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Case Report

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A case report of open infected clavicle fracture treated with locking compression plate as an external fixator

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ABSTRACT

46 year old male presented to emergency department 8 days after fall from bike sustaining trauma to right shoulder and head. On examination revealed that he had open right clavicle fracture (Gustilo and Anderson grade II). Patient was treated with locking compression plate (LCP) as an external fixator. Postoperative follow up was uneventful with no signs of infection and good functional outcome.

Keywords: Open clavicle fracture, External fixator, Locking compression plate

INTRODUCTION

Clavicle fractures are one the most common injury that can be managed conservatively. Open clavicle fractures are quite rare orthopaedic injury and caused by severe direct penetrating and blunt trauma with significant multiple injuries such as chest and head trauma.[1]

These fractures are prone to serious complications such as infection, mal-union and non-union. The goal of open fracture management is prevention of infection, soft tissue coverage, achievement of bony union and restoration of function. Important principles involve antibiotic utilization, timing of initial surgical intervention, thorough debridement, type of wound closure and fixation of fracture after proper alignment.[2]

In case of open clavicle fracture there is paucity of information in orthopaedic literature regarding appropriate management techniques and treatment outcome. External fixation is treatment of choice for open clavicle fractures because of it provides stable fixation with minimal local tissue damage resulting in excellent union and better soft tissue outcome.[3,4]

Here we reported a case of open infected open infected clavicle fracture treated with locking compression plate (LCP) as an external fixator.

CASE REPORT

A 46 year male was presented to emergency department 8 days after fall from bike sustaining trauma to right shoulder and head. Primary survey demonstrated an open grade II shaft clavicle fracture right side. On examination revealed an overlaying contused lacerated wound of size 3×2 cm with gross purulent discharge (Figure 1). Palpation of this region demonstrates increased warmth and elicited severe pain. A wound swab was taken and sent for culture and sensitivity examination and purulent material was expressed from wound. There were no obvious foreign bodies within wound and no evidence of any neurovascular injuries. The open wound was treated with irrigation with normal saline, H_2O_2 and betadine. Daily dressing done and broad-spectrum intravenous antibiotics were started.

Radiographic evaluation of the right shoulder with clavicle shows a displaced Allman group I clavicle fracture (Figure 2). The wound swab sent for gram staining and culture sensitivity shows growth of methicillin sensitive

staphylococcus aureus (MRSA). The rest of all routine investigation were within normal limits.

Figure 1: Contused lacerated wound 3×2 cm over right clavicular region.

Figure 2: Pre op X-ray of right shoulder with clavicle showing a displaced ALLMAN group I clavicle fracture.

Figure 3: Intra operative image of clavicle fracture fixed with LC DCP as external fixator.

Figure 4: Post op image showing LC DCP used as external fixator for clavicle fracture.

Figure 5: C-arm and immediate post op radiograph.

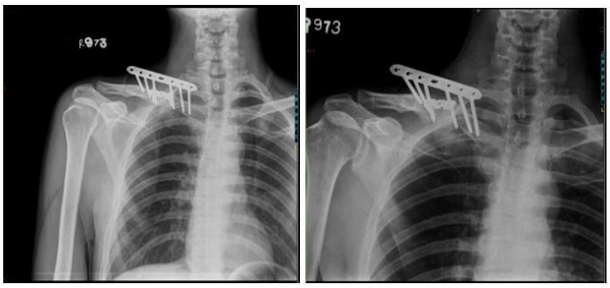

Figure 6: Postoperative radiograph at 6 weeks and 13 weeks respectively.

Figure 7: Clinical photo.

Pre-operative planning for open clavicle fracture was discussed. As there was severe soft tissue damage and significant infection, we planned to fixed open clavicle fracture with LCP as an external fixator.

Surgical technique for external fixation of clavicle with LCP

Under general anesthesia, the patient was put in supine position with sandbag in interscapular space. Wound debridement done and wash given with normal saline, H_2O_2 and betadine. Reduction achieved by holding medial and lateral fragment with allis forceps under C-arm guidance. Open reduction and internal fixation done by using 3-hole Recon plate fixed with 2 cortical screws. Closed reduction and external fixation done for open grade II displaced fracture clavicle right side by using stainless steel 7-hole locking DCP plate fixed with medially 3 and laterally 3 locking screws under C-arm guidance. Debridement done and wound closed with 2.0 prolene and sterile dressing done.

No additional debridement was needed in post-operative period as wound condition gradually improved; exudate discharge had decreased and the soft tissue inflammation resolved. Routine LCP external fixator care was done with tropical betadine ointment application and daily wound dressing. The wound healed within 15 days after operation. The shoulder was immobilised in arm pouch sling. The patient was advised to perform active range of motion for two weeks. Follow up Clinical examination and X-rays of clavicle were taken.

At 13 weeks after radiological evaluation fracture was united, hence fixator was removed.

DISCUSSION

Most of the fractures of clavicle unite conservatively but surgery is indicated in open fractures, floating shoulder and fractures associated with neurovascular injuries.[5] We had moved on from the era of conservative management to operative fixation owing to high incidence of non-union and then functional disability due to shortening/malunion of clavicle.[6]

Malunited fractures of clavicle lead to altered biomechanics around the shoulder, which lead to early arthritic changes in the musculotendinous unit around the shoulder.[6]

Wide range of options available for fixation of clavicle fracture from intramedullary devices like TENS nail, screw and IM IL nails, to extramedullary devices compromised of variety of plates.[7]

Management of open clavicle fracture is based on patients' overall condition, degree of contamination, severity of fracture and soft tissue Injury. ORIF with internal fixation devices does not recommended due to risk of further soft tissue damage and skin necrosis. Hence the external fixation was recommended either as temporary fixation in damage control surgery or definitive fixation to stabilize the fracture with minimal soft tissue damage and enable us to perform multiple debridement for treating infection.[8]

Traditional external fixator to clavicle causes discomfort to patient because of bulkiness, sharp edges causing local skin irritation, abrasion and restrictions of neck movements.[9]

Recently there had been emerging evidence that showed locking compression plates can be used as an external fixator in subcutaneous bones like tibia and clavicle. Again, for clavicle fracture this type of fixation was rarely done.[4,9]

External application of LCP has many advantages such as angular stability from locking mechanism, reduced irritation by low profile construct and possibility of contouring the plate along an anatomical area close to the skin. This technique gives strong fixation to provide long term stability and withstand load on the clavicle.[4,9]

CONCLUSION

Traditional external fixator to the clavicle causes discomfort to the patients because of its bulkiness, sharp edges causing local skin irritation, abrasions and restrictions of neck movements. External fixation of open clavicle fractures with locking compression plate as an external fixator is a simple procedure, provide strong fixation, there is reduced irritation and comfortable to patient because of low profile plate and can be used as definitive treatment for open clavicle fracture.

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