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Original Research Article

A study of the role of locking plates in management of fracture of scapula in adults at tertiary health care center

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ABSTRACT

Background: This study aimed to evaluate the functional outcome of displaced scapular neck, glenoid and body fractures treated by open reduction and internal fixation by locking plate.
Materials and Methods: In this study 10 patients of scapular fracture (neck, glenoid and body) were treated with locking plate at Dr. Hedgewar hospital, Aurangabad from January 2014 to December 2020 with age from 18 to 60 years. Functional outcome was evaluated by Constant-Murley scoring system.
Result: Total 10 patients were included in present study. Mean age of the patients was 44.9±11.06 years. Male patients (80%) were common than female patients (20%). Road traffic accident (80%) was most common mode of injury. In fracture type distribution, neck and body of scapula (90%) fracture was most common. Assessment of shoulder function was done using Constant and Murley scoring system. Good function was noted in 80% patients, followed by excellent function in 10% patients and fair function was noted in 10%.
Conclusion: Open reduction and internal fixation of displaced scapular (neck, glenoid or body) fracture with locking plate provides good functional outcome.

1. Introduction

The scapula has an important part in working of the arm. It sits perfectly against the ribs and stabilizes the upper extremity against the thorax. It also connects the upper extremity to the axial skeleton through the glenoid, the acromioclavicular joint, the clavicle, and the sternoclavicular joint. Fracture of the scapula occurs rarely, the prevalence being 3% to 5% of all shoulder girdle injuries and 0.4% to 1% of all fractures.[1] This low prevalence of scapular fractures may be due to the scapula's thickened edges, its great mobility with recoil, and its position between layers of muscle. The mean age of patients with fracture of the scapula is 35 to 45 years. Scapula fractures are uncommon fractures to the shoulder girdle associated with high energy trauma, associated lung or head injury, and increased injury severity scores.[2] Diagnosis can be made with plain radiographs. CT studies are helpful for understanding fracture geometry and for surgical planning. Treatment is generally conservative with shoulder immobilizer. Surgery is indicated for intra-articular fractures, displaced scapular neck, body fractures, open fractures, and those associated with unstable glenohumeral joint.

2. Materials and Methods

In present study patients with fractures of scapula were treated surgically with locking plate at Department of Orthopaedics, Dr. Hedgewar hospital, Aurangabad. Study

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was conducted between Jan.2014 to Dec. 2020.

Institutional ethical committee approval was taken.

2.1. Inclusion criteria

Patients 18-60 years age, with acute, closed, displaced scapular neck, glenoid and body fractures, fit for surgery.

2.2. Exclusion criteria

1. Patients with open fractures, Acute infection, Pathological fractures, and old fractures.
2. Not willing to participate or follow up, lost to follow up.
3. Patients managed conservatively for other medical reasons.
4. Non-union and delayed union.

A written informed consent was taken from all patients. Detailed history, clinical examination, routine investigation, pre-anesthetic check was done. X-ray of scapula true AP, scapular Y and axillary lateral view was taken. 3D CT was done for better understanding of fracture geometry and surgical planning. Indication for surgery were 1) > 5mm of glenoid articular surface step off or major gap, 2) displaced scapula neck fracture with > 40 degrees angulation or 1 cm translation and 3) floating shoulder.

All patients were operated with modified posterior approach for exposure of all the fracture sites under general anaesthesia. 3.5 mm and 2.4 mm locking plates were used for fracture fixation.[3]

Diagram showing the sequence of reduction of a displaced fracture of the glenoid, neck and body of the scapula. The reduction process starts with the placement of a Schanz pin in the body of the scapula and a traction in the caudal direction is performed to correct the length of the lateral border of scapula. Two holes are made with a 2.5-mm drill bit on each side of the medium border of the scapula and a pointed clamp is used for medium border reduction. Finally, a bone hook is used to pull the glenoid piece medially in order to achieve reduction. Fracture reduction is maintained with provisional k- wires or miniplates.[3]

Standard postoperative care was provided to all patients. Postoperatively, all patients were immobilized in universal shoulder immobilizer. Postoperative x-rays were taken to assess the fracture reduction. Pendular exercises and assisted and passive, active movements were started from the third postoperative day. Rotation exercises were started after 2 weeks. Assessment of shoulder function was done using Constant and Murley scoring system at four months. Follow up was kept till 4 months. Data was collected and statistical analysis was done using descriptive statistics. The qualitative variables were expressed in proportion and quantitative variables were summarized by mean and standard deviation.

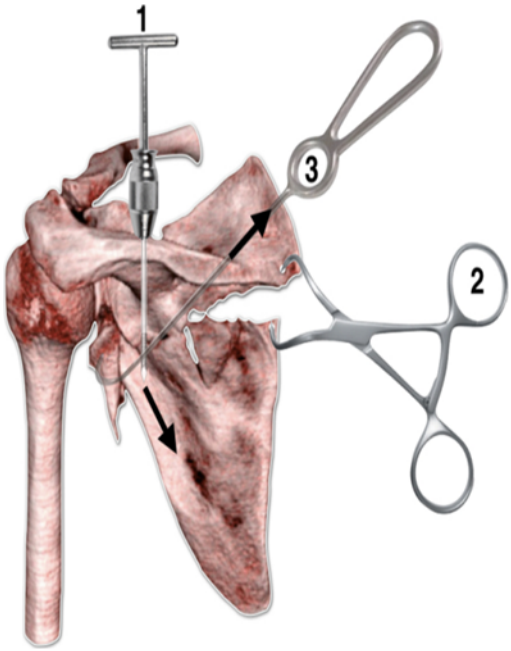

Fig. 1:

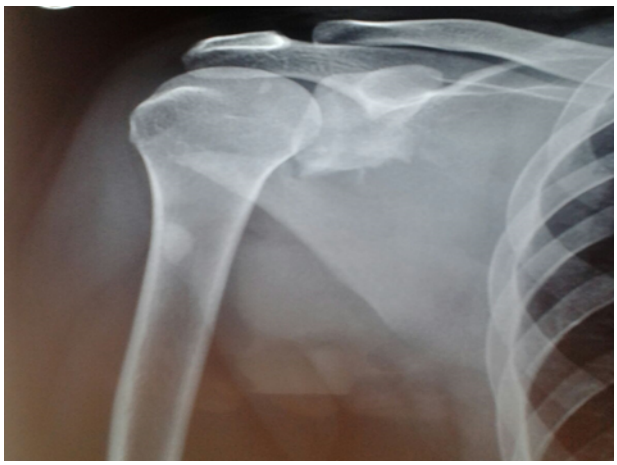

Fig. 2: X-ray pre-operative

3. Results

Total 10 patients were included in present study. Mean age of the patients was 44.9±11.06 years. Male patients (80%) were common than female patients (20%). Road traffic accident (80%) was most common mode of injury. In fracture type distribution, neck and body of scapula (90%) fracture was most common.

Assessment of shoulder function was done using Constant and Murley scoring system. Good function was noted in 80% patients, followed by excellent function in 10% patients and fair function was noted in 10%.

There was no surgical site infection, no malunion or nonunion. One patient having glenoid and neck fracture had

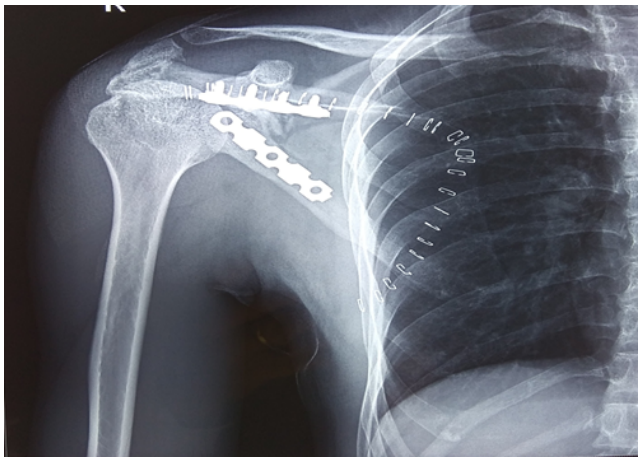

Fig. 3: X-ray post-operative

Fig. 4: X-ray pre-operative

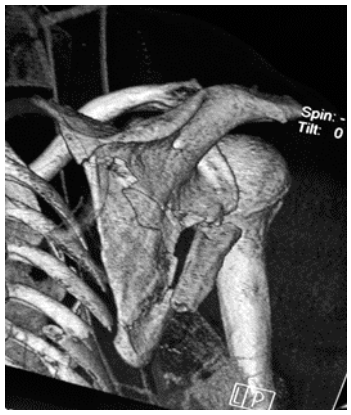

Fig. 5: Pre-operative CT scan

Fig. 6: X-ray post-operative

Fig. 7: Pre-operative CT scan

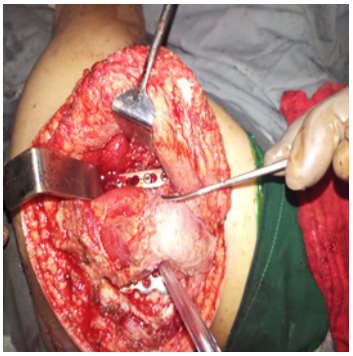

Fig. 8: Intra-op picture

Table 1: Distribution of patients according to age-group

Age-Group	No. of patients	Percentage
≤30 years	01	10.0
31-40	02	20.0
41-50	04	40.0
51-60	03	30.0
Total	10	100%
Mean±SD	44.9±11.06 years	

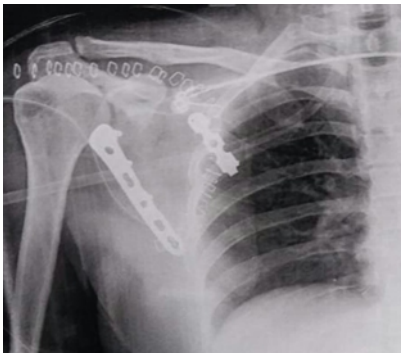

Fig. 9: Postop X-ray

Table 2: Distribution patients according to gender

Gender	No. of patients	Percentage
Male	08	80.0
Female	02	20.0
Total	10	100%

Table 3: Distribution of patient according to fracture type

Fracture Type	No. of patients	Percentage
Neck & Body	09	90.0
Glenoid & Neck	01	10.0
Total	10	100%

Table 4: Distribution of patients according to constant murley score

Constant Murley Score	No. of patients	Percentage
Excellent [100—90]	01	10.0
Good [80—89]	08	80.0
Fair [70—79]	01	10.0
Poor [00-70]	00	00
Total	10	100%
Mean±SD	84.4±4.86	

stiffness. There was no implant failure in our series.

Table 5: Distribution of patients according to complications

Complications	No. of patients	Percentage
Stiffness	01	10.0
No complication	09	90.0
Total	10	100%

4. Discussion

Treatment of scapular fractures remains challenging. Although most scapula fractures can be managed safely with conservative treatment, care should be taken not to miss the opportunity to correctly indicate surgical treatment in selected cases.[3]

Fractures of the scapula are uncommon and occurs following high-energy trauma.[2] Fractures may occur in one or more parts of the scapula, namely the scapular body (50% to 60% of patients), scapular neck (25% of patients), glenoid, acromion, and coracoid. The adverse scapular anatomy, along with the complexity of the fracture fixation approach, makes treatment challenging even for experienced surgeons. Furthermore, the literature is controversial regarding surgical indications and appropriateness of treatment. Treatment of scapula fractures has changed significantly over the past decade. Although the scapula has a privileged muscular envelope that inadvertently heals most fractures, a scapular malunion can significantly impair the function of the scapula, causing chronic pain, aesthetic deformity, impingement and scapulothoracic dyskinesis.

In the present study, we assessed shoulder function using the Constant-Murley scoring system. Excellent function was noted in 1 (10%) patient, good function was noted in 8 (90%) patients, followed by fair function in 1 (10%) patient.

Bauer G, Fleischmann W, Dassler E. evaluated the outcome in 20 patients with scapular fracture.[4] This showed that thirteen patients had excellent, two patients had a good, four had a fair and one had a poor outcome (according to the Constant- Murley score).[5]

Whereas another study by Giordano V, Du Amaral NP, Soares M, Pallotino A, Albuquerque RP, dos Santos Neto JF, de Souza FS, Miguel Filho GJ showed the outcome of 15 patients.[3] Out of which 13 had a good outcome, 1 had a fair outcome and 1 had a bad outcome.

5. Conclusion

Open reduction and internal fixation of displaced scapular fracture (neck, glenoid or body) with locking plate provides a good functional outcome, allows early mobilization and better patient satisfaction.

6. Conflict of Interest

None.

7. Source of Funding

None.

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