

Surgical versus conservative treatment of intra-articular glenoid fractures

Hesham Hamed Refae

Department of Orthopedics, South Valley University Hospital Qena, Egypt

Corresponding Author: Hesham Hamed Refae, MD Ass. Professor of Orthopedics Surgery.

Address: Aswan 84111 P.O. 33, Egypt. Or Department of Orthopedics, South Valley University Hospital Qena, Egypt

Fax: 002 0965345727- Mob: 00201001200154

Email: hesham_refa@yahoo.com

Abstract: Background: Between 1994 and 2006, twenty two patients with intra-articular glenoid fractures were treated (17 surgically and 5 conservative) and prospectively followed for a minimum of 2 years. **Patients and Methods:** The mean age of patients was 30.4 years and clinical results were evaluated using the Denis scale in 20 available (2 patients from operative group lost their follow-up) patients after a minimum follow-up of 24 months. **Results:** According to Denis scale of pain and work status, 14 patients (93.3%) of the surgical group reported no or minimal pain, while 1 (6.7%) has moderate pain with occasional medication. In the conservative group, only 1 patient (20%) had no pain, 1 patient (20%) had moderate pain, and 3 (60%) reported severe pain with frequent medication. Normal range of motion was regained in all surgically treated patients within 3 months postoperatively and within 6 months in 2 (40%) out of the conservative group, while limitation of movement was observed in 3 (60%) of the conservative group. **Conclusion:** Surgical treatment of displaced intraarticular glenoid fractures usually results in far much better clinical and radiological outcome than conservative management.

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1. Introduction

Fractures scapula are uncommon injuries that frequently present after high-energy trauma. Glenoid fractures are only one third of these injuries [1-4] most of them are minimally displaced and amenable to non-operative treatment. Significantly displaced glenoid neck and glenoid fossa fractures that require operative intervention are exceedingly rare and together represent approximately 1 in every 3,000 fractures [5-6]. Classification of intraarticular glenoid fractures was described by Ideberg on the basis of findings in 100 patients with this type of injury [7]. The aim of this study was to assess the outcome of conservative and surgical treatment of glenoid fractures, as these injuries carry high risk of morbidity

2. Patients and Methods:

Twenty two adult patients presented with intra-articular glenoid fractures, 14 were injured in road traffic accidents and 8 falls from a height. The mean age of the patients was 30.4 years. The male: female ratio was 4:1, and the right: left ratio, 2:3. There was a wide variety of associated injuries in all patients, fractures ribs were the most common (13) followed by pneumothorax (7), spine (4), extremities (3) and head injury (2). After initial assessment, according to ATLS principles, specific radiographic evaluation of the injured shoulder was done as soon as the patient is in a stable condition. This evaluation requires a minimum of two radiographs of the shoulder area that

are perpendicular to each other. Three dimensional CT reconstruction images may be of more benefit in assessment [8]. 17 Patients underwent operative management at a mean of 10 (5-21) days after injury. In 5 patients who required ventilation for the management of a haemopneumothorax, surgery was delayed for 21 and 24 days. Five patients who required ventilation for haemopneumothorax were contraindicated for surgery were conservatively managed during the same time period constituted a control group. Parameters such as pain, range of movement, performance of daily activities and return to pre-trauma activities were used for functional outcome assessment. Based on imaging and operative findings in this series, it seems that Ideberg glenoid fracture classification have underestimated the extent of scapular body involvement and failed to provide any consistent guidance for choosing a surgical approach. This applies to the original, widely accepted work by Ideberg, [8] and variation of his scheme by Goss [9]. For these reasons, this series was subgrouped according to Mayo and *et al.*, [10] reorganization which subgrouped Ideberg. Choice of surgical approach is dependant on fracture pattern. Type I & II fractures are operated on via a standard detopectoral approach. This is performed with the patient in beach chair position with the arm draped free. To obtain adequate exposure, the entrie subscapularis muscle and anterior capsule are released from the lesser tuberosity, leaving an adequate cuff for anatomic

reattachment. The pull of long head of the biceps at the supraglenoid tubercle and the conjoint tendon at the coracoid tip must be counteracted in Type II patterns. Fracture reduction is achieved by manipulation with a Kirschner (K) wire or small schanz screw joy stick and a dental pick. Temporary wire stabilization is replaced by small fragment (2.7 mm or 3.5 mm) cortical screw fixation. It may be necessary to place these screws with a nonlagged technique because of exposure restrictions on trajectory.

Types III, IV, and V injuries require a posterior approach to deal effectively with the inferior articular fragments and extensions of the fracture pattern into the body. A limited prone approach through the infraspinatus teres minor interval may provide adequate access for the thin patient with a simple Type III [2]. The approach described by Judet [9] ,and its modification [10], are used for all other Types III,IV,V patterns and also combined with deltopectoral approach and its optimum .Small fragment lag screw fixation of the reduced joint surface is usually possible and frequently can be achieved through a low profile plate along the lateral column. Some patterns may warrant additional fixation along the base of the spine and medial column. Closure is anatomic and requires meticulous reattachment of the posterior deltoid, often through drill holes in the spine. Type V patterns, which involve separate large coracoid or superior articular surface components, may require a simultaneous deltopectoral approach in some cases. Lateral positioning in these more complex patterns enables a second approach when needed to achieve a satisfactory reduction. We choose surgical approach on the basis of injury patterns described above. Two patients were operated on through adeltopectoral

approach. One patient was operated on through limited infraspinatus teres minor interval access. Ten patients were treated via a Judet posterior approach. Four patients required combined Judet and deltopectoral approaches. All ipsilateral upper extremity and shoulder girdle injuries were stabilized operatively to facilitate post operative passive motion from second day with active motion restrictions for not less than 8 weeks .Then rotator cuff and deltoid strengthening program.

3.Results:

According to Denis scale of pain and work status, 14 patients of twenty studied patients(2 lost their follow-up) of the surgical group reported no or minimal pain (P1-P2), while 1 (6.7%) has moderate pain with occasional medication (P3). In the conservative group, only 1 patient (20%) had no pain (P1), 1 (20%) had moderate pain (P3), and 3 (60%) reported severe pain with frequent medication (P4). Normal range of motion was regained in all surgically treated patients within 3 months postoperatively and within 6 months in 2 (40%) out of the conservative group, while limitation of movement was observed in the remaining 3 (60%) of the conservative group. Ten manual workers (66.7%) of the surgical group returned to their previous work (W1-2) and five (33.3%) returned to a modified work (W3), whereas two of the conservatively treated patients resumed their previous work (W3-4), three of them (60%) were returned to a modified work (W3).Two patients developed superficial infection that healed completely after drainage and antibiotics of surgically treated group and no major surgical complication was observed.

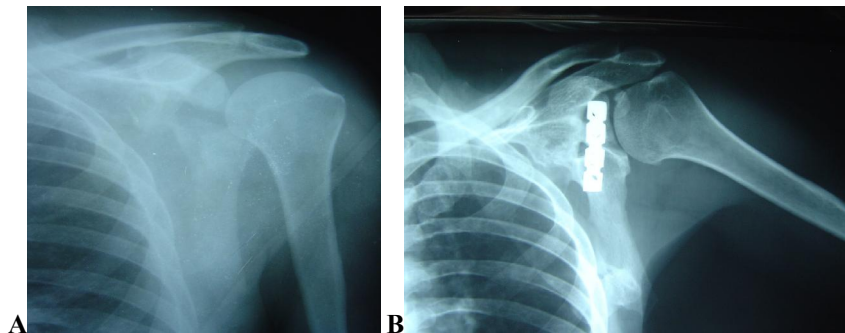


Fig 1: a) Anteroposterior radiographs of a 38-years-old man showing displaced intra-articular glenoid fracture b) After plate fixation and anatomical reduction of the fracture of glenoid fossa.

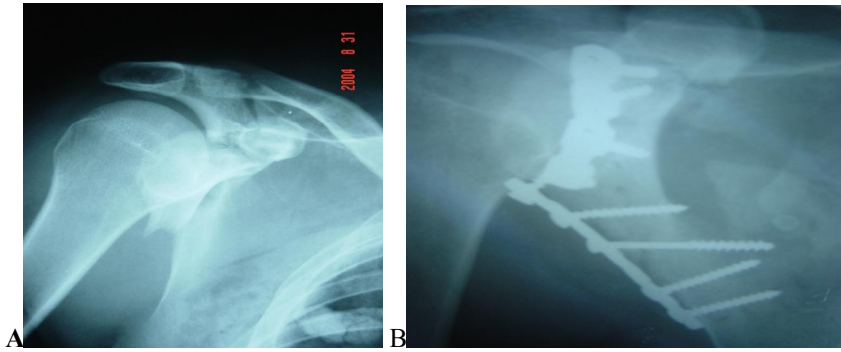


Fig 2: a) Anteroposterior radiographs of a 29-years-old man showing **displaced** intra-articular glenoid fracture with extension of the fracture to the scapular body. **b)** After plate fixation and anatomical reduction of the fracture of glenoid fossa.

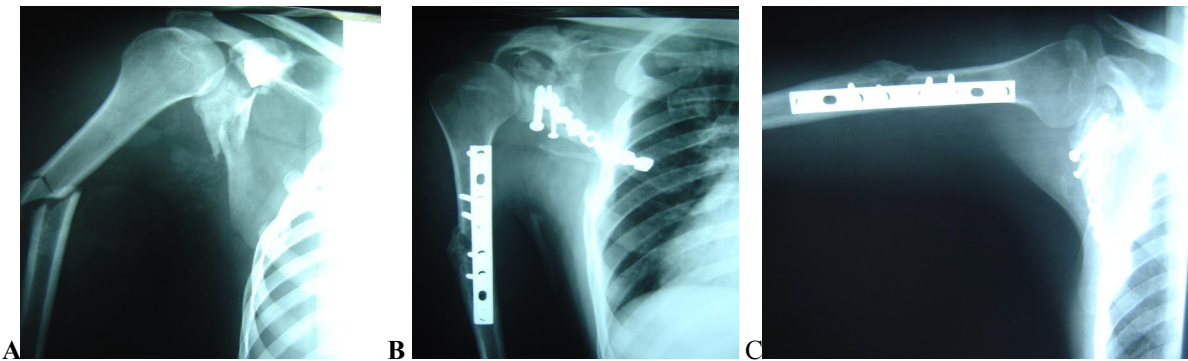


Fig 3: a) Anteroposterior radiographs of a 41-years-old female showing displaced intra-articular glenoid fracture with extension of the fracture to the scapular body and mid shaft fracture humerues. b,c) After plate fixation and anatomical reduction of the fracture of glenoid fossa and humerues.

4. Discussion:

Glenoid fractures are relatively rare and usually caused by high-energy trauma which often produces other associated life-threatening injuries so these injuries are often overlooked or neglected because life-threatening problem usually the focus of attention. Displaced fractures of the glenoid fossa are an uncommon injury plagued by poor outcome when treated non operatively[11]. Previous reports of open reduction and internal fixation have been limited by small numbers and a relatively nonsystematic approach to injury evaluation ,choice of approach, and stabilization[11-15]. High quality three dimensional CT reconstructions are a valuable diagnostic and surgical planning tool [8,11]. The aim of surgical reconstruction is to achieve osseous stability and thus prevent chronic instability and degenerative joint disease. Our indications for surgery were similar to those suggested by Goss (6)

The deltopectoral approach is well known to most orthopaedic surgeons but has limited use for glenoid fossa fractures. Posterior approaches to the

scapula, particularly the most useful exposure described by Judet, [16] are infrequently taught and less frequently used. Combining a usual approaches with complex anatomy of the injured scapula and glenoid represents a major surgical challenge[11]. The choice of implant depend upon surgeon experience and available bone stock. Rigid internal fixation is desirable but an inability to achieve this does not preclude an excellent out come(6) I n our series of surgically treated group we used easily contoured 3.5 mm. reconstruction and one-third plates using the available substantial solid bone stock of scapular neck and lateral border of scapular body. Functional outcome was satisfactory in all surgically treated group comparable to two of conservatively treated group.

Conclusions:

Surgical treatment of displaced intra-articular glenoid fractures usually results in far much better functional outcome than conservative management as it avoids post-traumatic instability and degenerative

joint disease but it demand experience and thorough knowledge of anatomical approaches,adequate surgical conditions with strict asepsis and post-operative rehabilitation programme. Operative indications, therefore,donot dependent solely on the pattern of fracture.

Corresponding author

Hesham Hamed Refae,

MD Ass. Professor of Orthopedics Surgery.

Address: Aswan 84111 P.O. 33, Egypt. Or Department of Orthopedics, South Valley University Hospital Qena, Egypt

Fax: 002 0965345727- Mob: 00201001200154

Email: hesham_refa@yahoo.com

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