

TREATMENT DISTAL RADIUS FRACTURE WITH VOLAR BUTTRESS TECHNIQUE- A CLINICAL STUDY

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Distal radius fractures account for one of every six fractures that come through the emergency room. These displaced fractures pose significant therapeutic challenges. Most authors agree that the fundamental principal of treatment is to restore the articular congruity. A number of studies have indicated the inadequacy of closed reduction and casting of complex fractures of the distal radius^{1, 2, 3}. Open reduction and internal fixation is an effective treatment option for simple fractures, but many intra-articular fractures are too comminuted for anatomic open reduction Pins and plaster treatment has been used successfully to maintain length and palmar and radial tilt of the distal radius. However, this method has been associated with high complication rates⁴

A stable internal fixation with buttress plate permits early motion of the neighboring joints and optimizes functional rehabilitation of the wrist and hand.⁴

Many studies have shown that dorsal approach is associated with many complication and volar having advantage. We have used volar approach for our fixation. When comminution is more not allowing placement screw we have used plate as just buttressing and either external fixator or cast or pinning as supporting fixation for 3 weeks.^{3, 4, 5, 6, 7}

MATERIALS AND METHODS: This is prospective randomized study conducted between 2007 and 2012 at our institute. 28 cases of distal radius fracture both intraarticular and extra articular irrespective of degree of comminution were taken up for study. Criteria for study inclusion were a volarly displaced fracture of the distal radius that after an initial attempt at closed reduction had radiographic evidence of a persisting deformity of 15° of angulations in any plane, >2 mm of articular displacement, or >2 mm of radial shortening. Patients were not excluded on the basis of age or bone quality. Exclusion criteria were fractures of the immature skeleton, and distal radial fractures extending into the distal third of the radial shaft.

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The fractures (10 intra-articular and 18 extra-articular) were classified according to Muller et al. There were 9 B1, 12 B2, 7 B3, fracture types. There were 16 men and 12 Women with an average age of 54 years (range, 25- 65 years). 20 patients were between age group of 25 -42 years old (most common). The causes of injury were simple falls on the outstretched hand (n = 10), work-related accidents (n = 8), motor vehicle accidents (n= 9), and sports injuries (n =1)

SURGICAL APPROACH: Volar skin incision measuring about 8-10 cm located over flexor carpi radialis starting from wrist crease proximally is used. Deep dissection was done with identifying the radial vessels and retracting them radially. Median nerve with tendons of flexor carpi radialis retracted laterally. Once pronator quadratus exposed with its covering sheath a (L) shaped incision made over muscle and it is retracted to expose the fracture site.

Fracture was reduced with gentle traction and manipulation of fragments using K-wire. The restoration of anatomic continuity of the volar cortex automatically restored the radial length, volar tilt, ulnar inclination, and articular congruency of the joint surface. Often buttress effect of plate combined with traction helped reduction. Temporary fine K-wires used to maintain the articular reduction.^{6, 7, 8, 9, 10}

Fracture were fixed with buttress Elis plate (n=22) and fixed angle locking plate (n=6) and selection of case for different plate depended on osteoporosis and fracture pattern. For intra articular fracture further stabilization along with plate fixation(depending on stability of fracture and fracture reduction)was done with external fixator (n=4), k-wire(n=3) ,or simple cast(n=3) .

RESULTS: All cases were accounted for and had an average follow-up time of 12.6 months (range 12-18 months). The average time to radiographic healing was 6 weeks (range, 6- 9 weeks). At final follow-up visit the average volar tilt was 5° (range, 5° dorsal tilt to 12° volar tilt), radial inclination averaged 21°(range, 15° to 26°), radial shortening averaged 1mm (range, 0 -10mm), and articular congruity averaged 1 mm (range, 0 -5mm)

Residual pain in the wrist was graded as mild, moderate, or severe. Mild pain was present only at the extremes of the active range of motion of the wrist, and the patient was neither physically nor psychologically disturbed by the pain. Moderate pain occurred during heavy manual labor and caused the patient to be disturbed physically or psychologically or both. Severe pain occurred during activities of daily living and at rest. At final evaluation, 22 patients were free of pain, 2 had mild pain, and 2 had moderate pain.2 patients had severe restriction of movement with radial shortening of 10 mm and also articular incongruity of 5mm and was considered failures.

Complications consisted of 1 case of dorsal tendon irritation from an excessively long peg, which was treated with hardware removal. Superficial infection in 1 case and pin track infection in one case with external fixator. Secondary displacement occurred in 2 cases. Stiffness due to cast immobilization in 4 cases

DISCUSSION: The primary goal in treatment of unstable fractures of the distal radius is to achieve optimal restoration of the disrupted anatomy and allow quick return of hand function, while preventing secondary fracture displacement. If the fracture has a displaced intraarticular

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component, additional efforts to secure and maintain anatomic reduction of the joint surface should be undertaken. If these goals are achieved, better final functional results are to be expected. Early wrist motion has been shown to enhance hand and finger function.

Encouraged by the ease of application of volar plates for volarly displaced fractures and the absence of tendon irritation reported with these techniques, we had more successful results. The functional outcomes of our patients are comparable with other reports of open reduction and internal fixation.^{4, 5, 6,8,9,11,12.}

CONCLUSION: This method represents a valuable treatment modality for the most frequent types of unstable fractures of the distal radius in young and elderly patients. The surgical approach is simple and can be extended depending on the complexity of the fracture. The biomechanical features of the volar buttress plate in combination with preservation of the vascularity of the dorsal comminuted area rendered additional bone grafting rarely necessary except for unusual cases of important dorsal and volar comminution seen with high-energy injuries. When fracture is more complex, and highly comminuted additional procedure like external fixator, k-wires and cast immobilization necessary to maintain reduction.

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Pre operative radiographs- 1



Pre operative radiographs- 2



Post operative radiographs- 1



Post operative radiographs-2