EXTRAARTICULAR ANTEGRADE FIXATION OF PROXIMAL PHALYNX FRACTURES WITH BENT K WIRE

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Abstract:
Introduction: Any fixation technique used in fixation of phalynx fractures should provide good stability to allow early mobilization. K wires are the most commonly used fixation devices in the proximal phalynx fractures. They have been used in various configurations. We aim to study the effectiveness of a new fixation technique using extraarticular antegrade bent K wires to achieve 3 point fixation and allow early mobilization.

Material methods: 18 patients with proximal phalynx fractures were included in our study. Closed reduction with bent k wire was done. Patients were followed up for a minimum period of 3 months. We assessed the outcome by calculating the Total active range of motion at three months after the surgery. Any complication was also documented.

Results: The average healing time was 45 days. Excellent outcome was seen in 63% of the patients. No major complications were recorded.

Conclusion: Extraarticular antegrade fixation with bent K wire which achieves 3 point fixation has better stability to allow early mobilization. Extraarticular entry point allows better joint movements after the surgery. This technique is easy and cost effective way to provide good fixation in proximal phalynx fractures.

Keywords: Extraarticular Antegrade Fixation, Proximal Phalynx Fractures, Bent K Wire
Introduction

Fractures of the proximal phalynx are very common next only to distal phalynx fractures. Unstable and displaced proximal phalynx fractures should be fixed to prevent angulation and displacement. Various techniques of fixation have been described in literature. Any device used for fracture fixation should provide adequate stability to allow early mobilization to achieve functional recovery as early as possible.

K wires have been used in various configurations to stabilize phalangeal fractures. Of all the available techniques use of a single intramedullary K wire is considered the least rigid form of fixation as it fails to provide rotational stability and cannot control shortening in oblique fractures. Techniques in which wires are crossing of the joints are more likely to cause stiffness of the adjacent joint and articular damage. In our study we have done extraarticular intramedullary pinning using bent K wire introduced in antegrade fashion.

We in this study aim to assess the stability of the above mentioned fixation technique and assess the post operative Range of motion. We believe that this technique has various advantages over other fixation techniques. It works on three point fixation which provides adequate stability to allow early mobilization and since it is extraarticular it does not hamper joint functions.

Material and Methods

We have conducted a retrospective study by collecting the total number of cases of proximal phalynx fractures operated in our hospital between July 2015 to July 2017. Fractures of the base and shaft of proximal phalynx were included in our study irrespective of the fracture type and, degree of comminution. Proximal phalynx fractures with concomitant metacarpal fractures were also included in this study. Fractures of head of proximal phalanx and uni or bi condylar fractures were excluded from the study since they cannot be managed by K wiring. Patients with associated tendon injuries were also excluded.

Technique

Regional anesthesia was used in all cases and all the procedures were done under image intensifier. Unless there was an overlying wound no skin incisions were made for introducing the K wires. A 2mm K wire was used to make an entry point. Only T handle was used for the entire procedure and no drilling was done. Entry point was made along lateral edge or medial of the articular surface of the proximal phalanx lateral to central tendon, with a 2-mm K-wire, which was used as an awl to make entry (fig1). The wire was then removed and one 1.5-mm K-wire was prepared by cutting its sharp tips to prevent inadvertent joint penetration during insertion. It was also bent gently to achieve 3 point fixation. The Kwire is introduced into the proximal fragment, the fracture is reduced under image guidance and then the wire is advanced into the distal fragment till subchondral bone. The bent nature of Kwire provides 3 point fixation and also helps in reduction and maintaining proper alignment of fracture fragments. K-wire is cut as close to the bone and buried under the skin. We usually don’t give any skin incision hence no suturing is required. Buddy strapping was used for temporary immobilization for a few days. However MCP joint functions were allowed from day 1 following the surgery. Whenever there was a concomitant metacarpal fracture a below elbow cock up slab was applied and the slab maintained for 3 weeks following the surgery.

Assessment

At each follow up we assessed the Total Active Motion (TAM) and any rotational deformities if present. All details were recorded at every visit and a database was prepared. The patients who failed to follow up for at least three months were excluded from...
the study. K wires were removed only after achieving a good radiographic union.

The grading used to grade TAM was in accordance with that used by Al-Qattan et al. The TAM score was graded as excellent, good, fair, or poor if it was greater than 240, 220–240, 180–219 or less than 180, respectively.

Results

18 patients with proximal phalynx fractures were included in our study. The mean age of the patients was 28 years (range, 19 to 40 y). The most common fracture type was transverse type followed by oblique type and one patient had a comminuted shaft fracture. The most common location of the fracture was at the base of proximal phalynx followed by the shaft. Three patients had neck fractures. Three patients had associated metacarpal injuries. Four patients had open fractures. The average operative time was 20 minutes to fix the fracture. All the surgeries were performed by a single surgeon.

Table No. 1: Epidemiological details of the patients included in the study.

<table>
<thead>
<tr>
<th>Slno</th>
<th>Age</th>
<th>Sex</th>
<th>Fracture location</th>
<th>Fracture type</th>
<th>Soft tissue status</th>
<th>Associated metacarpal fractures</th>
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<tbody>
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<tr>
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<tr>
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<tr>
<td>5</td>
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<tr>
<td>6</td>
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<tr>
<td>18</td>
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<td>F</td>
<td>Neck</td>
<td>Transverse</td>
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</table>

No patients had any major complications following the procedure. One patient had a superficial pin site infection which resolved with oral antibiotics. No incidences of fracture displacement, wire loosening or non union were seen. No patient has any extensor lag of the PIP joint.

Discussion

Proximal phalynx fractures are very common fractures of the hand. Various treatment options have been described for management of these fractures. Fixation of these fractures with plates and screws provides excellent stability. However this requires significant soft tissue dissections and can lead to extensor tendon adhesions and scarring.
Phalanges are similar to other tubular long bones of the body. Elastic intramedullary nailing has been established as the gold standard in the management of displaced or undisplaced fractures of long bones in children[13]. Intramedullary fixation was first time used for metacarpal fractures by Foucher and colleagues[14]. They used multiple elastic rods by bouquet technique. Similar study was done by Gonzalez et al giving excellent results by intramedullary fixation of metacarpal fractures[15]. However this technique had limited use in only transverse metacarpal and neck fractures is also technically demanding procedure[16].

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**References**