

Unilateral flail chest with scapular winging treated with tension band wirings of ribs: A case report

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Abstract

Tension band wiring is becoming increasingly popular method for stabilizing a flail chest resulting from multiple rib fractures. The indications for fixation of flail chest injuries remain controversial mostly because of a lack of adequate studies [1]. Recent guidelines recommend surgical stabilization of a flail chest based on consistent evidence of its efficacy and lack of major safety concerns. But complications of this procedure can occur and are wide ranging [2].

We report an interesting case of a patient who underwent fixation with tension band wiring for multiple unilateral rib fractures that successfully healed with good functional outcome.

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Introduction

Tension band wiring for flail chest is now commonly used method for stabilizing a flail chest resulting from multiple rib fractures over plating due to ease of technique and time salvage in emergent conditions. Studies have shown that when patients undergo open reduction with internal fixation (ORIF) of rib fractures they require shorter periods of ventilator support, which in turn reduces morbidity and mortality associated with mechanical ventilation, and reduces risk of contracting infections or septicaemia [4,5]. Complications of ORIF include fracture non-union, infection, pneumothorax, failure of fixation, and post-operative chest wall "rigidity" necessitating wire removal [6-11].

We report this case in view of its rare mode of injury and the life saving immediate fixations of ribs for better chest

physiotherapy leading to excellent outcome in a young patient.

Case Report

A 38 year old male suffered cave-in injury and was excavated out of earth using an Earth mover where he suffered massive trauma to the left side of the chest in form of scapular winging and complete scapulo-thoracic dissociation as one of the prong got pierced in the thoracic wall. The patient presented with complete lung contusion on the left side with complete tear of subscapularis, latissimus dorsi, rhomboids and partial tear of the trapezius muscle. He had severe shortness of breath and alarming low oxygen saturation on presentation. X-ray showed fractures of four ribs from 3rd to 6th with flail chest (Figure:1). The patient was managed in the emergency care theatre while stabilizing vitals following the principles of Advanced

Trauma Life Saving (ATLS). The patient was revived from hypovolumic shock pre-operatively using crystalloids and blood component transfusion.

After stabilization he was operated under general anaesthesia with tension band wiring for multiple (3rd to 6th) unilateral rib fractures on left side (Figure:2). The wound was thoroughly washed and chest tube was inserted during the repair of the chest wall for pneumothorax and primary closure of the full thickness chest wall flap was done. The surgery was uneventful.

During the post-operative period the patient was unable to maintain adequate saturation for the first post-operative week. The patient improved with simultaneous intravenous antibiotics and regained saturation from 3rd to 6th week postoperatively and chest tube was removed with evidence of loss of column movement for 3 days during the second week post-operatively. There was associated patchy consolidation in the middle and upper lobe of the left lung (Figure:3) which completely resolved by 8th week. There was complete loss of long thoracic nerve function with no neuro-

vascular deficit in the left upper limb. Nerve conduction velocity and electro-myographic studies showed normal latency for median, ulnar and radial nerves and a complete recruitment in flexor and extensor group of both arm and the forearm muscles on the 7th postoperative week.

Post-operative chest x-ray in the 16th week was normal and showed no signs of any consolidation (Figure:4). There was marked winging of the scapula on the left side with associated atrophy of the left shoulder. There was weakness in anterior elevation of the left upper limb. The EMG studies showed injury of the long thoracic nerve with no signs of re-innervation. In accordance with the general recommendations the patient started formal physical therapy at eight weeks after the operation. Physical therapy emphasized active range-of-motion exercises and strengthening of the rotator cuff and the trapezius. The ultimate outcome at one year was excellent and the patient is having full lung functions and no pain in the chest wall and shoulder.

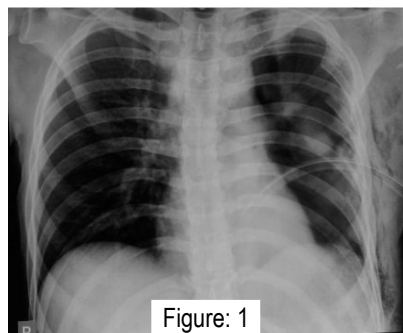


Figure: 1



Figure: 2



Figure: 3



Figure: 4

Discussion: Tension band wiring has been used for the fixation of rib fractures. Management of unilateral flail chest with associated long thoracic nerve injury with Tension Band Wiring has not been reported previously, to the best of our knowledge. It is difficult to prove if the nerve injury in our patient was an iatrogenic complication occurring during the surgical procedure or was present pre operatively, caused by the

multiple rib fractures. The possibility that our patient's long thoracic nerve injury was caused by the trauma is supported by the severity of the injuries on the affected side, including the complete and partial tears of the musculature forming the chest wall. Long thoracic nerve injury is a well-known complication of chest wall trauma without any fractures and also with associated ipsilateral and bilateral rib fractures [12-14].

In contrast to these prior studies, to our knowledge, long thoracic nerve injury has not been described as the direct result of rib fracture open reduction internal fixation. One of the reason for importance of this case is to caution the surgeons about the paralysis of long thoracic nerve injury as a potential complication of ORIF which might be a result of direct injury to the chest wall. In either case the winging would most likely not be recognized pre-operatively because of the need of emergent resuscitation first and associated recumbence. The diagnosis is very likely to be missed and the exact aetiology is difficult to establish.

This type of injury should be treated immediately after stabilization of general condition by a team of general surgeon,

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Legends for figures

Fig-1.X-ray chest showing multiple rib fractures with lung opacities and chest wall in situ.

Fig-2.Per-operative photograph showing cerclage wires being used for rib fixations.

Fig-3. Immediate post-operative photograph with ribs fixed with wires with lung contusions.

Fig-4. . Post-operative X-ray showing full lung expansion at three months.