Surgical treatment of dislocated fracture of the scapula column and glenoid: A 22-year follow-up

Desimir Mladenović, Marko Mladenović, Predrag Stojiljković, Ivan Micić, Saša Karalejić
Clinic of Orthopaedics and Traumatology, Clinical Center Niš, Niš, Serbia

Abstract

Introduction. Most scapular fractures are caused by high-impact blunt injuries, often as the result of motor vehicle accidents, fall from height, etc. In 80% to 90% of cases, scapula fractures are associated with multiple injuries (clavicle fracture, rib fractures, humeral fracture, pulmonary injury, brachial plexus injury). Case report. We presented scapular fracture in a 27-years-old male who had sustained a work-related injury when a ground soil brick machine pressed him. Fracture line was identified on radiotherapy and computed tomography scan from the distal scapular angle enclosing scapular neck. The whole lateral part of the scapula was dislocated laterally from the scapular body. Scapular fracture was treated operatively. The posterior approach was used for reposition, while for fixation after reposition we used two Blunt clamps. We presented functional outcome 22 years after the injury and the surgical treatment. The patient can perform all physical activities, still works, and there is no need to remove the osteosynthetic material as it causes no discomfort nor problems. The strength of the shoulder muscles is estimated as physician as the grade 5.

Conclusion. Displaced intra-articular fractures of the scapula should be treated operatively, with open reduction and internal fixation.

Key words: scapula; thoracic injuries; wounds and injuries; orthopedic procedures; recovery of function.

Introduction

The scapula is flat and triangular bone located at the posterior-upper chest and is well protected by the chest wall and muscle mass. Scapula fractures are rare, accounting for less than 1% of all fractures and 3–5% of fractures involving the shoulder. Most scapular fractures are caused by high-impact blunt injuries, and often are the result of motor vehicle accidents, falls from height etc. In 80% to 90% of cases, scapula fractures are associated with multiple injuries (clavicle fracture, rib fractures, humeral fracture, pulmonary injury, brachial plexus injury). Scapula fractures are usually treated nonoperatively, while displaced intra-articular fractures of scapula should be treated operatively, with open reduction and internal fixation.

Case report

A 27-year-old male sustained a work-related injury when a ground soil brick machine pressed him. Clinical and
radiological examinations (radiography, computed tomo-
graphy) showed the fracture of the body of the right scapula
and glenoid, and of the third and fourth ribs; on the right side
hemopneumothorax appeared, which was accompanied by
traumatic shock. Neurological examination revealed para-
esthesia of the brachial plexus resulting from compression. Ra-
diography of the right shoulder showed a fracture line start-
ing from the lower third of the glenoid over the column of
the scapula, along the external edge of the shaft to the lower
angle. According to the classification of glenoid fractures by
Ideberg et al. 12, it was type V fracture, i.e. its special varia-
tion as the fracture line goes to the lower scapula angle. The
lower third of the glenoid was 4 cm from the upper part, the
dislocation decreased towards the top of scapula and the
fracture line without dislocation was visible on the edge
(Figure 1).

The fractured part of the glenoid and the column of
scapula were moved forward and downward, leaning against
the surgical neck of humerus. This was the reason of the re-
sistance when trying to perform adduction of the arms – this
is why the hand was positioned in 30° abduction and external
rotation of 10°. This position was the result of the humeral
neck leaning against the detached part of the glenoid which
represents the obstacle for performing arm adduction.

Before admission, we undertook the reanimation meas-
ures and management of traumatic shock and hemopneumo-
thorax. The attempted orthopedic reposition – arm traction
and loosening the contact between the humeral neck and de-
tached part of the glenoid failed. Forced abduction was
maintained, as well as paresis of the brachial plexus.

Six days after sustaining the injury the open reduction
and fixation of the right scapula column was performed by
applying the Judet posterior approach. After sedation and
intubation, the patient was placed in the lateral position and
the inverted L-incision was performed – vertical cut along
the external scapula edge and horizontal edge along the col-
umn of the scapula (Figure 2).

After cutting the deltoideus muscle attachment we
reached the infraspinatus muscle which was further partly
detached from the attachment in the fossa infraspinatus. We
further reached m. teres minor, then caput longum m. triceps
brachii which was located under the shaft of teres m. teres
minor, m. infraspinatus was attached to the scapula column.
The attachment of m. teres minor was also cut to enable a
better approach to the column of the scapula. A particular
attention was paid to the nerves and the vascular elements,
i.e. a. and n. subscapularis taking care of a. circumflexa hu-
eri, a. circumflexa scapularis, as well as n. axillaris which
passed under the m. teres minor.

After reaching the fractured area, 90° arm abduction
was performed as well as the traction which loosened the
head and neck of the humerus and prevented their exerting
the pressure on the detached part of the glenoid. Thus, a
space was provided for the reposition of the glenoid and the
column of scapula, taking care not to cause fracture of the
scapular body. After the reposition of the glenoid we placed
two Blaunt clamps in the massive column of the scapula,
close to the glenoid (Figure 3).
Suturing of the lower part of the posterior articular capsule was also done. A drain was inserted into the operative wound and Desault's bandage was used for the right shoulder – the patient was advised to wear it for three weeks. Three days after the operation, arm paresthesia disappeared. Three weeks later, physical therapy began, lasted two months, and soon after the patient began to work.

Twenty-two years after the operation, clinical examination was performed as well as radiography of the right shoulder which showed the two Blaunt clamps in the column of the scapula, immediately along the edge of the glenoid. There were no radiological signs indicating arthrosis of the shoulder joints and periscapular ossification, and the fracture healed. Disabilities of the arm, shoulder and hand score (DASH) was 7.5, while Constant and Marley Score was 91. In both left and right shoulder joints there was a full scope of movements, without pain (Figure 4). The patient could perform all physical activities, still worked, with no need to remove the osteosynthetic material as it caused no discomfort nor problems. The strength of the shoulder muscles was estimated by the physician as the grade 5.

Discussion

Owing to being protected by the chest wall and muscles of the shoulder belt, scapula fractures are rare, accounting for less than 1% of all bone fractures. Fractures are usually caused by high-impact blunt traumas and usually occur concomitantly. These fractures are commonly associated with the fractures of clavicula, resulting in the phenomenon of the “floating shoulder”. The degree of dislocation and the scope of ligament lesions strongly influence the decision whether to perform the osteosynthesis of the clavicula or not, and thus indirectly shorten the column of the scapula and attain the shoulder stability. Scapula fractures are usually associated with hemopneumothorax, which was diagnosed in the presented patient, as well, while damage of the pulmonary parenchyma caused by the fragments of a fractured scapula is not so common. Disruption of the brachial plexus is also possible, as reported here.

Intra-articular glenoid fracture is very rare and results from high-intensity trauma.

There are different types of scapular fractures: fractures of the scapular shaft, neck of the scapula, glenoid rim, glenoid fossa, apophyseal fractures (coracoid, acromion, spina scapulae) and combinations of these types of fractures. Traditionally, scapular fractures are treated conservatively. Indications for surgical treatment are: intra-articular displacement greater than 5 mm, fractures of the glenoid rim associated with dislocation or subluxation of the humeral head, unstable fractures of the scapular neck, severity of displaced apophyseal fractures and floating shoulder.

Types IV and V glenoid fractures lead to the dislocation of fragments, and the fracture line, over the scapula column, affects the scapula shaft, as well. These types of fractures require open reduction and internal fixation, aiming to achieve an ideal reposition of the articular surface, i.e. the scapular glenoid. With the reposition of the glenoid and the scapular column, the reposition of scapular shaft fragments is also achieved.

The surgical procedure included humerus traction. We managed to move the humeral head from the fracture cavity, thus providing the ground for proper reposition of the glenoid and scapular column and placing the Blaunt clamps on the column of the scapula, just along the edge of the glenoid. We attained normal anatomic and biomechanics’ ratio in the glenohumeral and scapulothoracic joints, while the ratio in the acromioclavicular and sternoclavicular joints did not change in the initial injury incident, which provided for quicker recovery and regaining of the full function of the injured shoulder joint.

The literature rarely describes cases of the scapular spine nonunion, as well as the heterotopic ossification along the lateral edge of the scapula. In this case, radiography shows healing of the scapular body, spine and glenoid, but also the absence of the heterotopic ossification.

Conclusion

Displaced intra-articular fractures of the scapula should be treated operatively, with open reduction and internal fixation.
REFERENCES


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