracture at the junction of the mid-thirds and outer thirds of the clavicle with separation of the fracture fragments with relative depression of the distal fragment was diagnosed on the chest radiograph. There was no radiological evidence of a pneumothorax at this stage.

The patient was discharged the following day in a broad arm sling with a fracture clinic appointment after being reviewed by the orthopaedic team who decided on conservative management for the clavicle fracture.

Five days after the initial injury the patient attended fracture clinic. He complained of breathlessness on minimal exertion, that is, climbing stairs and tightness in his chest. A repeat chest and clavicle radiograph were taken which showed a right 3 cm deep apical pneumothorax. He was then admitted for a chest drain which stayed in situ for 2 days. Following this, the right lung had fully re-inflated and the chest drain was removed. There were no complaints from the patient of breathlessness and his clinical examination was normal prior to discharge. The patient was followed up in orthopaedic outpatients for his clavicle. Six weeks after the accident, the patient had made a complete functional recovery from his fracture and therefore did not warrant operative intervention.

INVESTIGATIONS

Four x-rays

1. Chest radiograph from initial trauma series showing only isolated clavicle fracture and no pneumothorax (figure 1).
2. Chest radiograph from fracture clinic showing apical pneumothorax and clavicle fracture (figure 2).
3. Chest radiograph with chest drain inserted (figure 3).
4. Chest radiograph showing resolution of pneumothorax (figure 4).

Figure 1 Chest radiograph from initial trauma series showing only isolated clavicle fracture and no pneumothorax.

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Figure 2 Chest radiograph from fracture clinic showing apical pneumothorax and clavicle fracture.

TREATMENT

As stated above, the patient need a chest drain for the pneumothorax and conservative treatment for clavicle fracture.

OUTCOME AND FOLLOW-UP

Two days after the chest drain insertion, repeat chest radiographs showed complete resolution of the pneumothorax. There were no further episodes of shortness of breath or chest tightness. The patient had non-operative management of his clavicle fracture and after 6 weeks there was no pain over the fracture site with no loss in upper limb function (figures 5 and 6).

DISCUSSION

Clavicle fractures account for approximately 5% of all fractures and over half of all injuries sustained to the shoulder girdle.¹⁻³ Complications from this fracture are mostly owing to direct trauma to the shoulder causing a comminuted, displaced fracture of the clavicle bone. There are few actual reported cases of isolated clavicle fractures causing a pneumothorax, with subclavian vessel injury and brachial plexus paresis being mentioned in the literature as other rare complications.^{4 5}

Dath *et al* reported a similar aged patient to our case report who sustained a mid-clavicle fracture and resulting pneumothorax which was treated by a chest drain.⁵ However, this patient had pain on inspiration at presentation and radiological evidence of a pneumothorax which allowed for immediate management by means of a chest drain.

Another case reported by Williams described a 30-year-old lady who sustained a low-energy injury causing a clavicle fracture with an ipsilateral pneumothorax of 10% which was

Figure 4 Chest radiograph showing resolution of pneumothorax.

initially treated conservatively owing to the small size and absence of symptoms.⁶ This patient then had a repeat chest radiograph the following day to assess the pneumothorax which had consequently enlarged to almost 70% without any clinical signs or symptoms.⁷ This was again treated by chest drain insertion.

The patient in our case report did not have any radiological evidence or clinical symptoms of a pneumothorax on initial presentation. His symptoms developed slowly over 5 days and was diagnosed by a good clinical history and knowledge of possible complications occurring with this fracture. As with the case described by Williams, the patient was young with no history of lung pathology and therefore was able to compensate. A problem may have arose if there was pre-existing lung disease or in an elderly patient. We can therefore assume that there was an initial injury to the lung at the time of the primary trauma which resulted in a 'slow leak' of air into the pleura resulting in the symptomatic and radiological pneumothorax noted on day 5.

Displaced clavicle fractures should always be assessed on initial presentation both clinically and radiologically for a pneumothorax. However, clinicians should also be aware that this complication can have a delayed presentation and should be vigilant for this problem on follow-up as it can have serious consequences if not treated appropriately.

Figure 3 Chest radiograph with chest drain inserted.

Figure 5 Images showing no residual deformity/skin complications following the injury.

Figure 6 Images showing no residual deformity/skin complications following the injury.

Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 Simon RR, Koenigsnecht SJ. Clavicle fractures. In: *Emergency orthopedics: the extremities*. 5th edn. McGraw-Hill, 2007.
- 2 Khan LA, Bradnock TJ, Scott C, *et al*. Fractures of the clavicle. *J Bone Joint Surg Am* 2009;91:447–60.
- 3 Yates DW. Complications of fractures of the clavicle. *Injury* 1976;7:189–93.
- 4 Mouzopoulos G, Morakis E, Stamatakis M, *et al*. Complications associated with clavicular fracture. *Orthop Nurs* 2009;28:217–24. quiz 225–6.
- 5 Dath R, Nashi M, Muddu BN. Pneumothorax complicating isolated clavicle fracture. *Emerg Med J* 2004;21:395–6.
- 6 Williams RJ. Significant pneumothorax complicating a fractured clavicle. *J Accid Emerg Med* 1995;12:218–19.
- 7 Dugdale TW, Fulkerson JP. Pneumothorax complicating a closed fracture of the clavicle. *Clin Orthop* 1987;221:212–14.

Learning points

- ▶ Pneumothorax, subclavian vessel injury and brachial plexus paresis are rare complications but should always be assessed for when faced with a clavicle fracture.
- ▶ Clinicians should be aware that there can be a delayed presentation in the formation of a pneumothorax following a clavicle fracture. Patients should, therefore, be warned that if they develop chest symptoms after discharge they should return to accident and emergency for clinical and radiological assessment.
- ▶ Chest radiographs are essential in the management of clavicle fractures and should be taken on initial presentation of the fracture, if the patient experiences new respiratory symptoms and on follow-up in clinic.

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