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Case Report: Management of Segmental Clavicle Fracture Using Lateral End Clavicle Plate

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Abstract: ***Background: Segmental clavicle fractures are very rare, with few articles described in English literature. Most commonly clavicle fracture occurs in the diaphysis followed by lateral end and least in the medial end. Segmental clavicle fracture occurs when there is a high energy trauma and is usually associated with other injuries like rib fracture or pneumothorax. They occur less often after direct trauma, and this has been the mechanism described in segmental fractures in which there is generally multiple trauma in the clavicle. The diagnosis is simple with local examination and radiographs as clavicle is a subcutaneous bone. In contrast to simple clavicle fractures which give good results without surgery, segmental clavicle fractures need to be surgically fixed early due to loss of blood supply of the fractured segments. Case Presentation: A 47 yr old female presented to kurla babha hospital opd with complaints of pain in the right shoulder following a history of fall from stairs. On examination she had swelling on the right side of her supraclavicular area and there was tenderness on palpation of the medial and lateral end of clavicle. She was having difficulty in moving her right shoulder. She was advised to get a radiograph done of the right clavicle with shoulder which revealed segmental clavicle fracture. She was given figure of 8 splint and was admitted in ward. Routine investigations were sent and she was posted for surgery after 2 days. Open reduction and fixation was done with the use of lateral end clavicle plate. Post op patient was stable and was shifted to ward. Post op dressing was clean with no complications. She was then discharged on 5th post op day and was advised to follow up in OPD. Conclusion: Segmental clavicle fractures are rare with few case reports being described in literature. Diagnosis requires careful radiographic examination in various views. Surgical management gives a good outcome. But care has to be taken to watch for any complications like lung injury, rib fractures or head injury which are usually accompanied with segmental clavicle fractures.***

Keywords: Segmental clavicle fracture, lateral end clavicle plate

1. Introduction

Clavicle is also known as the collar bone, slightly S shaped attached by ligaments to the top of sternum. It lies horizontally and articulates with sternum and first costal cartilage medially and with the acromion of the scapula laterally. It is subcutaneous throughout its length; its medial two thirds are convex forward and its lateral third is concave forward.

Clavicle fractures are common injuries in young, active individuals, especially those who participate in activities or sports where high-speed falls (bicycling, motorcycles) or violent collisions (football, hockey) are frequent, and they account for approximately 2.6% of all fractures. It is more common in males. The majority of clavicular fractures (80% to 85%) occur in the midshaft of the bone, where the typical compressive forces applied to the shoulder and the narrow cross section of the bone combine and result in bony failure.

Distal third fractures are the next most common type (15% to20%), and, although they can result from the same mechanisms of injury as that seen with midshaft fractures, they tend tooccur in more elderly individuals from simple falls.

Medial third fractures are the rarest (0% to 5%), perhaps due tothe difficulty in accurately imaging (and identifying) them. In segmental fractures, the fractured segment suffers the action of muscular forces and may evolve with blood supply failure, for which reason fixation should be performed early.

Allman classified the fracture based on position into proximal (Group I), middle (Group II), and distal (Group III) third fractures. Neer divided distal clavicle fractures into three subgroups, based on their ligamentous attachments and degree of displacement.

Type I: Distal clavicle fracture with the coracoclavicular ligaments intact

Type II: Coracoclavicular ligaments detached from the medial fragment, with the trapezoidal ligament attached to the distal fragment

IIA (Rockwood): Both conoid and trapezoid attached to the distal fragment
IIB (Rockwood): Conoid detached from the medial fragment

Type III: Distal clavicle fracture with extension into the AC joint.

Clinical features:
1) Pain on moving shoulder
2) Swelling
3) Tenderness
4) Bone may poke through skin

Diagnosis: Radiograph of the clavicle and involved shoulder is usually enough. CT scan is sometimes useful for diagnosing medial end fractures.

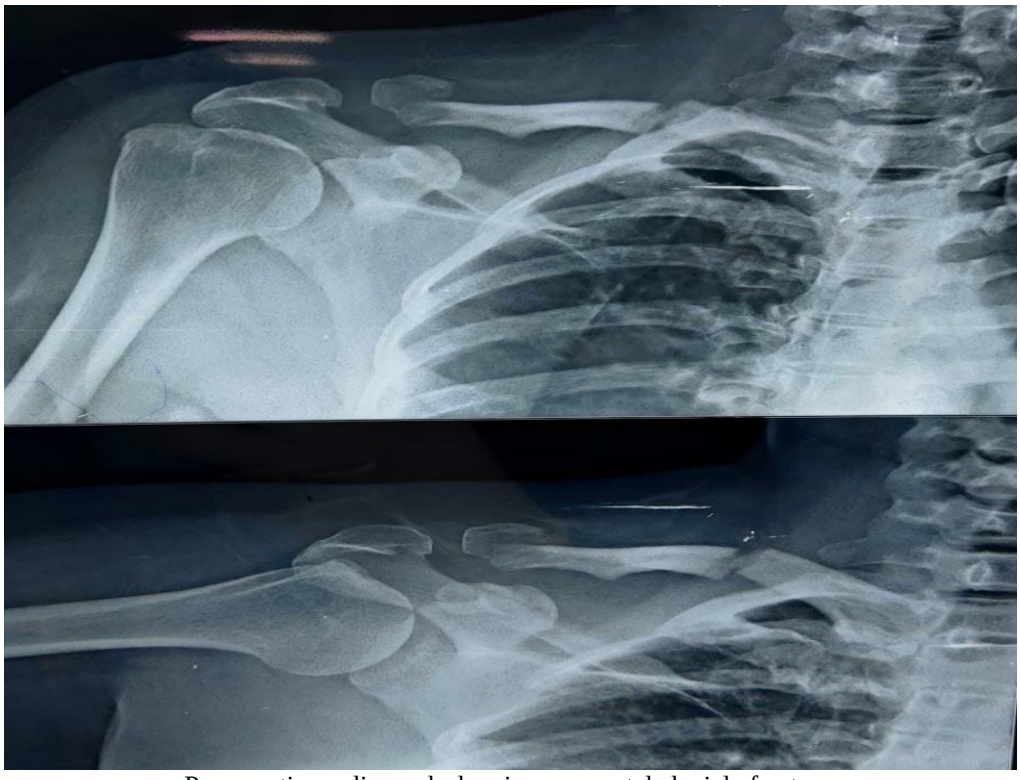
Treatment options:
1) Nonsurgical:
   a) figure of 8 or arm sling.
   b) analgesics
2) Surgical:
   a) plates and screws

b) tens nail or percutaneous pins.

2. Case Presentation

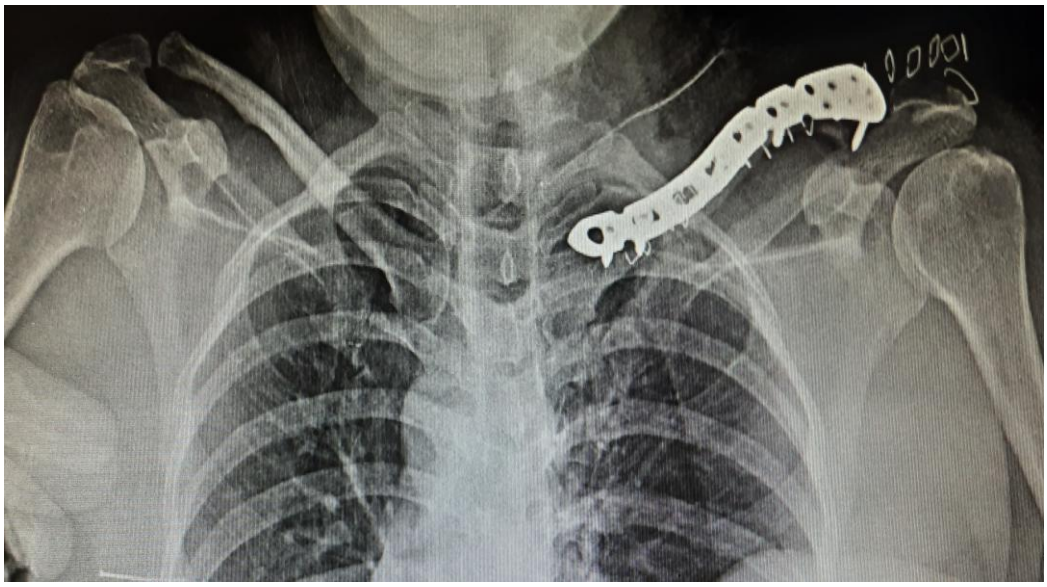
A 47 yr old female presented to kurla babha hospital opd with complaints of pain in the right shoulder following a history of fall from stairs. She had no complaints of breathing difficulty. No history of head injury or pain in other extremities.

On examination she had swelling on the right side of her supraclavicular area and there was tenderness on palpation of the medial and lateral end of clavicle. She was having difficulty in moving her right shoulder. She was advised to get a radiograph done of the right clavicle with shoulder which revealed segmental clavicle fracture. She was given figure of 8 splint and was admitted in ward.



Preoperative radiograph showing segmental clavicle fracture

Routine blood investigations were sent and she was posted for surgery after 2 days. General anesthesia was given. Incision was taken along the superior border of clavicle. Platysma was cut. Fracture was identified. Reduction was done using bone holding clamps. Fracture fixation was done with the use of 6 hole lateral end clavicle plate. Reduction was found satisfactory. Incision was closed in layers after giving wash. Sterile dressing was done. Post op patient was stable and was shifted to ward. Post op dressing was clean with no complications. She was then discharged on 5th post op day and was advised to follow up in OPD.



Post operative radiograph showing right side clavicle fixed with lateral end plate

3. Discussion

Osman *et al* treated a similar case of fracture of the diaphysis and lateral third of the clavicle, which was associated with ipsilateral rib fractures and consequent pneumothorax. The patient underwent plateosteosynthesis.

Miller *et al* presented a report of fracture of the medial and lateral extremity of the clavicle with the use of a reconstruction plate and another with locking T-plate.

Osteosynthesis of diaphyseal clavicle fractures with locked plates is an excellent treatment option, and some authors have treated segmental fractures similar to this one using this method. We agree with the indication of osteosynthesis in this type of fracture due to the risk of pseudarthrosis, according to Heywood and Clasper who treated segmental clavicle fracture with a superior plate and use of the hook plate, but the latter is seldom used due to risk of osteolysis.

The choice of plates as diaphyseal clavicle fracture synthesis material is more common, and their anterior placement is more aesthetic, while the superior placement has the advantage of greater rigidity yet they increase the risks of neurovascular lesion and prominence of the plate. The intramedullary method has also been used in diaphyseal fractures, through threaded, smooth wires, locked mobile nails and cannulated screws; but in the case of segmental fracture, the "S" shape of the clavicle prevents the same nail from fixing the two fractures with rigidity.

4. Conclusion

Segmental clavicle fractures are rare with few case reports being described in literature. Diagnosis requires careful radiographic examination in various views. Surgical management gives a good outcome. But care has to be taken to watch for any complications like lung injury, rib fractures or head injury which are usually accompanied with segmental clavicle fractures.

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