Delayed Operative Management of Fractures of the Lateral Condyle of the Humerus in Children

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ABSTRACT

Purpose; Delayed presentation of lateral condylar fractures of the humerus is relatively common in the developing regions of the world. These fractures are difficult to manage because of the displacement and fibrosis around the condylar fragment secondary to the delay. There is a paucity of literature concerning the management of these fractures. An oft repeated finding is the requirement of extensive dissection around the fragment for proper reduction. The purpose of this study was to assess the efficacy of surgical management of lateral condylar fractures with delayed presentation.

Methods; We assessed the results of lateral condylar fracture fixation in 20 cases with delayed presentation.

Results; The lateral condylar fractures in patients with a delayed presentation can be managed surgically with good results.

Conclusions; Open reduction and internal fixation should continue to be the method of choice for the management of lateral condylar fractures which report late for management.

Key Words: Lateral condyle, delayed, surgical management, paediatric.

INTRODUCTION

Fractures of the lateral condyle of the humerus comprise 18.5 per cent of all fractures of the distal end of the humerus in children1. The incidence of the functional loss of the range of motion of the elbow is much greater with fractures of the lateral condylar physis because the fracture line extends into the articular surface. A poorly treated fracture of the lateral condyle is likely to result in significant loss of range of motion of the elbow that is not as responsive to surgical correction. The complications of lateral condylar physsis may not be obvious months after the initial injury.

There is a consensus in literature about the requirement of early intervention and anatomical reduction of these fractures with Dhillon et al and Zionts et al reporting uniformly bad results which included cubitus varus and valgus deformities, osteonecrosis, nonunion and malunion, and loss of motion. They recommended that patients presenting late be left alone and any sequelae evaluated at a late stage2, 3, 4. Fractures that are operated upon after a delay are also complicated by the presence of fibrosis, and callus formation. Preoperative stiffness that is found in these cases is likely to affect the post operative result1.

We report the results of operative management of twenty lateral condyle fractures of the humerus in the paediatric population that presented after more than 3 weeks of the initial trauma.

MATERIAL AND METHODS

20 patients ranging from 3 years to 13 years were included in the study. All patients presenting after more than 3 weeks of trauma were included in this prospective study. There were 12 boys and 8 girls. The fractures were difficult to classify radiologically in view of the delay. An attempt was still attempted.

Surgical technique

A lateral approach was made to the elbow. Dissection through the plane between the triceps and the brachioradialis. The approach was carried through the lateral fascia right down to the fracture. The fragment was often found to be displaced and fibrous tissue often made it difficult to assess the orientation of the fracture. Careful dissection of the fibrous tissue was made and posterior attachments were saved. Thorough irrigation was done to remove the fibrinous debris. Any dissection needing to be done on the lateral epicondyle and metaphysis was made anterior, to avoid the posterior blood supply and minimize the risk for avascular necrosis. The displaced fragment was

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redomon surgeries and signiﬁcant stiffness in one. The patient with poor results had a persistent nonunion in 2 fractures, good in 10 fractures and excellent in 7 fractures. 

According to Hardacre criteria (Table 1), the functional results were excellent in 7 fractures, good in 10 fractures and poor in 3. The poor results had a persistent nonunion in 2 cases and signiﬁcant stiffness in one. The patient with significant stiffness was not compliant with the physiotherapy protocol. Both nonunion patients had needed more dissection at surgery due to excessive ﬁbrosis. Lateral humeral condyle was clinically and radiographically prominent in 12 patients due to formation of new and extra bone. Review of early radiographs demonstrated that the bone spicules were elevated from the lateral condyle. The spicules were probably osteoperiosteal ﬂaps, and the lateral prominence was depending on the formation of bone between spicule and lateral condyle.

It can be appreciated that due to the unavailability of such patients in large numbers, the statistical analysis is constrained by the small size of the series.
particularly posteriorly at the origin of the long extensor muscles, and disruption of this will destroy the vessels and render the condyle ischaemic.\(^7\)

Surgical results in patients operated after delays are reported to be uniformly bad. In a series of seven cases operated more than 2 weeks after the injury, Jakobs et al reported uniformly bad results. They reported non union, malunion, persistent subluxation, limitation of motion and avascular necrosis.\(^8\)

The surgical technique should not be too aggressive to disturb the condylar vascularization. In order to control the intra-articular reduction, it may be necessary to cut some parts of the capsule and the synovia.\(^9,10\) Jakob et al felt that surgical intervention in cases with delayed presentation did not improve results in comparison to patients with no treatment at all.\(^7\) They pointed out the difficulty caused by the early callus formation. Whilst studies aim at a less than 2mm step at the articular cartilage, the criteria for cases with delayed presentation are not defined.\(^11\)
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There is a general agreement that surgical intervention in old established non unions should be avoided as osteosynthesis may reduce the range of motion of the elbow or the bone may not unite, so operative treatment for such patients has not been popular. However studies differing from this concept have reported reasonable results after proper patient selection. According to Toh et al nonunions consistently lead to pain, instability, loss of function, and tardy ulnar nerve palsy, they should be treated as soon as possible after injury, preferably before skeletal maturity.

Aggarwal et al reported in their study of 22 cases with delayed presentation. According to them exact anatomical reduction of the lateral condylar fragment were difficult to achieve, but conspicuous alteration in carrying angle was not present except in 2 cases. Fish-tail appearance was seen in 7 cases and premature closure of lateral condylar epiphysis was noted in 4 cases.

Saraf et al in their series of 20 cases reported avascular necrosis of the lateral condyle in one patient, premature fusion in two patients, pin tract infection in three patients, and gross restriction of elbow movements in three patients.

Both series report union times similar to ours.

All cases in our series reported for treatment after more than 3 weeks of injury. Expectedly all our cases had significant restriction of motion at presentation. It was important that posterior dissection be avoided as the possibility of avascular necrosis would be high.

Our series supports the view that lateral condylar fractures with a delayed presentation in spite of being more difficult to fix than fresh fractures can still be managed operatively with good results.

Fig. 3: 8 week old fracture of the lateral condyle [A]. Immediate post operative and final x rays [B and C]. Final range of motion is also depicted [D].
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