Isolated Sternal Fracture

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ABSTRACT

Isolated sternal fracture is rare and benign. A 36-year-old female presented had severe chest pain and mild dyspnea after her anterior chest wall was bluntly injured by the front seat at car brake. She urgently went to a nearby hospital to see the doctor, whereas no remarkable findings were noted on the chest roentgenogram and electrocardiogram. However, she was referred to this hospital due to a sustained chest pain. A three-dimensional chest computed tomography was examined and an isolated sternal fracture was found. She was advised a rest. Isolated sternal fractures usually require minimal treatment unless there are associated injuries. Efforts have to be taken on traveling safety to avoid unintentional injuries.

Keywords: Closed, fractures, sternum, wounds and Injuries.

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INTRODUCTION

Isolated sternal fracture is very rare. However, the diagnosis may be challenging as it would not be visible on routine chest X-ray films. It may be divided into sternal fracture and sternal dislocation, accounting for 7.5% and 2.9% of chest trauma patients (1). ISFs are mostly benign, but a sustained chest pain should arouse the suspicion of such a lesion. A young female had sustained chest pain after a car site collision, but the chest X-ray film did not show any abnormalities. A three-dimensional chest computed tomography that was taken later showed an isolated sternal fracture.

CASE REPORT

A 36-year-old female, on the way traveling to the provincial city, had an anterior chest wall collision onto the front seat at car brake. She complained of severe anterior chest pain and mild dyspnea, and urgently went to the doctor of a nearby hospital. A chest roentgenogram did not reveal any remarkable findings and the electrocardiogram was also normal. She was released home, but chest pain sustained. She was then referred to this hospital and a three-dimensional chest computed tomography revealed an ISF in the sternal body (Fig. 1). She was advised a rest for two months. At two-month follow-up, another three-dimensional chest computed tomography showed callus formation at the site of sternal fracture.

DISCUSSION

The etiologies of ISFs included road accidents (47.6%), trauma at work (34%) and accidental falls (18.4%). Of them, direct trauma was a major cause, accounting for 81.5% of the patients (1). ISFs are more prevalent now with the increasing use of seat belt restraints in the cars (2). ISFs are more common in patients older than 50 years as a result of a weaker or rigid bony chest wall (2).

However, most sternal fractures do not occur in isolation. The retrosternal hematoma can be an indirect sign of the fracture (3). A severely displaced sternal fracture may be associated with severe cardiovascular injury (4). Cardiac arrhythmia or elevated cardiac enzyme levels are uncommon following ISFs, and cardiac enzyme detections may not be helpful for the diagnosis of ISFs (5). Recently, comparisons of sensitivity and specificity between chest roentgenogram and ultrasound were made in terms of the verification of sternal fractures. Chest roentgenogram demonstrated a sensitivity of 70.8% and a specificity of 75.0%; whereas ultrasound exhibited the sensitivity and specificity were both 100% (6).

Patients with ISF usually do not need hospitalization or reevaluation (7). However, they might be admitted in the following situations, for example, observation for abnormal electrocardiogram and low oxygen saturation, pain control, abnormal cardiac enzymes and social circumstances (8).

Satisfactory pain control can usually be achieved with oral or parenteral analgesics. Patients received paracetamol, dihydrocodeine and non-steroidal anti-inflammatory drugs for pain control. Sadaba *et al*. (9) reported that eight patients (22%) required additional analgesia with injectable morphine sulphate. Patients may not develop any cardiac sequelae, and were

discharged within 48 hours from admission (10). The indications for surgical treatment for ISF patients as described in the literature were listed in Table 1. Repair of ISFs can be with titanium plate (64%), steel plate (25%) and steel wire (11%) (1).

The prognosis is good and these patients usually make a full recovery. As a rule, no complications have been noted for ISFs (2). The mortality rate from ISF is extremely low. Death and morbidity are related almost entirely to associated injuries such as aortic disruption, Cardiac contusion, and pulmonary contusion, or unrelated injuries to the abdomen or head sustained in the accident (2).

CONCLUSION

Ultrasound is a sensitive diagnostic method superior to radiography in diagnosing ISFs. They require minimal treatment unless there are associated injuries. Efforts have to be taken on traveling safety to avoid unintentional injuries.

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Table 1: Indications for treatment for isolated sternal fracture patients

Indications
✧ Oblique stumps and unstable nonunion of the sternum in case of fracture (1)
✧ Respiratory distress and kyphosis of cervicothoracic rachis in case of Luxation. (1)
✧ Presence of a sternal deformity (11)
✧ Loss of sternal continuity for >6 weeks (11)
✧ Sustained chest pain for 2-8 weeks (11)

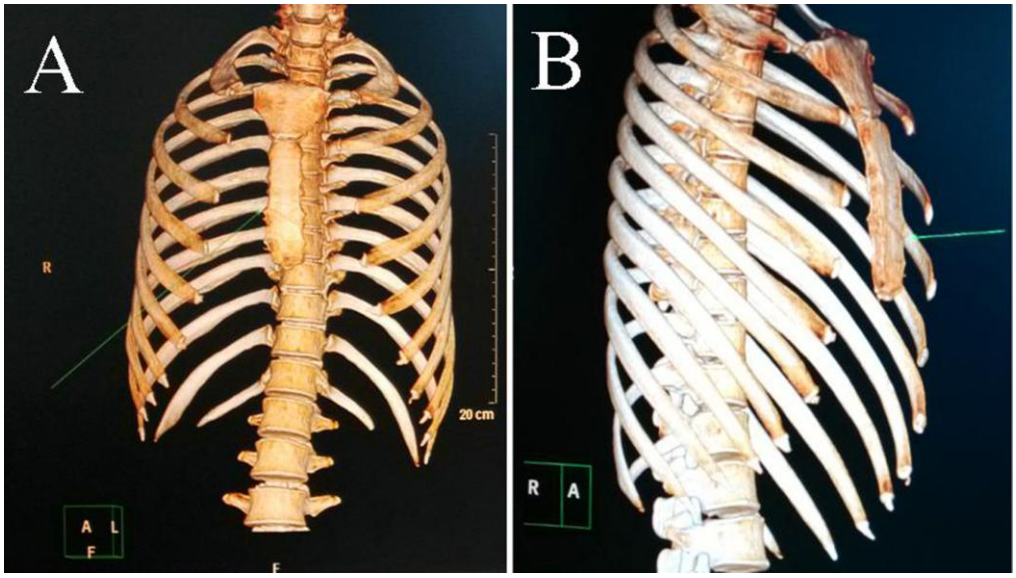

Fig. 1: Three-dimensional chest computed tomography showed an isolated sternal fracture in the body of the sternum involving only the cortex (arrow) from: (A) an anteroposterior view, and (B) a right lateral view.