Trauma Monthly 2025; 30(4): 1525-1529

10.30491/tm.2025.432394.1732

Trauma Monthly

Case Report

Open Reduction and Screw Fixation of Ideberg Type III Glenoid Fractures: A Case Report and Review of Literature

Omid Reza Momenzadeh, MD[1], Armin Akbarzadeh, MD. MPH[2,1], Hamid Arabi, MD[3]

[1] Department of Orthopedic Surgery, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran.

[2] Orthopedic & Rehabilitation Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.

[3] Orthopedic Research Center, Shahid Kamyab hospital, Mashhad University of Medical Sciences, Mashhad, Iran.

***Corresponding Author**: Armin Akbarzadeh, MD, MPH, Assistant professor of orthopaedic surgery, Address: Orthopedic & Rehabilitation Research Center, Department of Orthopedic Surgery, Chamran Hospital, Chamran Boulevard, Fars Province, Shiraz, Iran., Tel: +989173369952; E-mail: armin.akbarzadeh@ymail.com

Received 2024-03-05; **Accepted** 2025-07-25; **Online Published** 2025-08-29

Abstract

Ideberg type 3 glenoid fracture is a rare pattern of glenoid fracture that should be surgically managed in case of displacement. Surgical fixation of such fractures can be applied through an open or arthroscopic approach or under fluoroscopy guidance. Each method has its advantages and disadvantages. We presented a 32-year-old man with a case of an Ideberg type 3 glenoid fracture that was effectively managed by open reduction and internal fixation using a transcoracoid screw. After 25 months of follow-up, the constant score was 85. The University of California, Los Angeles (UCLA) score and the Disabilities of the Arm, Shoulder, and Hand (DASH) were 31 and 15, respectively. He returned to his previous daily activities and was satisfied with the result. Also, we reviewed the previous reports from fractures that were treated using a similar technique.

Keywords: Open Fracture Reduction, Internal Fixation, Bone Screw, Glenoid.

Introduction

Ideberg type 3 glenoid fracture is a rare pattern of glenoid fracture that should be surgically managed in case of displacement. This type of fracture involves the glenoid transversely with superior extrarticular extension medial to the base of the coracoid1. It is associated with injury of the superior shoulder suspensory complex (SSSC), including: distal clavicle, acromioclavicular joint, and acromial process[2]. Various methods are presented in the literature. Some surgeons perform reduction with open technique[2-5] while others use minimal invasive methods under guidance of arthroscopy[6-10] or fluoroscopy[11]. Each method has its pros and cons; thus, there is no consensus regarding the best technique for fixation of glenoid fractures.

In the present study, we are going to present a case of an Ideberg type 3 glenoid fracture that was managed by open reduction and internal fixation using a trans-coracoid screw. We also reviewed previous reports from such fractures that were treated by open reduction and screw fixation.

Case presentation

A 32-year-old man was admitted to the hospital following a high energy motorcycle accident with a car. After the patient's initial management, he was admitted to intensive care unit due to traumatic brain injury. Few days later his level of consciousness increased and examined carefully. He complained from right shoulder pain. Neurovascular examination was intact. X-ray radiography and computer tomography were performed. In imaging a displaced glenoid fracture, Ideberg type 3, and a non-displaced acromion fracture (meta-acromion region) and acromioclavicular injury (Rockwood type II) were seen (Figure 1). The procedure was performed under general anesthesia in a beach-chair position. The surgery site was painted and

draped, and his right arm was left free to facilitate reduction maneuvers. The deltopectoral approach opened the interval between the deltoid and the pectoral major muscles. The subscapularis tendon was split medial to the bicipital groove, and the long head of the biceps was cut. Then, the fracture site was exposed by shoulder capsulotomy. The fracture reduction was performed under direct vision. Then, through a stab incision at the superior aspect of the shoulder, the fracture was temporarily fixed with a K-wire. After checking the position of the screw under the guidance of the C-arm, a number 4.5 cannulated screw and a washer were advanced on the K-wire. After wound irrigation, the subscapularis tendon was repaired, and tenodesis of the long head of the biceps was performed to the adjacent soft tissue. Since the acromion fracture was minimally displaced, we did not fix it. An arm sling and swath were applied for him after surgery. Pendulum exercise of the arm and passive mobilization of the elbow (including supination, pronation, flexion, and extension) were started after 48 hours. A passive shoulder mobilization exercise was prescribed after two weeks. Active shoulder mobilization exercise was gradually started after 6 weeks.

At 25 months, the patients were visited, examined, and radiographic images were taken. The Constant score was 85, and the University of California, Los Angeles (UCLA) score was 31. The Disabilities of the Arm, Shoulder, and Hand (DASH) score was 15. The patient was satisfied with the result and did not report any shoulder pain. Informed written consent was obtained from the patient to publish his medical records.

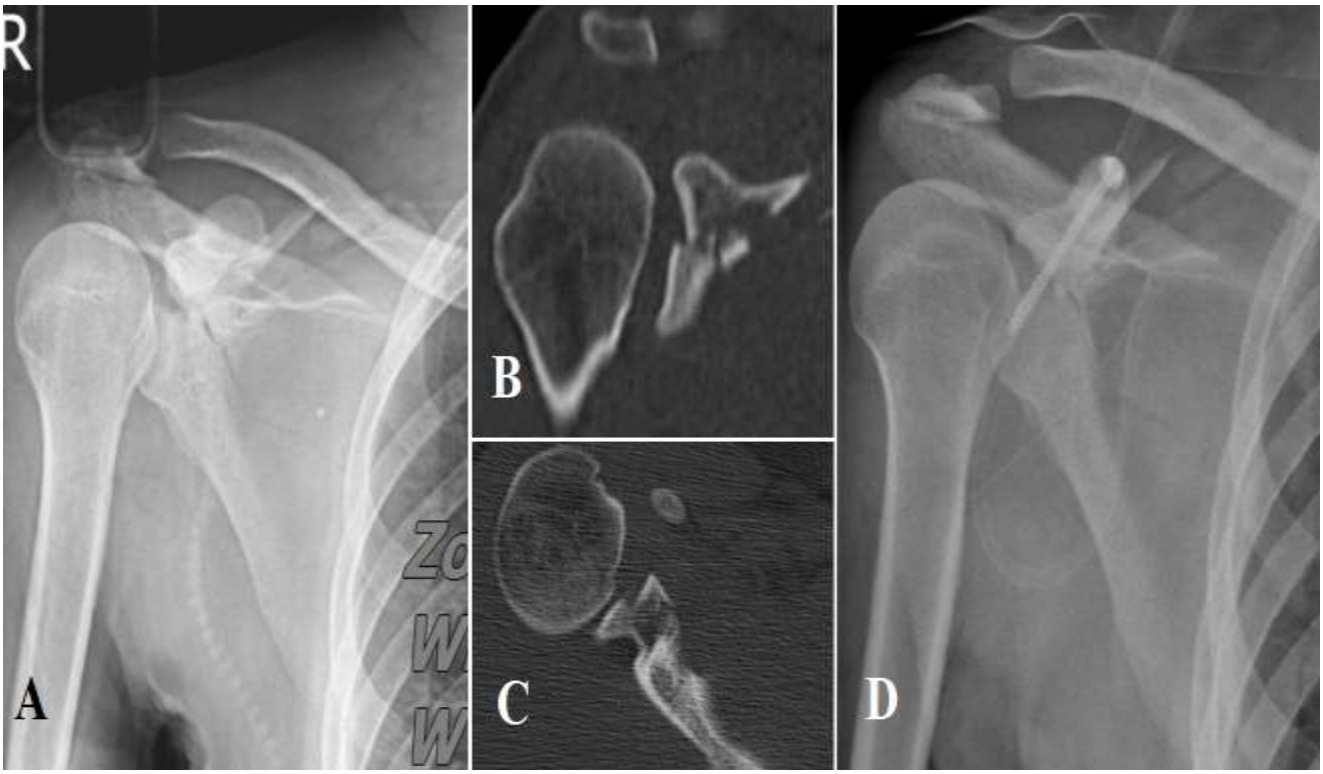

Figure 1: Antero-posterior view of our patient with ideburg type 3 glenoid fracture (A). The coronal (B) and axial (C) views section of glenoid joint show displaced intra-articular fracture. The patient was treated with open reduction and screw fixation through deltopectoral approach (D).

Discussion

Ideberg type 3 glenoid fracture is a rare fracture pattern of the glenoid cavity. However, several case reports or case series are dedicated to its surgical management. The main described surgical techniques for Ideberg type 3 glenoid fractures can be classified as open or percutaneous, whether under arthroscopic or fluoroscopic guidance. Each method has its advantages and disadvantages. Arthroscopic glenoid fracture fixation can be performed with minimal incision and

better cosmesis. Also, less soft tissue stripping in arthroscopic surgery may result in faster recovery and less post-operative pain. However, the surgeon needs to have a high level of expertise in shoulder arthroscopy[6,12,13].

On the other hand, an arthroscopy device may not be available in all trauma centers. Fixation under fluoroscopic guidance increases ionizing radiation exposure. Also, reduction of the joint surface under fluoroscopic guidance is less accurate than reduction under direct vision, which is provided by arthroscopy or arthrotomy[11]. Open reduction of glenoid fracture can be performed via anterior, posterior, superior, or combined approaches. Table 1 reveals the previous reports of the Idberg type 3 glenoid fractures that were treated by open reduction and internal fixation with a screw. Zheng J et al.[4], Kc K et al.[3], and AO R et al.[14] applied a superior approach for fixation. Zheng J et al.[4] presented a case of a middle-aged man with a glenoid fracture and AC joint injury that was fixed with a Y-plate and a transcoracoid screw.

Table 1: The summery of the previous studies that reported open reduction and screw fixation of Ideberg type III glenoid fractures.

Author (year)	Number of cases	Age, mean, years	Sex (M:F)	Side (R:L)	Mechanism of trauma	associated injury	Surgical approach	F/U period, months	outcome
Bauer G et al. (1995)[15]	1	40	1:0	0:1	Kicked by horse	TBI	deltopectoral	-	CS=81/100
Qin H et al. (2013)[16]	10	34.4	8:2	7:3	7 Road traffic accident, 2 falls, & 1 Crush by heavy object	9 AC injury, 4 acromion fx, 1 LT fx, & 1 distal clavicle fx	deltopectoral	24	CS= 84.1 UCLA=33.6 DASH=16.6
Rongguang A et al. (2015)[14]	1	30	1:0	0:1	Direct trauma by heavy object	Acromion fx	acromial	13	CS= 84 UCLA=32 DASH=15
Chouhan V et al. (2018)[17]	1	29	1:0	0:1	two-wheeler-four-wheeler collision	Proximal humerus and multiple ribs fx	deltopectoral	3	100° active abduction
Toru M et al. (2020)[5]	3	60	3:0	1:2	1 traffic accident & 2 fall	3 acromion fx, 2 rib fx, 2 TBI	-	33	1 Shoulder joint OA
Zheng J et al. (2020)[4]	1	Middle-aged	1:0	1:0	motorcycle crash	AC injury	Superior	4	CS=92
Kc K et al. (2021)[3]	1	39	0:1	0:1	road traffic accident	Acromion & distal clavicle fx	superior	-	-
Tonelli F et al. (2021)[2]	1	74	1:0	1:0	Fall on bike	AC injury	deltopectoral	3.5	ASES=91.5 CS=71 UCLA=28
Present study	1	32	1:0	1:0	motorcycle to car accident	AC injury & acromion fx	deltopectoral	25	CS= 85 UCLA=31 DASH=15

M:F, male to female ratio; R:L, right side to left side ratio; F/U, follow-up; TBI, traumatic brain injury; CS, constant score; UCLA, University of California Los Angeles shoulder score; DASH, Disability of Arm, Shoulder and Hand) score; AC, acromioclavicular joint; fx, fracture; LT, lesser tuberosity; OA, osteoarthritis; ASES, Shoulder and Elbow Surgeons Shoulder Score

KC K J et al.[3] presented a 39-year-old woman with a glenoid fracture with concomitant Acromion and distal clavicle fractures that were fixed with a pin beside a transcoracoid screw for glenoid fracture fixation. AO R et al.[14] presented a 30-year-old man with glenoid and associated acromion fractures. The glenoid fracture was fixed with a screw, and the acromion fracture was fixed with a locking plate. Other studies performed transcoracoid internal fixation through the deltopectoral approach. Bauer G et al.[15] presented a series of patients with glenoid fractures, including an Ideberg type 3 glenoid fracture, who were treated with a screw through the deltopectoral approach. Qin H et al.[16] reported 10 patients with Ideberg type 3 glenoid fracture. The glenoid fractures were fixed through a deltopectoral approach for nine patients and a combined (anterior and posterior) approach for one of the patients. Five glenoid fractures were fixed with a cannulated screw alone, two fractures were fixed with small plates alone, and three fractures were fixed using both cannulated screws and small plates. They inserted K-wires inside the coracoid as a reduction tool and temporary fixation. However, the cannulated screws were inserted in the subchondral bone and perpendicular to the fracture line. Similarly, Tonelli F et al.[2] applied a transcoracoid K-wire as a reduction tool and fixed the glenoid fracture with a screw through the Neviaser portal. Similar to our method, Chouhan V et al.[17] used the transcoracoid K-wire as a joystick and a guide to insert a cannulated screw. The fracture line of type 3 glenoid fractures usually spans through the upper half of the glenoid cavity to the superior border of the scapular notch. So, insertion of a screw from the base of the coracoid process provides a strong bony stock in the proximal part of glenoid fracture osteosynthesis.

Toru M et al.[5] presented four cases of concomitant type 3 glenoid fractures. They operated on three patients who had associated acromion fractures and conservatively managed the one with an isolated glenoid fracture. Also, they fixed the glenoid and Acromion in two patients and only the glenoid in one patient, who later developed shoulder joint osteoarthritis. They concluded that we should fix both fractures to stabilize the superior shoulder suspensory complex in the presence of an associated acromial fracture. However, in many studies, including ours, the acromion fractures were not fixed beside glenoid fixation when it was non-displaced.

Apart from the shoulder fracture management it is important to address life threatening conditions when we encounter such comminuted fracture. As previous studies shown such fractures are prevalence among motorcycle drivers[4, 16-18]. Since, shoulder is located near head, airway and circulatory system addressing possible injuries to such vital organs has priority to the fracture management[19,20].

We used home-based self-rehabilitation due to COVID-19 pandemia. Similar to our previous experience from telerehabilitation, in this patient's good range of motion and functional score were achieved[21].

According to our experience and other similar studies, open reduction and screw fixation are safe and useful methods for managing Ideberg type III glenoid fractures.

Conclusion

According to our experience and other similar studies, open reduction and screw fixation are safe and useful methods for managing Ideberg type III glenoid fractures.

Acknowledgments

The authors would like to thank Shiraz University of Medical Sciences, Shiraz, Iran and also Center for Development of Clinical Research of Nemazee Hospital and Dr. Nasrin Shokrpour for editorial assistance.

Conflict of Interest Disclosures

Nothing to declare.

Funding Sources

Nothing to declare.

Authors' Contributions

Omid Reza Momenzadeh: perform surgery, critical revision of the manscript

Armin Akbarzadeh: data gathering and writing the draft

Ethical Statement

Written informed consent was obtained from the patient for publication of this case report.

Declaration of Generative AI and AI-assisted technologies

Nothing to declare.

References

1. Van Oostveen DP, Temmerman OP, Burger BJ, Van Noort A, Robinson M. Glenoid fractures: a review of pathology, classification, treatment and results. Acta Orthop Belg. 2014 Mar 1;80(1):88-98.

2. Tonelli F, Sani G, Bartolini S, Mugnaini M. Osteosynthesis of Ideberg type III glenoid fracture with retroclavicular cannulated percutaneous screw. Lo Scalpello-Journal. 2021; 35:112-116.

3. KC KM, Raju G, Acharya S. Lateral third clavicle fracture with concomitant glenoid and acromian fractures: A rare combined injury pattern. Nepal Orthopaedic Association Journal. 2021;7(2)

4. Zheng J, Lu N, Shen Z, Chen A. Superior approach for treating Ideberg III glenoid fractures with superior shoulder suspensory complex injury: A technical trick. Trauma Case Rep. 2020; 29:100343.

5. Toru M, Hideaki S, Tsunemasa M. Ideberg type III glenoid fractures are caused by indirect force: A report of four cases. Trauma Case Rep. 2020; 30:100363.

6. Lin I-H, Lin T-L, Chang H-W, et al. Arthroscopy-Assisted Reduction and Internal Fixation versus Open Reduction and Internal Fixation for Glenoid Fracture with Scapular Involvement: A Retrospective Cohort Study. J Clin Med. 2022;11(4):1131.

7. Wafaisade A, Kappel P, Pfeiffer TR, Lambert C, Banerjee M. Arthroscopic screw fixation technique for transverse Glenoid fractures. Arthrosc Tech. 2021;10(11): e2495-e2499.

8. Zbili D, Sali E, Serane J, Lefиvre E, Amsallem L. Arthroscopy-Assisted Reduction and Fixation of a Transversal Glenoid Fracture: About a Case. Case Rep Orthop. 2017;2017

9. Papadonikolakis A. Arthroscopic reduction and fixation of transverse intra-articular glenoid fractures with scapular extension. Arthrosc Tech. 2017;6(3): e879-e885.

10. Kim SJ, Lee SH, Jung DW, Kim JW. Arthroscopic-assisted Reduction and Percutaneous Screw Fixation for Glenoid Fracture with Scapular Extension. J Orthop Case Rep. 2017;20(3):147-152.

11. Gras F, Marintschev I, Aurich M, Rausch S, Klos K, Hofmann GO. Percutaneous navigated screw fixation of glenoid fractures. Arch Orthop Trauma Surg. 2013;133(5):627-633.

12. Marsland D, Al-Khateeb H, Andrews E, Goldie B, Ahmed HA. Results and functional outcome of arthroscopically-assisted fixation of glenoid fractures: three cases. Shoulder & Elbow. 2012;4(1):33-37.

13. Park SG. Arthroscopy Assisted 2 Cannulated Screw Fixation for Transverse Glenoid Fracture: A Case Report. Clinics in Shoulder and Elbow. 2016;19(2):105-109.

14. Ao R, Yu B, Shi J, Li Z, Zhu Y. Acromial approach for treating glenoid fractures: A report of two cases and a literature review. Exp Ther Med. 2015;10(5):1653-1656.

15. Bauer G, Fleischmann W, Dussler E. Displaced scapular fractures: indication and long-term results of open reduction and internal fixation. Arch Orthop Trauma Surg. 1995;114(4):215-219.

16. Qin H, Hu C-Z, Zhang X-L, Shen L-X, Xue Z-C, An Z-Q. Surgical treatment of Ideberg type III glenoid fractures with associated superior shoulder suspensory complex injury. Orthopedics. 2013;36(10): e1244-e1250.

17. Chouhan V, Gupta A. Transcoracoid Screw Fixation for Ideberg Type 3 Glenoid Fracture: Surgical Technique. J Orthop Case Rep. 2018;8(3):65.

18. Heydari ST, Vossoughi M, Akbarzadeh A, Lankarani KB, Sarikhani Y, Javanmardi K, Akbary A, Akbari M, Mahmoodi M, Shirazi MK, Tabrizi R. Prevalence and risk factors of alcohol and substance abuse among motorcycle drivers in Fars province, Iran. Chin J Traumatol. 2016 Apr 1;19(02):79-84.

19. Maghsoudi B, Tabei SH, Zand F, Tabatabaee H, Akbarzadeh A. A model for decision making for intensive care unit admission in source limited hospitals. Iran Red Crescent Med J. 2014 Oct 5;16(10): e15497.

20. Paydar S, Akbarzadeh A, Nasermoadeli L, Mohammadkarimi V. Adherence to guideline in hydrating traumatic patients with crystalloid fluids: a single center experience from southern iran. Journal of Emergency Practice and Trauma. 2023 Jan 1;9(1):9-12.

21. Tahami M, Vaziri AS, Tahmasebi MN, Ahmadi MA, Akbarzadeh A, Vosoughi F. The functional impact of home-based self-rehabilitation following arthroscopic meniscus root repair. BMC Musculoskelet Disord. 2022 Aug 5;23(1):753.