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RESEARCH ARTICLE

PERCUTANEOUS K-WIRE FIXATION FOR A COMMUNUTED PROXIMAL HUMERUS FRACTURE – A CASE REPORT.

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Abstract

Severe proximal Humerus fractures when left untreated have a poor functional outcome because of severe displacement of the fragments. Reduction is essential even though there is a danger that Open Reduction and Internal Fixation may increase the risk of avascular necrosis, especially in 4-part fractures. Open reduction doubles the risk of avascular necrosis compared with closed treatment [1]. The risk is increased still further by the exposure required for plating compared with that for a lesser procedure [2,3,4]. Here we describe a case of 90-year-old elderly female presenting with pain and restricted range of right shoulder movements following fall at her residence and was incidentally found to be suffering with severe anemia which was managed with a minimally invasive technique.

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Introduction:-

Proximal humerus fractures are common, and about 80% are well managed non-surgically, the remaining 20% require surgical intervention so as to ensure healing and to optimize function. The priorities in surgical stabilization of proximal humerus fractures are to restore the anatomic relationship between the tuberosities and the articular head fragment and to maintain vascularity of the articular fragment [5]. ORIF may allow for rigid fracture fixation, but soft-tissue dissection may endanger residual vascularity of the articular segment, however closed reduction followed by percutaneous K-Wire fixation reduces the risk from soft-tissue dissection and may reduce the fracture indirectly and achieving provisional fixation for anatomic healing. Closed reduction and percutaneous fixation was first described by Bohler [6] for pediatric proximal humerus fractures treatment. He under general anesthesia reduced the fracture of the patient and provisionally fixed the shaft to humeral head fragment the using percutaneously placed pins. This method then was adapted to the treatment of fractures in adults. Initially, the technique was applied to the management of two-part surgical neck fractures [7] where it was as successful as open methods. More recently, closed reduction and percutaneous fixation with pins and cannulated screws has been applied to the management of three- and even four-part proximal humerus fractures [8,9,10]. Although these approaches to more complex fractures are challenging, vascularity of the humeral head seems to be more reliably preserved than in open treatments that require soft-tissue dissection to place rigid fixation implants [11]. The incidence of osteonecrosis is reduced with these methods [8-10,12-16] because the principal vascular supply to the humeral head, the ascending branch of the anterior circumflex humeral artery, is left undisturbed with no dissection in the region of the bicipital groove or around the subscapularis (Figure 1).

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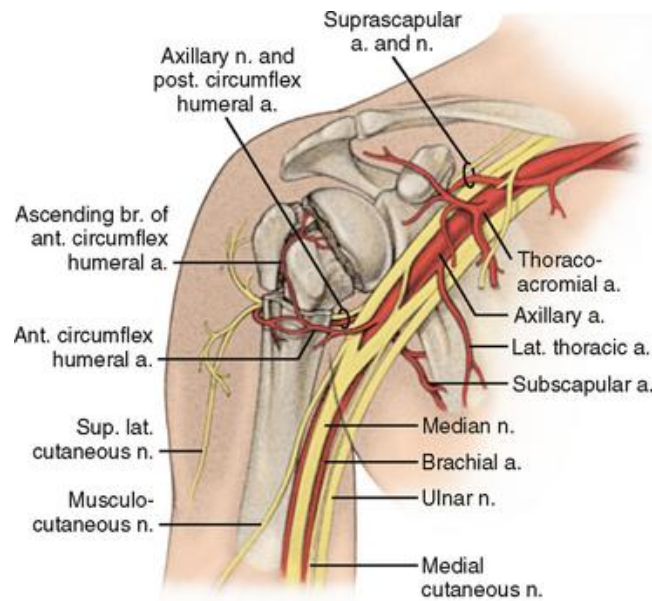


Figure 1:- Diagrammatic representation of blood supply to proximal Humerus.

Case presentation:-

A 90-year-old female patient presented to the emergency department with pain, restricted range of movements with swelling of the right shoulder following accidental fall at her residence. Local examination there was a gross swelling over the right shoulder with tenderness at the deltoid region with restricted and painful active and passive range of shoulder movements with no external injuries. Both antero-posterior and axillary lateral radiographs revealed a four part fracture according to Neer's classification, with osteoporotic bones with intact gleno-humeral joint (Figure 2a,b).



Figure 2a:- Plain radiograph AP View showing greater tuberosity fracture.



Figure 2b:- Plain radiograph Axillary Lateral View showing four part fracture

Her Hemoglobin initially at the time of admission was 3.7gm/dL i.e., she was severely anemic and rest of the routine blood investigations were found to be normal. Her 2D-Echo revealed AV sclerosis, mild to moderate MR with mild TR/PAH. While an open reduction and internal fixation is recommended for such type of fractures, which takes a lot of time for healing, with risk of infections, prolonged intubation period during anesthesia, blood loss and even high risk as per her age, hemoglobin level and cardiovascular status, in view of all the above complications she was thoroughly evaluated and blood transfusion with five packs of packed cell volume was done until her hemoglobin improved to 9gm/dL. Under general anesthesia fracture was reduced by manipulation with fluoroscopic guidance

and fixed with five K-wires three infero-laterally and two of them supero-laterally giving the fracture a rigid fixation (Figure 3).



Figure 3:- Post-operative plain radiograph showing fracture reduced and fixed with K-Wires.

Patient was then immobilized with a shoulder immobilizer for about 2 weeks and was then gradually mobilized starting with pendulum movements and later with controlled abduction movements, K-Wires were removed after 6 weeks. Shoulder range of movements were achieved to the extent that patient was able to eat herself and do her daily activities to some desired extent without pain.

Discussion:-

In elderly patients fractures of the proximal humerus are common. The overall prevalence is about 70 per 100000 population/year, representing about 5% of all fractures [17-19]. Restoration of muscle power to the injured arm is not the prime objective in elderly patients. The main requirement is to handle activities of daily living which do not need much strength, but require a reasonable range of movement. There is a particular need for sufficient internal rotation for eating and for personal hygiene and enough external rotation for combing hair and washing. The main aims of management in these fractures are a good functional result and pain relief, irrespective of a compromise on restoring precise anatomical congruity [20]. A good functional outcome is when an abduction and elevation of 90°, external rotation of 25° and an internal rotation good enough to touch the L1 vertebra is achieved. The choice of treatment for patients with a complex fracture of the proximal humerus remains controversial and is mainly based on the personal experience of the surgeon treating the injury. Here we planned for a closed reduction and internal fixation due to patient's poor compliance, her elderly age and other co-morbid conditions. The results of closed reduction and percutaneous pinning are favorable in most series [7-10,12-15]. The largest two series have been published by Jaberg and associates⁷ and Resch and associates [8,12]. Over the past 15 years, we have performed closed reduction and percutaneous fixation of more than 50 proximal humerus fractures. All patients have regained overhead motion and have achieved stable fixation. No osteonecrosis was observed; including the patients who had true four-part fractures.

Conclusion:-

ORIF results in lower rates of nonunion, shorter time to union, earlier mobilization, and better anatomical reduction. But this case has been presented with almost similar outcome treated with minimally invasive procedure as the patient was not compliant, had co-morbid conditions like severe anemia, cardio-vascular disease and elderly aged, who almost required a shorter period of intubation compared to ORIF, post surgically she had a shorter hospital stay and early mobilization of shoulder was initiated. However outcome depends on accuracy of reduction, avascular necrosis, and degree of comminution.

Conflicts of interest: None.

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