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Late stabilization surgery in flail chest and pulmonary contusion



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ABSTRACT

Background: Traumatic thoracic injury is currently the second leading cause trauma-related death after head injury, and rib fracture are the most common of thoracic injury. Flail chest, as defined by the presence of three or more consecutive rib fractures in 2 or more places characterized by paradoxical motion of flailing chest wall. An associated injury directly related to flail chest is pulmonary contusion. Pulmonary contusion in turn is the most common injury in blunt thoracic trauma, occurring in 30% to 75% of all cases.

Case Description: a 69-year-old woman was referred from the rural hospital to the Dr. Zainoel Abidin General Hospital emergency room with chief complains of unconsciousness since 3 days ago after collision. Patients had a motorcycle crush accident and loss of consciousness after the event. Clear airway, but there

is a paradoxical motion at left chest wall. Crepitation found from palpation at left hemithorax. From the chest X-ray shown haemothorax, pulmonary contusion, multiple ribs fracture at 3,4,5,6,7,8 at the left hemithorax. From head CT Scan found cerebral oedema. Also closed fracture at left 1/3 medial radius ulna and tibia fibula medial. The patients were performed surgery for open reduction and internal fixation of the flail chest. Hospitalized in ICU afterwards, Unfortunately, the patients were died few days later due to intracerebral worsening.

Conclusion: Flail chest which related to pulmonary contusion must be treated immediately. If it is accompanied by severe head injury, it will make the patient's prognosis worse, if we delay the diagnosis and treatment.

Keywords: flail chest, pulmonary contusion, operative stabilization.

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INTRODUCTION

Traumatic thoracic injury is currently the second leading cause trauma-related death after head injury. Specific injuries to the thorax may involve the chest wall, pleura, tracheobronchial tree, diaphragm, lungs, heart, oesophagus, great vessels and ribs, rib fracture are the most common of thoracic injury. Ribs may be fractured bilaterally and hemothorax, pneumothorax or hemopneumothorax may also present, contributing to the development of acute respiratory failure.¹

Flail chest, as defined by the presence of three or more consecutive rib fractures in 2 or more places characterized by paradoxical motion of flailing chest wall. Flail chest is a life-threatening injury and related mortality ranges from 20% to 30%.² Flail chest represent high energy chest trauma with significant morbidity and mortality and associated injury directly related to flail chest is pulmonary contusion.^{1,5} Pulmonary contusion in turn is the most common injury in blunt thoracic trauma, occurring in 30% to 75% of all cases.³

According to the severity, the management of flail chest is varies. There is growing evidence that surgical stabilisation is a preferred option due to its advantages of shorter mechanical ventilation time

and reduced complications caused by mechanical ventilation. Despite of its cost, surgical fixation should be recommended for treating appropriate flail chest patients.²

CASE REPORT

A 69-year-old women was referred from the rural hospital to the Dr. Zainoel Abidin General Hospital (RSUZA) emergency room with chief complains of unconsciousness since 3 days ago. Patients had a motorcycle crush accident and loss of consciousness after the event.

From primary survey, we found airway is clear, patient still have a spontaneous breathing but there was a paradoxical motion at left chest wall, blood pressure was 130/80 mmHg and there was neurologic deficit. Patient was performed endotracheal tube because a decrease of oxygen saturation.

Physical examination found crepitation and ronchi at left hemithorax. There were a swelling, wound and crepitation and deformity at left antebraichial and left cruris. This patient has an anaemia, leukocytosis, diabetes mellitus and hypokalemia condition were found in the laboratory results

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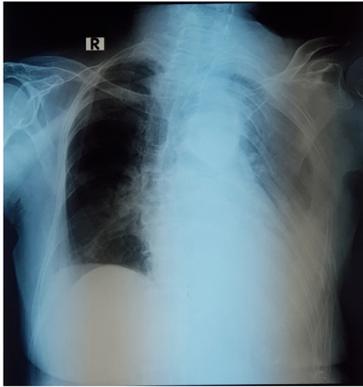


Figure 1. Thorax X-ray showed massive opacity the multiple rib fractures on the left chest

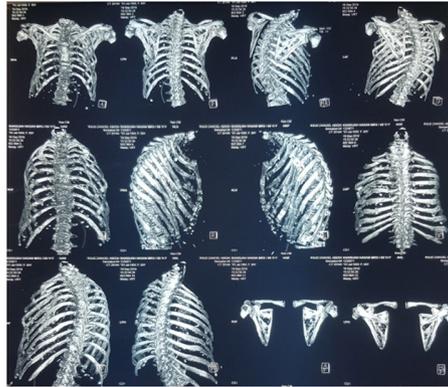


Figure 2. Thorax 3D CT-Scan showed multiple segmental ribs fracture

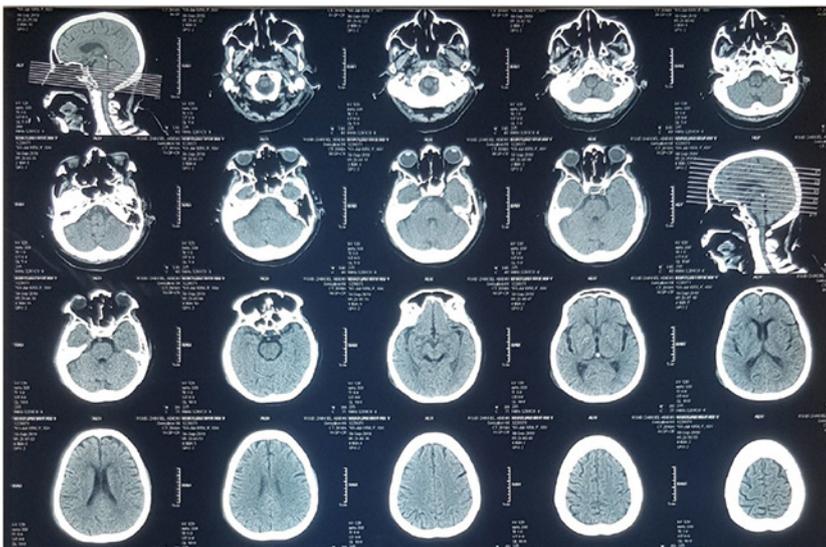


Figure 3. Head CT-scan showed oedema cerebri



Figure 4. Left antebrachii X-ray showed fracture on the 1/3 left medial radius ulna bone



Figure 5. Left Cruris X-Ray showed fracture on the 1/3 medial tibia fibula bone

From the chest X-ray found haemothorax, pulmonary contusion, multiple ribs fracture at 3,4,5,6,7,8 left hemithorax. Patient was subsequently taken to CT scan for imaging which revealed significant chest wall deformity with multiple segmental fractures, from head CT-scan found cerebral oedema, and then closed fracture at left 1/3 medial radius ulna and tibia fibula medial.

Emergency left chest tube was performed, revealed 800 ccs of blood. Transferred to ICU and performed surgery for open reduction and internal fixation of costae and blood transfusion on the next day. The prognosis of these patients is not very good and after undergone operative procedures, the patients were died few days later due to intracerebral worsening.

DISCUSSION

This case report presents a woman who had a motorcycle crush accident and loss of consciousness after the event. The unconsciousness could happen because of head injury from this patient and another proof from head CT-scan that shows cerebral oedema.

Another problem that matter is a paradoxical motion of chest wall. Paradoxical chest wall could happen because of flail chest that is defined as three or greater consecutive ribs fractured in two places, with or without sternal component.^{4,6} This affected segment is in discontinuity with the rest of the chest wall, leading to collapse on inspiration and expansion upon expiration. Flail chest is a life-threatening injury and has a mortality rates ranges from 20% to 30% and related to pulmonary contusion. In this case, from Thorax X-ray and CT-scan, we found pulmonary contusion.^{7,8} Associated pulmonary contusion can further complicate patient conditions.

The mortality rate for the combination of flail chest and pulmonary contusion is in excess 40 per cent compared with a mortality rate of 16 per cent for blunt thoracic injury alone without pulmonary contusion.^{1,2} The most common ribs that fracture with blunt trauma are the fourth through the ninth, which are also the ribs involved with flail chest. In this patient we found from Thorax X-ray there is a ribs fracture at 3,4,5,6,7,8 left hemithorax.

There are a lot studies compare surgical vs non-surgical indications for flail chest but no global guideline or consensus on surgical indications for flail chest. Some of the large numbers of studies give recommendations for surgical treatment that can allow a better recovery.^{3,5} In this patient was performed an open reduction and internal fixation (ORIF) of costae. The surgery for radius-ulna fracture and fibula-tibia fracture at regio sinistra is

planning after the ORIF costae.

Unfortunately, from the beginning this patient is referred from the rural hospital with a bad condition. We know the patient was about three days at the rural hospital and there was no definitive treatment that given to the patient and three days in between the rural hospital just give a medicine before referred to the main hospital. We know there must be a treatment for stabilizing the patients before the patient referred or if the hospital didn't have proper tools, the patient can be transferred immediately.

CONCLUSION

Flail chest which related with pulmonary contusion must be treated immediately. If it is accompanied by severe head injury, it will make the patient's prognosis worse, if we delay the diagnosis and treatment.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding this study.

FUNDING

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AUTHOR CONTRIBUTION

All authors are contributed equally to the content of the study, including data gathering, statistical analysis and data synthesis.

ETHICAL STATEMENT

Patient and their relatives have been agreed and signed an informed consent regarding publication of the patient's receptive medical data in the journal article.

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