Case Report

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Bilateral Osteopenic Volar Barton Fracture of Lower End of Radii

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Abstract

A 35 years old male, farmer by occupation, patient had a trivial fall from a motorcycle and sustained injury to both the wrist joints, diagnosed to have a Bilateral closed distal end intra-articular radius fracture (volar Barton), our patient had osteopenia on DEXA study, patient was treated with ORIF with volar lock plating and Umex external fixators with K-wire fixation on the left side. Patient regained full range of movements in both the wrist joints. Discussed the results of ORIF locked plating and closed reduction U-MEX external fixator with K-Wire fixation. *Case Report:* A 35year old male farmer by occupation came to the casualty with the history of fall from a motorcycle (trivial injury) and sustained injury to both the wrists, on examination had swelling over wrist and hand but no open wounds and no neurovasular deficits, preoperative radiographs diagnosed to have bilateral volar barton fractures . On DEXA examination patient had a T-Score of -2.0 , categorising him as an osteopenic. Treated with Open reduction & internal fixation with titanium locked plating on right side, Closed reduction UMEX external fixator followed by percutaneous K-wire fixation on left side. Patient was put on Calcium supplements daily 500mg for 6 months and vitamin D3 60k IU once a week. Right wrist was mobilised after a week of operative intervention and left wrist mobilised after 6 weeks, patient regained normal range of movements .

Keywords: Fracture of Lower End of Radius; Volar Barton; Dorsal Barton; U-MEX External Fixator; Percutaneous K-Wire Fixation.

Introduction

Osteoporosis is a common metabolic bone disease characterized by reduced bone mass, micro architectural deterioration of bone tissue, and an increased risk of fragility fracture. Osteoporosis is being increasingly found in younger population which has led to increase in fragility fractures in the younger individuals like the distal end radius, pertrochanteric fractures, and vertebral fractures . Volar Barton fractures are not uncommon and may be either due to high or low energy injuries [1,2], such fractures are unstable and methods of treatment vary [3,4]. Although different success rates have been reported for non-surgical and surgical techniques in the literature, surgical treatment is currently favoured [4,5]. Reporting bilateral volar Barton fracture in a young osteopenic as a rare case report.

Case Report

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bilateral volar barton fractures. On DEXA examination patient had a T-Score of-2.0, categorising him as an osteopenic. Treated with Open reduction & internal fixation with titanium locked plating on right side, Closed reduction UMEX external fixator followed by percutaneous K-wire fixation on left side. Patient was put on Calcium supplements daily 500mg for 6 months and vitamin D3 60k IU once a week. Right wrist was mobilised after a week of operative intervention and left wrist mobilised after 6 weeks, patient regained normal range of movements .

Fig. 1: Right Wrist with Hand (AP and lateral radiograph)

Fig. 2: Left Wrist with Hand (AP and lateral radiograph)

Fig. 3: Right Wrist with Hand Post Operative Radiograph

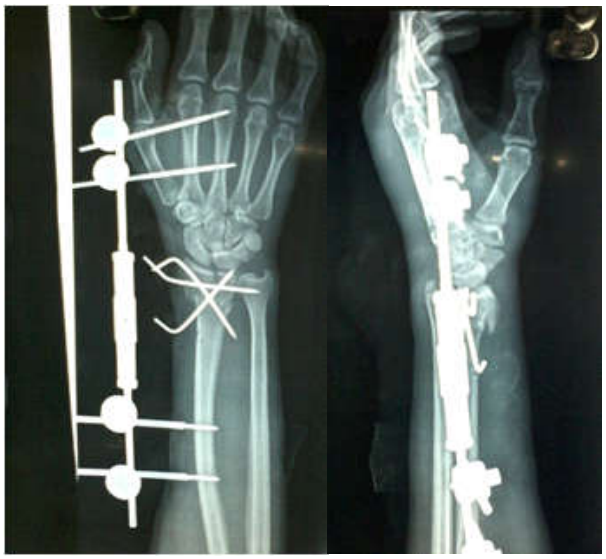

Fig. 4: Left Wrist with Hand Post Operative Radiograph

Surgical Technique

Under general anaesthesia,for left volar barton, traction was applied to the thumb ,using manipulation, the displaced volar fragment was reduced. After the fragment was reduced and was confirmed using an image intensifier , a 2.0 mm one Kirschner was inserted from the radial styloid process to ulnar side of the proximal cortex and one more from proximal to distal cortex another K wire immobilised the inferior Radioulnar joint with a power hand-tool. The pin end was bent and kept outside the skin. The fragment reduction was rechecked using the image intensifier. An U-MEX external fixator was applied to bridge the wrist joint, maintain the length of the radius and enforce wrist stability .

For right volar barton, the Ellis approach was used and the wrist joint was opened at the volar aspect [7]. A dissection plane between the flexor carpi radialis and the Palmaris longus was developed. The radial artery was retracted radially and median nerve ulnarly. The fibers of the pronator quadratus were severed from their origin on the radius, followed by fracture fixation with a titanium locked plate.

The wrist function was evaluated with Pattee and Thompson criteria, and a satisfactory outcome was excellent [3].

Result

Postoperatively , radioulnar variance (the ulnar prominence of the distal radioulnar joint) in the plating was 1.3 mm and in the pinning was - 0.6mm

The comparison between both techniques was not significant (p= 0.58). Postoperatively, the volar inclination (the volar tilting of distal radial joint) in the plating was (+5.2 degrees) and in the pinning was (+ 5.6 degree), At the latest follow up , the volar inclination in the plating was plus 5.1 degrees and in the pinning was plus 5.8 degrees. The comparison between both techniques was not significant (p=0.89). Postoperatively, the ulnar angulation (the inclination of the distal radial joint) in the plating was 19.6 degrees and pinning was 17.98 degrees . At the latest follow-up , the ulnar angulation in the plating was 19.0 degrees and in the pinning was 17.4 degrees.

Discussion

Various surgical techniques have been reported in literature. Currently closed reduction with external fixation and percutaneous Kirschner pinning. Open reduction with volar lock plating have achieved most support. Factors favouring fracture healing include minimal gap , adequate stability and sufficient nutrition supply [8]. For the distal radius, massive cancellous bone can speed the fracture healing process . Therefore, a non-union at this area is rare. On the other hand, malunion is not uncommon; volar barton's fractures often produce volar subluxation of the carpus [5,6]. The principle of treatment is mainly to provide anatomic reduction and stabilization [5]. A malunion of a volar Barton's fracture can cause serious disability, which is very complicated to treatment. Additionally, the articular cartilage may be severely injured and cannot regenerate [9,10].

Therefore, prevention of malunited volar Barton's fracture is extremely important to avoid having to treat a malunion. In this study, plating or external fixation combined with Kirshner pinning achieved sufficient stability for the healing process to occur. Clinically, both techniques have disadvantages, Plating treatment can reduce fragments more precisely and the fragments can be stabilized more precisely and the fragments more securely. However, it requires opening the fracture site, If local swelling is serious, closure of the incision site may be difficult, although the incision is usually not large and the infection rate negligible. Additionally, the fracture healing process is not hindered due to cancellous bone character. The success rate is high.

Pinning treatment avoids opening of the fracture site and so there is no need to worry about incision site and so there is no need to worry about incision site problems. However, fragment reduction with stabilization may be not so satisfactory. Moreover, tendon penetration by external fixation may interfere with thumb and index finger movement [11,12], the external fixation can only be removed after six weeks, and wrist and finger range of motion exercises can then be implemented. Therefore, the functional outcome of the wrist joint is satisfactory.

To avoid poor function of joints, wrist and finger range of motion exercises should be implemented as early as possible. This is especially important for Barton's fractures that have intra-articular involvement. Once adhesion in the joint occurs, treatment becomes very complicated. Both intra-and extra-articular release techniques are very difficult. In this patient, immobilization of joints lasted no more than six weeks. This may be another factor that influenced the high satisfaction rating.

Conclusion

Both the above mentioned techniques give a high success rate. Despite the fact that each technique has advantages and disadvantages, Volar Barton's fractures are not uncommon. Current surgical techniques can provide a high satisfactory rating. In the present study both open reduction with lock plate stabilization, closed reduction with pinning and external fixation stabilisation have achieved success. Both techniques have advantages and disadvantages but the result from both the techniques are similar. Bilateral volar Barton's in young osteopenic is virtually not reported.

Osteoporotic fractures in India occur commonly in both sexes, and may occur at a younger age than in the West. Recently published data have clearly demonstrated widespread vitamin D deficiency across India, at all ages and in both sexes, particularly in the urban areas. Indians have low BMD as compared to the western Caucasians. This could be attributed to differences in skeletal size,however, the high prevalence of vitamin D deficiency is a major factor in the low BMD and poor bone health of Indians [13].

Clinical Message

Bilateral volar Barton is a rare fracture, knowledge about this injury aids in diagnosis and radiological pattern of Barton fracture helps in treating different modalities of surgical technique. Incidence of Osteopenia in young patients in india is discussed.

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