

## CASE REPORT

### Idiopathic non-traumatic or stress fracture of clavicle

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#### ABSTRACT

Stress fracture is a known entity with common occurrence in lower limbs especially in military recruits and athletes. Stress fracture of the upper limb is a rare occurrence, but is much rarer in clavicle. Only 16 to 20 such case reports have been mentioned in literature. Stress fracture or non-traumatic idiopathic fracture of the clavicle in a non athletic patient without any pre-disposing factors is very rare and till date only 2 such cases have been reported. Such patient requires a detailed work-up and high index of suspicion on the part of treating physician. Our case report is the 3rd such case report and highlights several points with regards to its diagnosis, treatment and prognosis.

**Key words:** stress, fractures, clavicle, idiopathic

#### INTRODUCTION

In 1855, Breithaupt first described an overuse injury of the fifth metatarsal in marching Prussian soldiers (March Fracture) and later in 1958 Devas first reported this injury in athletes.<sup>1</sup> Stress fractures account for 10% of sporting injuries predominantly in lower extremity in compressive load bearing bones. Upper limb stress fractures are very rare as compared to the lower limb, but are on the rise in recent times.<sup>2</sup> They have been reported in scapula, humerus, radius, ulna and clavicle. Stress fractures are common overuse injuries seen in athletes and military recruits and have a multifactorial pathogenesis usually involving repetitive sub-maximal stresses. Intrinsic factors, such as hormonal imbalances, may contribute to the onset of stress fractures, more so in women.<sup>3</sup>

Only two cases of non traumatic idiopathic/stress fractures of the clavicle in non athletic individuals have been described in the literature.<sup>4,5</sup> Here we report a very rare case of such a fracture in a 20-year-female with no co-morbidities and a non athletic lifestyle.

#### CASE REPORT

A 20-year-old female patient working as a maid with good nutritional status and medium built presented in our outpatient department with chief complaints of pain in the clavicular region for 8 to 10 days (Fig. 1). The pain was continuous in nature, increasing with activity and relieved partially with rest and analgesics. It was localized at the medial aspect of left clavicle and was non-radiating. There was no history of any trauma. Patient initially was treated conservatively with analgesic and rest for 2 weeks without any

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arm sling or Velpeau bandage. After 4 weeks, the pain improved significantly and there were no restrictions of movement, however the patient complained of a lump localized at the medial border of the clavicle. On examination the lump measured 2 cm by 2 cm, it had a bony hard consistency, rounded borders smooth edges and was not adhered to the skin or other surrounding musculature and clinically was arising from the underlying clavicle at its medial end. There were no inflammatory features, lymphadenopathy or similar lumps elsewhere in the body. There was no history of any constitutional symptoms, fever, loss of weight or loss of appetite. The patient was able to perform



**Figure 1,** Clinical image of patient with swelling over medial end of left clavicle.

her daily routine and household activities with ease and her only complaint was regarding the cosmetic deformity due to the clavicular swelling. An antero-posterior view of shoulder X-ray performed at the end of the fourth week showed an undisplaced fracture of the medial third of the left clavicle with abundant callus and no apparent lytic lesions (Fig. 2). All blood investigations including calcium, phosphorous, parathormone and alkaline phosphatase were within



**Figure 2,** X-ray image showing healing Stress fracture of Left clavicle as indicated by an arrow



**Figure 3,** Computer tomography cuts showing (antero-posterior) Stress fracture of left clavicle with healing callus as indicated with arrows.

limits. Computerized tomography (CT) and magnetic resonance imaging (MRI) were performed to rule out neoplastic lesions or pathological fractures. All were normal showing undisplaced healing fracture of medial end clavicle with abundant callus (Fig. 3, 4). A needle biopsy was done which showed only evidence of regenerating bone suggestive of bridging callus. The patient and her relatives were very sure of absence of trauma and no strenuous activity. The fracture healed forming an abundant callus, and the patient had a full range of movement of the shoulder, and was able to perform all her household activities with no limitations.

## DISCUSSION

Clavicle stress fractures are particularly rare, with only 16 to 20 reported cases. The clavicle is the only bone which connects the upper limb and the axial skeleton and contributes significantly in energy transfer from hand to trunk. Many theories are hypothesized in which stress fractures of the clavicle may occur. They all involve repetitive activities of the upper limb or alteration in the biomechanics of the clavicle.<sup>5,6</sup> Harrington demonstrated that the critical force for buckling the clavicle is approximately 1 to 3 times the body weight.<sup>7</sup> Classically stress fractures present as an insidious onset of pain after an abrupt increase in the duration or intensity of any strenuous activity. In our case there was no history of trauma or any increase in the intensity of the patient's activities. The diagnosis is mainly clinical with high level of suspicion and also as diagnosis of exclusion. Plain radiography, scintigraphy, computed tomography, and magnetic resonance imaging are useful diagnostic tools. The differential diagnosis should include traumatic or pathological fracture, neoplastic lesion, infections, metabolic bone diseases and bone dysplasia.<sup>8</sup> Most stress fractures are uncomplicated and can be managed by rest and restriction from the precipitating activity. Common sites of stress fracture are the femoral neck (tension side), the patella, the anterior cortex of the tibia, the medial malleolus, the talus, the tarsal navicular, the fifth metatarsal, and the great toe

sesamoids.<sup>1</sup>

The first stress fracture of clavicle was reported in a boat rower.<sup>9</sup> A stress fracture clavicle has been reported following radical neck dissection, as a complication of coracoclavicular ligament reconstruction with a Dacron loop. It has also been reported in a male javelin thrower, diver, female gymnast, weight lifter, a human tower stuntman, a cricket player and a baseball player.<sup>10</sup> All of these fractures are caused by strenuous activities and may be prevented by rest, appropriate training and conditioning. Most of these fractures heal with a period of relative rest followed by a structured rehabilitation program. Very rarely these fractures may require surgical intervention.<sup>11</sup> Stress fracture results from combination of load, repetition, and inadequate recovery that eventually results in injury. Extrinsic factors leading to injury include strenuous activities like training regimens, playing equipment (footwear, playing surface), and nutritional habits. Intrinsic factors include anatomic variation, muscle endurance, and hormonal effects.<sup>1</sup><sup>12</sup> In our case we did not identify any of these potential risk factors. Also conservative treatment yielded good results with union evident, although some cosmetic deformity persisted.

Only two cases of non-traumatic stress fracture of the clavicle have been published in the literature. Margaret Birks *et al*<sup>5</sup> reported similar case in a 47-year-old nurse involving medial aspect of clavicle without any pre-disposing factors. She was managed initially conservatively. Three months later, on returning to her work she was unable to perform any moving or handling activities. Repeat plain radiography and computerized tomography confirmed non-union of the fracture. Percutaneous biopsy of the fracture was performed and revealed only bone necrosis with no abnormal features. Surgery was performed, with a reconstruction plate and bone graft which led to fracture union and functional recovery. The second case was a bilateral non-traumatic idiopathic clavicle fracture reported by Quinn *et al* in a 20-year-old healthy male with no predisposing factors.<sup>6</sup> Presentation of patient was similar to that of ours. In this article the



**Figure 4**, Computer tomography cuts showing (axial) stress fracture of left clavicle with healing callus as indicated with arrows.

patient suffered from a bilateral non-traumatic idiopathic fracture of the medial end of clavicle. All the blood tests were normal and the Magnetic resonance, Computerized Tomogram scan confirmed the diagnosis. The presentation of patient was similar to that of ours. The left side required surgical intervention with plate osteosynthesis whereas the right side healed with conservative treatment.

A high level of suspicion is needed to establish the diagnosis of stress fracture or non-traumatic idiopathic fracture of the clavicle in patients with no known predisposing factors, in addition to an adequate clinical, radiological and histological work up. The treatment of these extremely rare conditions must be individualized depending on the symptoms and functional needs of the patients. Lastly we would like to suggest that differential diagnosis of a fractured clavicle should be expanded to include idiopathic non-traumatic fractures. To our knowledge, and as per our search in the literature only two such case reports have been published till date.

## CONCLUSION

No firm conclusions can be made from a single case report but from review of literature, stress fractures must be diagnosed on time as early as possible for good outcome. High level of suspicion and aggressive work up of patients with symptoms corresponding to stress fracture irrespective of presence or absence of pre-disposing factor is mandatory for clinicians.

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