"Radio-Ulnar Synostosis Following Isolated Fracture Of Shaft Of Ulna And Its Treatment By Radical Excision And Interposition Of Tensor Fascia Lata Graft"

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Abstract

Radioulnar synostosis is a well recognized and disabling complication of fractures of forearm bones; however it is very rare following single forearm bone fracture. Excision of synostosis alone carries a high potential for recurrence. Therefore interposition of varieties of foreign or biologic materials has been recommended. We describe a patient with a fixed type II diaphyseal radioulnar synostosis following an isolated fracture of ulna treated with radical bony excision and tensor fascia lata graft interposition.

Introduction

Synostosis or cross-union between the radius and ulna resulting in complete loss of supination and pronation is a well recognized complication of fractures of forearm bones, which significantly impairs the ability to perform many activities of daily life (Vince and Miller, 1987). It is very uncommon following a single forearm bone fracture where overuse of injured extremity can lead to exuberant callus formation leading to synostosis between radius and ulna (Posman and Little, 1986).

Excision of synostosis alone carries a high potential for recurrence. Therefore interposition of varieties of foreign or biologic materials including bone wax, silicone, muscle, fat, and fascia has been recommended. Additionally use of nonsteroidal anti-inflammatory medicines and postoperative radiotherapy has also been reported to decrease the chances of recurrence (Jones et al, 2004).

We describe a patient with a fixed type II diaphyseal radioulnar synostosis following an isolated fracture of ulna treated with radical bony excision and tensor fascia lata graft interposition.

Case Report(s)

A 23 years old laborer sustained an isolated fracture of the right distal ulna on following a fall from bicycle, which was immobilized in an above elbow plaster cast by a local practitioner. Patient removed the cast himself after 10 days and continued to work. Patient presented to us after six months of injury with range of motion of 50 pronation to 300 supination and normal wrist and elbow movements. X-rays (Fig 1.) revealed a radio-ulnar synostosis involving distal 1/3rd of the right forearm. On 5th January 2006, the synostosis was excised and a tensor fascia lata graft harvested from patient’s left thigh was interposed between the radius and ulna.

Surgery was conducted under general anaesthesia and above elbow tourniquet control. A volar approach was used and care was taken for minimal soft tissue dissection. (Fig. 2) The synostosis was excised with the help of osteotomes and rongeurs. A tensor fascia lata graft, measuring 8 x 4 cm. was taken from the opposite thigh and wrapped circumferentially around the ulna and ends were sutured with 2-0 vicryl. Full pronation and supination was achieved under anaesthesia. Tourniquet was deflated and hemostasis achieved. Wound was closed in layers and a compression bandage was applied. Patient was started on physiotherapy from the next morning with a unique Indian musical instrument called ‘Damru’ (Fig. 3) which is played by repeated supination, pronation movement of forearm. After 3 months, patient’s range of motion was 700 pronation to 900 supination (Fig. 4). This range of motion was same at his last follow up on 15th May 2009. Radiographs showed no evidence of recurrence.

Discussion

Post traumatic radio-ulnar synostosis is a rare
complication of forearm bone fracture and is even rarer after isolated fracture of single bone forearm (Posman and Little, 1986). A number of risk factors have been implicated following fracture of both bones of forearm, including both fractures at the same level, severe trauma with marked soft tissue damage, open reduction and internal fixation of both fractures through single incision, delayed open reduction and internal fixation and closed head injury leading to an increased propensity towards heterotopic bone formation.

Only a few cases have been described in literature following isolated fracture of distal ulna and the usual factor implicated is ‘overuse’ of the injured extremity leading to exuberant callus formation, further leading to synostosis. This exuberant callus may also result from subperiosteal hemorrhage, simultaneous tear of the periosteum of radius or it may actually represent a myositis ossificans of the interosseous muscles. It is often very difficult to assess the degree of soft tissue injury as displacement of ulna is prevented by intact radius (Posman and Little, 1986).

Vince and Miller (Vince and Miller, 1987) classified radio-ulnar synostosis according to their location—
Type I – Distal intraarticular area of radius and ulna Type II – Middle third and distal third nonarticular area of radius and ulna Type III – Proximal third of radius and ulna

However they did not discuss the rationale for their grading system.

Most of the recent literature on the treatment of post traumatic radio-ulnar synostosis has advocated excision of synostosis followed by interposition of either foreign or biologic material. Non-biologic materials have been superseded by the use of fascia, fat and muscle as they prevent scar formation better than any foreign material. In our case, we used the tensor fascia lata graft (Friedrich et al, 2006) as it is easy to harvest and there is less donor site morbidity.

Whatever may be the interposition material, early postoperative mobilization is the key to success. The value of continuous passive motion, low dose postoperative radiation and bisphosphonates remains to be determined, but they should probably be considered as adjutants. In our case, Damru, a unique Indian musical instrument proved to be very useful. Recurrence more than 6 months after excision is unusual.

Conclusion

This case report emphasizes the fact that radioulnar synostosis, which classically follows both bone forearm fracture at same level, can also occur following single bone forearm fracture. This complication was treated by excision of the mass with interposition of tensor fascia lata. In the postoperative rehabilitation, a unique Indian instrument called ‘Damru’ is a useful adjunct.

References

Illustrations

Illustration 1

Preoperative X-rays showing radio-ulnar synostosis involving distal 1/3rd of the right forearm

Illustration 2

Intraoperative photograph showing radio-ulnar synostosis involving distal 1/3rd of the right forearm
Illustration 3

A unique Indian musical instrument called 'Damru' which is played by repeated supination, pronation

Illustration 4

Final range of motion
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