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Published by Intisari Sains Medis

Left scapulothoracic dissociation with floating shoulder and grade IIIC open left clavicle fracture with Ideberg type III scapula fracture: a rare case report



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Received: 2020-12-10

Accepted: 2021-03-19

Published: 2021-04-01

ABSTRACT

Background: A high-energy trauma can cause fractures involving clavicle, scapula, and scapulothoracic dissociation with floating shoulder and vascular injuries. Early and correct diagnosis of fracture with vascular injury should be performed to prevent the patient from mortality. This case report aims to evaluate the left scapulothoracic dissociation with floating shoulder and grade IIIC open left clavicle fracture with Ideberg type III scapula fracture.

Case Presentation: A 19 years old male was on a motorcycle-truck accident which was diagnosed with

a rare left scapulothoracic dissociation with floating shoulder and grade IIIC open left clavicle fracture with Ideberg type III scapula fracture. The patient underwent arteriography, repair of the vascular injury, and open reduction internal fixation for the fracture.

Conclusion: A rare and complex case of scapulothoracic dissociation with floating shoulder and traumatic subclavian artery injury and clavicle with scapula fractures require early recognition and a multi-disciplinary approach to manage the injuries.

Keywords: Scapulothoracic Dissociation, Floating Shoulder, Subclavian Artery Rupture, Scapula Fracture, Clavicle Fracture.

Cite This Article: Sugiarto, Y., Winoto, A.R., Shodiq, M.A. 2021. Left scapulothoracic dissociation with floating shoulder and grade IIIC open left clavicle fracture with Ideberg type III scapula fracture: a rare case report. *Intisari Sains Medis* 12(1): 28-31. DOI: [10.15562/ism.v12i1.878](https://doi.org/10.15562/ism.v12i1.878)

INTRODUCTION

High-energy trauma is associated with fractures involving the scapula, clavicle and may cause scapulothoracic dissociation.¹⁻⁴ Scapulothoracic dissociation (STD) is one of the consequences of high-energy trauma with a blunt force to the shoulder girdle and can easily result in rapid mortality.^{4,5} STD is associated with musculoskeletal and neurovascular injuries.⁴ STD can show a rare injury complex called the floating shoulder.⁶ Floating shoulder consists of an ipsilateral fracture of clavicle and glenoid neck.⁵ Patient usually came with massive soft-tissue swelling of the shoulder due to hematoma and edema, instability of the joint, displaced clavicle fracture, and sternoclavicular disruption.⁵ Moreover, the axillary vessels and brachial plexus are commonly injured because of the proximity of STD with a floating

shoulder.⁶

Traumatic Subclavian Artery Rupture (TSAR) is considered an uncommon complication of blunt chest trauma, a prevalence of 2% of all acute vascular injuries.⁷⁻¹⁰ Anatomy of superior mediastinum and thorax is complex and provides protection for subclavian vessels, making the injury uncommon.¹¹ Despite being rare, TSAR is a high cause of morbidity and mortality. TSAR can be detected in the period following trauma or the late period after trauma.¹⁰ The immediate confirmation is needed by angiography or arteriography and continued by recanalization.⁵ In 50% of the case, the injury may be accompanied by a clavicle fracture.¹⁰

Fracture of the clavicle is highly prevalent in young males, with direct fall on the shoulder during sports or accidents

as the most frequent cause.¹² Open fracture of the clavicle is also considered a high-energy trauma.^{1,2} Medial and lateral parts of the clavicle are rarely affected in trauma due to the strong ligaments and muscles securing them.¹² A classification by Gustilo and Anderson has become the most commonly used to classify open fractures.^{2,13} Open injuries were categorized based on wound size, level of contamination, and osseous surgery. Based on the classification, Grade I is an open fracture with < 1 cm long and clean wound; Grade II is an open fracture with a laceration > 1 cm long without extensive soft tissue damage, flaps or avulsions; Grade III is an open segmental fracture or an open fracture with extensive tissue damage or traumatic amputation.² Grade III injuries were further subclassified into A/B/C according to the severity

of soft tissue injury, need for vascular reconstruction, and worsening prognosis.² In a study, Grade IIIC injuries showed a 100% complication rate.²

Scapula fractures were said to be uncommon and the diagnosis may be delayed or ignored.^{3,14} Radiographic imaging holds a critical role in the diagnosis of scapula fractures.¹⁴ A classification of scapula fractures of the glenoid fossa was introduced by Ideberg et al.¹⁴ Ideberg Type III fractures are rarer and challenging, characterized by a transverse fracture line that separates upper one-third to one-half of the glenoid fossa and the coracoid from the rest of the scapula.^{3,14}

A previous study by Leopold and Kim stated that primary asepsis, debridement, immobilization, and wound protection against disturbance and reinfection remain to be the underlying principles in treating open fractures.² The goals of fracture treatment are to prevent infection, promote fracture healing, and restore function.² Open Reduction Internal Fixation (ORIF) has been a gold standard in treating open clavicle and scapula fractures.^{2,14}

Based on those mentioned above, this case study aims to describe a 19 years old male patient who suffers from a left STD with floating shoulder and grade IIIC open left clavicle fracture with Ideberg type III scapula fracture and the multi-disciplinary management of the complicated case.

CASE REPORT

A 19-year-old male patient was brought to Kariadi General hospital's emergency room after an accident three days before. He had been brought to Batang General Hospital and was said to have blood vessel injury and then referred to Pemalang General Hospital, referred to Kariadi General Hospital. He complained of pain in his left arm two days ago. The patient was on a motorcycle-truck collision accident and was fainted at that time but did not vomit. He did not remember how he fell down. The initial condition of the patient can be observed in [Figure 1](#).

On the objective examination, the patient was in moderate pain and compos mentis. The blood pressure was 120/80 mmHg on the right arm but undetected on the left arm. Radialis artery pulse was



Figure 1. Initial condition of the patient on the emergency room of Kariadi General Hospital.

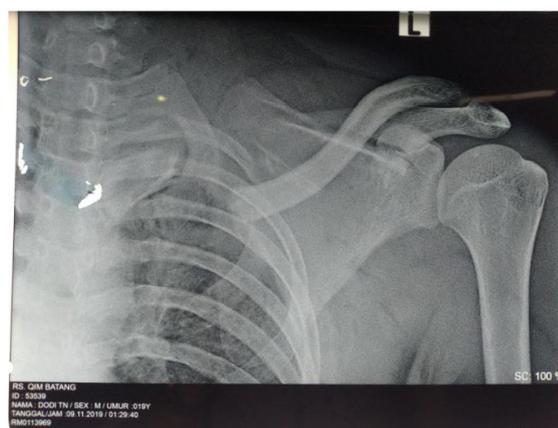


Figure 2. X-ray of chest and left shoulder of the patient after an accident. Discontinuity of 1/3 medial left clavicle bone, alignment was not good; Discontinuity of superior margo of left scapula; Both indicated fracture of 1/3 medial left clavicle and superior margo of left scapula.

80 times/minute on the right arm and was pulseless on the left arm.

The left clavicle's local status showed that the skin had been sutured but showed a discontinuity and still edematous. The clavicle was painful on palpation and crepitation was difficult to assess. The left upper extremity did not show any deformity, was warm on palpation and had a positive range of motion of the left fingers. Oxygen saturation on the first finger was 96%, the second finger 98%, the third finger 96%, the fourth finger 97%, the fifth finger 98%. On the radiographic examination, discontinuity of unaligned 1/3 medial left clavicle bone and

discontinuity of superior margo of the left scapula was observed ([Figure 2](#)). Further assessment showed discontinuity of left subclavian artery with medial punctum separated with distal punctum by 11cm with a collateral vascular appearance, which can be interpreted as a rupture of the left proximal subclavian artery and collateral in the distal. The patient was diagnosed with left STD with floating shoulder and TSAR and grade IIIC open left clavicle fracture with Ideberg type III scapula fracture.

The patient was given 1.5 gram of ampicillin-sulbactam/8 hours intravenous, 80 mg gentamycin/12 hours intravenous,

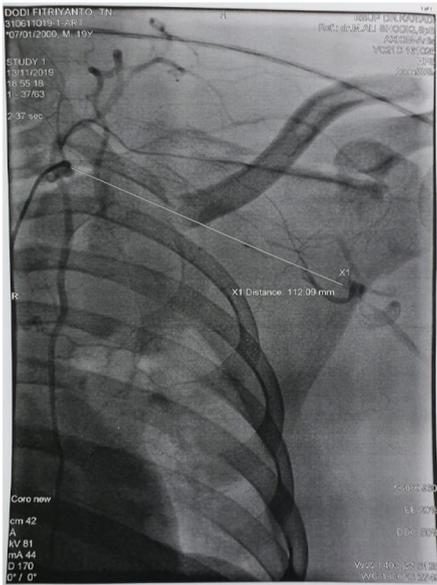


Figure 3. An X-ray showed discontinuity of the left subclavian artery with medial punctum separated with distal punctum by 11cm with collateral vascular appearance.



Figure 4. Post-surgery X-ray showed the internal fixation with plate and screw in the 1/3 medial left clavicle. Soft tissue swelling on the left shoulder was also observed.

1 ampoule of Methycobalamin/8 hours intravenous, 30 mg Ketorolac/8 hours intravenous. Arm sling for the left arm was maintained in this patient, and arteriography was scheduled. Left clavicle ORIF and shoulder reconstruction with left subclavian artery repair was planned.

One day after admitted to Kariadi General Hospital, the patient underwent arteriography of intrathoracic vessels. The arteriogram showed total occlusions

/ rupture of distal and proximal left subclavian artery. Following the arteriography was the repair of left subclavian artery by Thoracic and Cardiovascular Surgeon. A day after it, the open reduction of fracture with internal fixation surgery was done by Orthopaedic surgeon. Plate and screws were mounted on the left clavicle and scapula to fixate the fracture. The left subclavian artery injury was repaired and sutured with prolene 6-0 with minimal bleeding. The operation went well and the patient was sent back to the ward. X-ray image after the surgery showed screws and plate along the scapula and clavicle. Patient came home six days after surgery and was scheduled for a week control to the outpatient unit. The patient has been informed and advised to come for control a week after coming home, but until now the patient has not come to the outpatient unit for the control and was difficult to reach. The patient and the family has agreed and gave consent for his case to be studied and reported.

DISCUSSION

The above case presents the injuries of 19 years old male patient involved in a motorcycle and truck accident. This case presented STD with floating shoulder and TSAR together with the grade IIIC open left clavicle fracture with Ideberg type III scapula fracture. It is a combination of rare and difficult injuries as a result of high-energy trauma.¹⁵

As seen in the patient’s objective examination, the hematoma and edema on the patient’s left shoulder and the signs of clavicle and scapula fracture were the signs leading to STD and floating shoulder diagnosis.⁵ The absence of pulse on the left arm was essential and should be taken seriously as a sign of subclavian artery injury.¹⁶ Ecchymosis over the left clavicle may be the sign of the TSAR and seen in this patient. The subclavian injury appeared to be caused by the trauma of adjacent bony structures such as the clavicle, as stated in previous studies.^{9,10}

As the patient made it alive to the emergency room, he underwent arteriography immediately to confirm any vascular injury, as had also been stated by Girdwood et al., and continued by vascular injury treatment.⁹ There is a

list of examination criteria by Sturm and Cicero as follows, first rib fracture, low or no radial pulse, palpable hematoma in supraclavicular area, mediastinal mass in chest image, hematoma in the lung, and brachial plexus palsy, as some were also found in this patient.¹⁰ ORIF by the orthopedic surgeon was indicated for the open fracture as stated in previous studies and was done in this case to fixate the clavicle and scapula.^{2,14} A multi-disciplinary approach treatment should be well implemented to treat the patient with a complicated case.

CONCLUSION

This case highlighted a complex and rare case of left scapulothoracic dissociation with floating shoulder and traumatic subclavian artery rupture together with rare type of grade IIIC open left clavicle fracture and Ideberg type III scapula fracture, which require early recognition and the multi-disciplinary team of thoracic and cardiovascular surgeon and orthopedic surgeon to manage the injury. Due to the complicated and extensive injury, the patient should be advised and educated to do a routine control and a minimum of 2 years of follow-up. Despite this study’s limitation due to no patient control data, the study can serve as a report for future learning of the diagnosis and the management of this rare case.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

FUNDING

This case report received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ETHICAL STATEMENT

The authors state that the writing of this study has received the consent of the patient and family to be used as written case report and a learning for the other clinicians. The authors will preserve patient’s privacy and confidentiality. The authors certify that they have no commercial associations that might pose a conflict of interest regarding the submitted study.

AUTHOR'S CONTRIBUTIONS

YS wrote the manuscript with support from ARW and MAS. All authors read and approved the final manuscript.

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