Original Research Paper

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EXTRAARTICULAR TENSION BAND WIRING (TBW) FOR LATERAL END CLAVICLE FRACTURE

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ABSTRACT Clavicle fracture is a common injury, and can be classified into middle third, medial third, and lateral third fractures. Only 10-15% of clavicle fracture occur in the lateral third segment. Neer classified the lateral clavicle fracture into five types; type II and V are unstable and requiring fixation. Various common methods of stabilizations are introduced such as K-wiring, tension band fixation , plate fixation, osteosynthesis with hook plate and coracoclavicular screw however all those operative methods have their own advantages and disadvantages. Many surgical techniques are available. But adequate reduction and minimal soft tissue dissection during implant placement and early removal is ideal for these fractures. In view of these considerations, the present study is of Surgical Management of Displaced Lateral End Clavicle Fractures with minimal soft tissue dissection using Extra articular K-wires and Tension band wiring.

KEYWORDS :

MATERIALS AND METHODS:

This study was conducted in SRG MEDICAL COLLEGE AND HOSPITAL JHLAWAR from JANURARY 2022 to DECEMBER 2022. During this period 12 cases of adult patients with displaced lateral end clavicle fractures were included.

Pre-operative assessment was made by X-ray AP view for all patients. All the patients were operated in Beach chair position. A small incision of about 3cms was made antero-superiorly centering over the fracture site and exposing the acromioclavicular ligaments. Cautery dissection was carried out to minimize bleeding from the subcutaneous plane onwards. Every care was taken not to disturb acromioclavicular ligaments.

The fracture site was visualized and the hematoma was curetted and washed. The fracture was reduced and fixed with two 1.5 mm Extra articular Krischner wires. The Krischner wires inserted from anterosuperior and posterosuperior of lateral end clavicle and the reduction was checked with an image intensifier. An anteroposterior drill hole was made with 2mm drill bit on proximal part of the fracture. A stainless steel size 1.0 mm wire was passed through the hole. The SS wire was tied in a figure of eight manner keeping the knot superiorly around the K-wires. The K-wires were bent and buried inside the soft tissues. The wound was irrigated with saline and closed in layers.

Figure 1 Incision

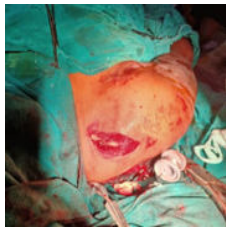

Figure 2 Fixation with TBW

Figure 3 Pre operative Xray

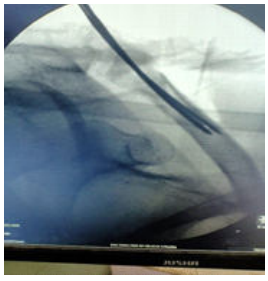

Figure 4 Reduction achieve by k wire

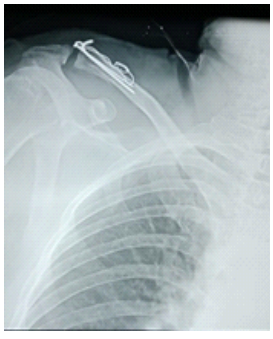

Figure 5 Post operative Xray

Arm pouch immobilization is used for 2 weeks after the operation. Unrestricted tolerable shoulder motion is permitted. Stretched and exertional exercise is allowed after radiography shows osseous union and the implants are removed.

Introduction

Clavicle fractures are one of the most common fractures encountered in orthopaedic practice.

Previous epidemiologic studies suggest that clavicle fractures represent up to 5% of all adult fractures and up to 44% of all shoulder girdle fractures.[2-4]

The incidence of injury also is characterized by bimodal age distribution with peak under age 40yrs. With respect to the incidence of different fracture types, fractures of middle third of the clavicle are most common accounting for 69% to 81%. The second most common type is fracture of lateral or distal third of clavicle, accounting for 16% to 30%. Less than 3% of all clavicle fractures are fractures of medial or proximal third of the clavicle.[2-4] Neer in 1968 classified distal clavicle fractures according to the location in relation to the coraco-clavicular ligaments.[6]

Neer original series of clavicle fractures observed unusually high rate of non-union or delayed union in displaced lateral third clavicle.[1]
The deforming forces and the rotational movements acting in the clavicle is the reason for the displacement of the fragments which is the reason for delayed or non-union.So Neer suggested operative stabilization for displaced lateral end clavicle. He showed successful results with K-wire fixation with few complications.[6] Consequently, various surgical modalities have been advocated with various techniques of fixation with better outcomes. But still there is no gold standard method of fixation for displaced lateral end clavicle. Gaining control over such rotational movement with some sort of semi rigid to rigid fixation would prevent non-union.

Coracoclavicular reconstruction is generally not required as the ligaments are intact and attached to the distal clavicle.

Anatomical alignment and prevention of rotation will suffice for such fractures to unite.

In view of these consideration our method is a minimally invasive with two 1.5 mm Extra articular Krischner wires and tension band wiring with SS wire, where tensile force is converted into compressive force.[7]

Full active mobilization of the shoulder started around six weeks by the time fracture become sticky and due to its intramembranous nature of ossification, union takes place if a conductive environment is provided. Early implant removal eliminates the complications like wire breakage which is compared to Laxman Rijal et al.[7]

With our method, minimal dissection is required to reduce the fracture. Extra articular K-wires are passed under image intensifier guidance to hold the fracture in an anatomical position and compression at fracture site is given by tension band wiring. We keep the limb supported in an arm pouch for six weeks to make the patient aware that their shoulder needs protection and secondly, the stress exerted by hanging the limb is guarded. Both these facts minimize undue stress at the healing bone. Results of our method of fixation are encouraging with this small cohort study of 12 patients and comparable with other studies.

Results

In our study males are more commonly affected (83%) than female which is compared to Laxman Rijal et al[7] and Chi- Chuan Wu.[8]

In our study 1 cases had associated rib fracture (8%) which is compared to Faisal Qureshi et al who showed 10% associated rib fractures.[9]

In our study most common mode of injury with RTA (75%), fall with an out stretched hand (25%) which is compared to Robinson who showed simple fall (25%), RTA (29%).[5]

In our study we achieved 100% union in all cases which is compared to Neer who reported 100% union with K-wires,[6] Kona et al showed 52.6% union[11] and Yih-Shiunn Lee et al showed 95% union with tension band wires.[10]

Loosening of Kirshner wires, migration, undue stress during active mobilisation, back out, and breakage are known complications with only Kirshner wires fixation. In our study We addressed one case had hardware irrigation problem resolved by implant removal after fracture unioun.

CONCLUSION:

Lateral end clavicle fractures are the second most common clavicle fractures encountered in orthopaedics practice which accounts 16%to 30%. The deforming forces and the rotational movements acting in the clavicle is the reason for the displacement of the fragments which is the reason for delayed or non-union. Hence the displaced lateral end clavicle fractures necessitate fixation. Anatomical alignment and prevention of rotation will suffice for such fractures to unite.

Our method is a minimally invasive with two 1.5 mm Extra articular Krischner wires and tension band wiring with SS wire, where tensile force is converted into compressive force which helps in fracture union. Full active mobilization is allowed with the implants. Early implant removal as soon as there is a radiological signs of union may minimize implant related complications.

Rigid internal fixation between clavicle and coracoid or clavicle and acromian will fail, as it interferes with the normal rotational movement of the clavicle with relation to the coracoid and acromion. Furthermore, if the fracture unites with such procedures, implant removal must be before full mobilisation is started. These fixations demand a second operation and extensive exposures for implant removal. The same is true with coracoclavicular reconstruction, which requires extensive exposure with soft tissue damage and risk of neurovascular injury.

To conclude the clinical and radiological outcome with two 1.5 mm Extra articular Krischner wires and Tension band wiring with SS wire for displaced Neer Type 2 lateral end clavicle fractures were encouraging.

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