



Case Report

Bilateral Clavicle Fractures with Multiple Rib Fractures and Hemothorax: A Case Report

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ABSTRACT

Background: Bilateral clavicle fractures are rare injuries usually caused by high-energy trauma and are often associated with thoracic injuries such as rib fractures and hemothorax. Due to their rarity, the optimal management strategy remains controversial. This report describes the multidisciplinary management of bilateral clavicle fractures accompanied by multiple rib fractures and hemothorax following a road traffic accident.

Method: A 46-year-old man presented with bilateral shoulder pain after a motorcycle accident. Clinical and radiographic examinations showed a middle-third fracture of the right clavicle, a distal-third fracture of the left clavicle, multiple rib fractures, pulmonary contusion, and left hemothorax. Surgical treatment involved open reduction and internal fixation (ORIF) using an S-shaped locking plate for the right clavicle and a hook plate for the left clavicle. The hemothorax was treated with water seal drainage (WSD), while the rib fractures underwent elective ORIF.

Results: Postoperative evaluation demonstrated satisfactory stabilization of both clavicles, improved shoulder girdle stability, and better respiratory function. Combined fixation of the clavicle and rib fractures contributed to pain reduction, improved chest wall mechanics, and favorable functional recovery without major complications.

Conclusion: Bilateral clavicle fractures are uncommon injuries that frequently indicate severe thoracic trauma. Early multidisciplinary management and individualized implant selection according to fracture characteristics are important for achieving optimal outcomes. Surgical stabilization may improve respiratory function, reduce complications, and support favorable recovery.

INTRODUCTION

Bilateral clavicle fractures are not frequently seen. It could be missed because of their association with more severe chest injuries or a more symptomatically displaced

fracture on one side or due to inadequate chest radiographs.¹ However, the clavicle fractures are common injuries. It has reported incidence of 2.4-4% in all type of fractures. The bilateral clavicle fractures comprised

0.43% of all the clavicle fractures, with an overall incidence of between 0.011 to 0.017%². As it is a rare injury, there is no general consensus to treat this injury surgically or non-surgically³. If a patient is treated with open reduction and internal fixation (ORIF), there is also a debatable issue of the type of implant best used in clavicle fracture. There are several options including anatomical locking plate, intramedullary K-wire, and non-locking 3.5mm reconstructive plate.⁴

Herein, we report a case of bilateral clavicular fracture in a 46-year-old male patient whom we managed surgically, ORIF using hook plate on the left side and S plate on the right side.

CASE REPORT

A 46-year-old right-hand-dominant man presented to the emergency department with bilateral shoulder pain. Five hours prior to admission, he had been riding a motorcycle when he was struck from behind by a car and fell, with his chest impacting the road surface. He did not lose consciousness and did not experience vomiting. Following the incident, he reported pain in both shoulders. He was initially transported by bystanders to Karima Utama Hospital and was subsequently referred to Dr. Moewardi General Hospital due to the need for thoracic and cardiovascular surgical evaluation. He denied any prior history of illness, trauma, or surgery. Prior to the injury, he had been able to ambulate independently without assistive devices.

On physical examination, the airway was patent. Respiratory assessment revealed dullness to percussion over the left hemithorax, with normal vesicular breath sounds on the right and decreased breath sounds on the left. Findings for circulation, disability, and exposure were within normal limits. Examination of the right shoulder demonstrated tenderness over the medial clavicular region with palpable crepitus and limited range of motion due to pain. Examination of the left shoulder revealed an

abrasion over the superior aspect, with swelling, tenderness over the lateral clavicular region, palpable crepitus, and restricted range of motion secondary to pain.



Figure 1. Clinical picture of the shoulder region



Figure 2. Clinical picture of the right shoulder region



Figure 3. Clinical picture of the left shoulder

Chest and bilateral shoulder radiographs demonstrated fractures of both clavicles, involving the middle third of the right clavicle and the distal third of the left clavicle. The injuries were diagnosed as a closed left clavicular fracture (Allman group II, type I, oblique) and a closed right clavicular fracture (Allman group III, comminuted)..



Figure 4. Preoperative anteroposterior radiographs of the bilateral shoulder joints show the middle third fractures of the right clavicle and distal third fracture of the left clavicle.

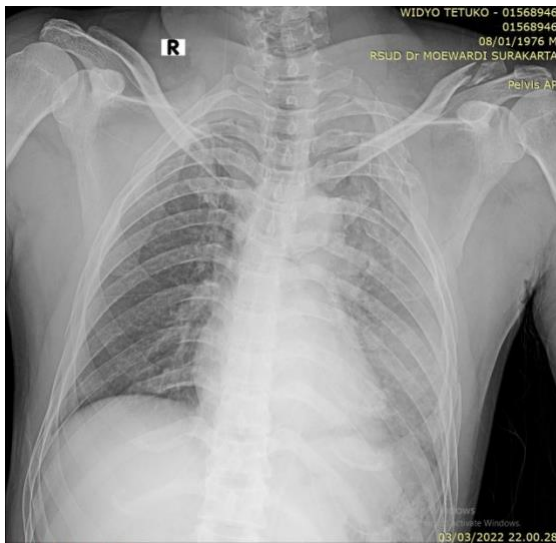


Figure 5. X-ray of the thorax show multiple rib fractures and haemothorax on the left lung. Evaluation by the thoracic and cardiovascular surgery team identified left pulmonary contusion, left hemothorax, and multiple rib fractures.

DISCUSSION

Clavicle fracture is common but bilateral clavicle fractures are rare.⁴ In this patient, bilateral clavicle fractures occurred in the middle third of the right clavicle and the distal third of the left clavicle. From the TCVS

Department, the patient was assessed with multiple rib fractures along with the hemothorax on the left lung⁵.

Bilateral fracture of clavicle often occurs due to compressive force across or direct blow to both shoulder girdles, direct impact on both clavicles, or subsequent trauma to two clavicles: one after another. These are generally associated with high-energy trauma. These are frequently observed in high energy impact incidents such as motor-vehicle accidents, motorcycle accidents, pedestrian-vehicle accidents, pedestrian-cycle accidents, crush type of injury, fall from a height, and other road traffic accidents.⁶ In this case report, the patient had a history hit by a car from behind and fell with his chest hitting the road. This involved high energy transfer of forces across the shoulder joint.

On general orthopaedic principle, all fractures should be immobilized. Furthermore, any mobile fracture in acute phase will cause pain and discomfort⁷. When bilateral clavicle fractures are managed without operation, the patient will experience more pain and become more incapacitated. These will cause more stiffness in short term.⁸ There are also evidences that suggest a high rate of delayed, non-union or shoulder dysfunction after conservative treatment in clavicle fractures.⁹⁻¹⁰ In previous study indications for ORIF in clavicle fracture were an open fracture, ipsilateral fractures of the arm or ribs, bilateral clavicle fractures and fractures that were irreducible by conservative means.¹¹⁻¹² Therefore, we decided to proceed with surgical intervention through ORIF in both of the patient's clavicles¹³.

he optimal implant for bilateral clavicle fractures remains controversial, with options including anatomical locking plates, intramedullary Kirschner wires (K-wires), and 3.5-mm reconstruction plates. Anatomical locking plates are widely regarded as reliable, particularly in osteoporotic bone, due to their superior stability and fixation strength. Intramedullary K-wire fixation has been

associated with satisfactory union and functional outcomes, while reconstruction plates have demonstrated good union rates and early return to daily activities. However, implant selection should be guided by fracture location, morphology, and associated injuries rather than a single standardized approach.¹⁴⁻¹⁶

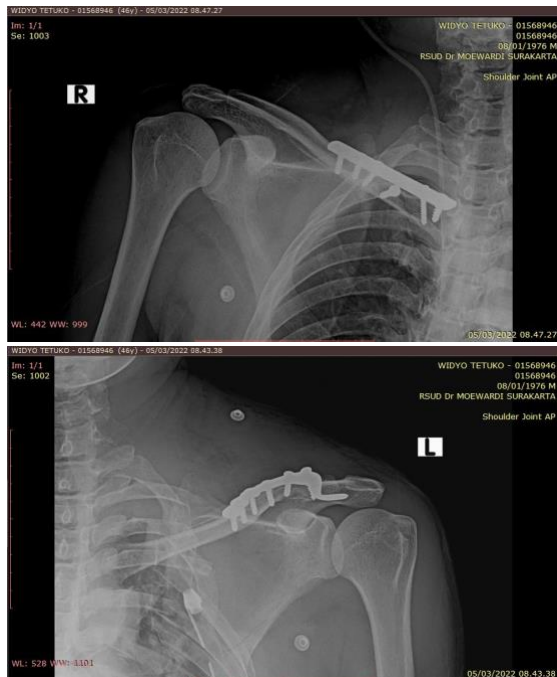


Figure 6. Postoperative anteroposterior radiographs of the bilateral shoulder joints. The middle third fracture of the right clavicle was fixed with hook plate and distal third fracture of the left clavicle was fixed with S-shaped locking plate.

In the present case, fracture patterns differed by laterality and were classified according to the Allman system: the right clavicle sustained a middle-third fracture (Allman Group I, comminuted), while the left clavicle sustained a distal-third fracture (Allman Group II, oblique). This distinction informed implant choice. The left distal clavicle fracture was stabilized with a hook plate, which provides superior fixation in unstable lateral fractures by maintaining acromioclavicular alignment and offering greater mechanical stability compared with K-wire constructs. In contrast, the right midshaft comminuted fracture was treated with an S-shaped locking plate, which allows

anatomical contouring and rigid fixation, promoting early mobilization and reliable union. This fracture-specific strategy is consistent with current literature emphasizing tailored fixation based on anatomical and biomechanical considerations¹⁷⁻²⁰.

The presence of concomitant thoracic injuries significantly influenced management priorities. Multiple rib fractures and hemothorax are well-established predictors of increased morbidity and mortality, with outcomes worsening as the number of rib fractures increases²¹. Combined clavicle and rib fractures further compromise chest wall stability, potentially impairing respiratory mechanics and shoulder function. Evidence suggests that surgical stabilization of the clavicle, particularly in bilateral cases, may improve chest wall mechanics, facilitate respiration, and reduce pain.²²⁻²³

Consistent with these findings, bilateral clavicle fixation in this patient was performed to restore shoulder girdle stability and support respiratory function. Additionally, the rib fractures were managed with elective open reduction and internal fixation, in line with literature advocating surgical stabilization in cases of significant or multiple rib fractures. The associated left hemothorax was appropriately treated with water seal drainage, which remains the standard initial management for most cases without ongoing hemorrhage.²⁴

Puranik et al. reported a rare case injury about bilateral fractured clavicles with multiple rib fractures. In that case, the bilateral clavicle fractures were internally fixed to provide stability to shoulder girdles which assisted her respiration and also likely to have reduced analgesic requirements. In that report, the authors mentioned that significant rib fractures, associated with clavicle fractures, should be considered for internal fixation. This is even more important when the injury is bilateral.²⁵ In this case, the TCVS Department also treat the multiple rib fractures with elective ORIF.

Hemothorax or bleeding into the pleural space is also commonly observed in chest trauma. The most common causes are intercostal vessel injury associated with rib fractures, bleeding from injured lung tissue, or more rarely from sub-lobar, lobar, or great vessel injury. Most patients with haemothorax can be managed conservatively with intercostal drain placement alone, but those with large volume or ongoing active bleeding may require operative intervention to control bleeding.⁸In this case, the patient had a hemothorax due to the multiple rib fractures that treated with WSD hemithorax on the left lungs from TCVS Department²⁶.

CONCLUSION

typically indicate high-energy trauma with associated thoracic injury. Management should prioritize a multidisciplinary approach, addressing both skeletal and thoracic components. Implant selection should be individualized according to fracture location and pattern, as demonstrated by the combined use of a hook plate for the distal clavicle and an S-shaped locking plate for the midshaft fracture in this case. Early surgical stabilization of both clavicular and rib fractures may enhance respiratory function, reduce complications, and support favorable functional outcomes.

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