

Closure Of Ulnar Pseudoarthrosis Following Sauve-Kapandji Procedure. A Case Report

C K Low F.A.M.S., M. Med, F.R.C.S., Y P Low F.A.M.S., F.R.C.S.

*Department of Orthopaedic Surgery
Tan Tock Seng Hospital, Singapore*

ABSTRACT

We present a rare case of excessive formation of bone at the pseudoarthrosis of distal ulna following Sauve-Kapandji procedure in a patient with head injury. The gap in the ulna was filled by bone leading to closure of the pseudoarthrosis. The forearm was fixed at mid prone position. Range of forearm rotation was restored by Darrach procedure. Further bone formation was prevented by covering the raw bone surfaces with tendon and six weeks of indocid. At one-year follow up, there was no recurrence of excessive bone formation and no loss of forearm rotation.

CASE REPORT

A 46 year-old man fell from scaffolding of 6-meter high at work. He had loss of consciousness. There were multiple lacerations over the scalp. He sustained open depressed frontal bone fracture; closed comminuted right distal radial fracture and contained liver hematoma. The open frontal fracture was treated with wound debridement, elevation of the depressed fragment and internal fixation. The liver hematoma was treated conservatively. The distal radial fracture was treated by manipulation and immobilized in a cast for 8 weeks. Radiological examination of the right wrist at 8 weeks showed union of fracture. There was comminution of the ulnar aspect of the distal radius with incongruity of the distal radioulnar joint. Three months following union of fracture, he experienced increasing pain at the right distal radioulnar joint. The pain became worse and was not relieved by analgesics, wrist splint and reduction of activity. There was marked limitation of supination and pronation of the right forearm. Radiological examination of the right wrist showed osteoarthritis of the distal radioulnar joint. Sauve-Kapandji procedure was performed. The distal radioulnar joint was fused with two 4-mm cancellous screws. A pseudoarthrosis was created proximal to the arthrodesis by resection of a centimeter segment of ulna (Figure 1a). The extensor carpi ulnaris (ECU) tendon was split along the midline from the musculo-tendonous junction to the insertion. The radial half was transected at the musculo-tendonous junction and a tendon slip based on

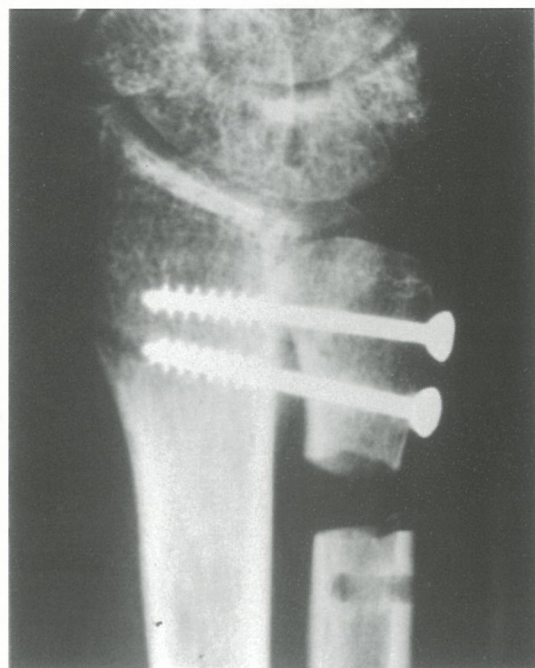


Fig 1a. - The immediate postoperative radiograph of Sauve-Kapandji operation showed fusion of distal radioulnar joint and creation of a pseudoarthrosis at the distal ulna.

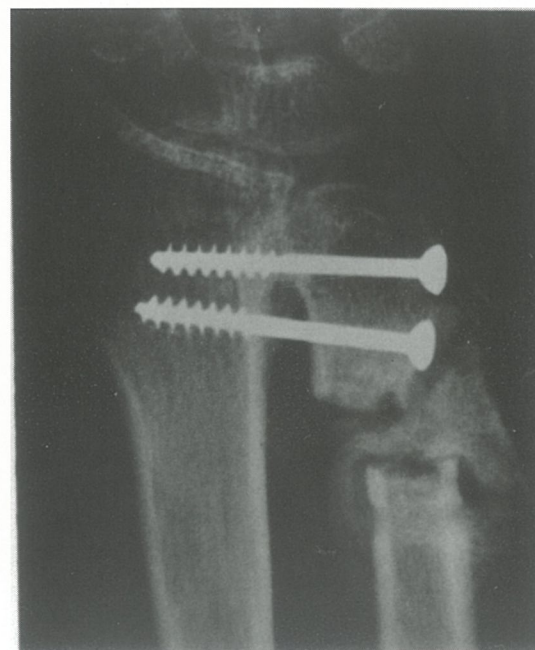


Fig 1b. - Radiograph at 8 weeks after Sauve-Kapandji operation showed excessive bone filling the gap created at the distal ulna resulting in forearm being fixed in mid prone position.

*Correspondence should be sent to:
Dr Low Chee Kwang
Department of Orthopaedic Surgery
Tan Tock Seng Hospital
11 Jalan Tan Tock Seng
Singapore 308433*

its insertion was created. A 3.5-mm drill hole was made 5 mm proximal to the distal end of the ulnar shaft. The proximal end of the tendon slip was treaded through the hole in a dorsal to palmar direction. It looped around the ulnar 1/2 of ECU and weave on to itself with tension. A sling around the ulnar 1/2 of ECU was thus created. It stabilized the ulnar shaft to prevent radial deviation of the bone. Postoperatively, the patient underwent intensive physiotherapy. However, the range of forearm rotation deteriorated after one month. Radiographs showed excessive bone formation at the pseudoarthrosis. Another month later, the gap was filled with bone with closure of the pseudoarthrosis (Figure 1b). The forearm was fixed at mid prone position. The forearm rotation was restored by Darrach procedure. Fusion at distal radioulnar joint was taken down and the ulna head excised distal to the tendon sling. The radial slip of the extensor carpi ulnaris was dissected and cut one cm below the distal end of the ulna. The raw surface of the ulna was covered with the tendon slip attached to the ulna. The distal portion of the radial slip was rolled into an anchovy and filled the gap between the ulnar articular surface of distal radius and the distal end of ulna. Drill holes were made at the articular surface of the distal end of radius and the tendon anchovy anchored to the bone using sutures to cover the raw bone surface. The ulna shaft was stable because the tendon sling was preserved. The patient was on 6 weeks of Indocid to prevent excessive bone formation. At 1-year follow up, there was no loss of forearm motion. Radiograph did not show excessive bone formation between the distal end of radius and ulna (Figure 1c).



Fig 1c. - Radiograph at one year after Darrach procedure showed absence of ulna head. There was no excessive bone formation and the forearm rotation was maintained.

DISCUSSION

Sauve-Kapandji procedure involved fusion of the distal radioulnar joint. A centimeter segment of ulna was excised just proximal to the fusion to create a pseudoarthrosis. Rotation of the forearm occurred at the pseudoarthrosis. In this case, excessive bone formation occurred at the pseudoarthrosis resulting in obliteration of the gap. The forearm was fixed in mid prone position and the hand function was poor.

Excessive bone formation has a strong association with head injury. The aetiology is unknown and many proposed theories have been described.¹⁻⁴ In this patient, there was history of head injury 5 months before the Sauve-Kapandji operation.

The forearm motion was salvaged with taking down the fused distal radioulnar joint and excision of the ulna head. Excessive bone might form between the raw articular surface of distal radius and distal end of ulna. This complication was prevented by long term Indocid^{5,6} and covering the raw bone surfaces with tendon. Stability of the ulna after resection of ulna head was maintained by preserving the tendon sling created at Sauve-Kapandji operation.

Excision of the excessive bone to recreate the pseudoarthrosis was considered. To prevent recurrence of excessive bone formation, the periosteal sleeve on both side of the pseudoarthrosis should be excised. It would involve taking down the tendon sling and destruction of the sling would destabilize the ulna shaft.

This case illustrates that excessive bone formation can occur in head injury patients. It can recur even after the excessive bone is excised. After the Darrach procedure, it is wise to give the patient six weeks of postoperative Indocid and covered the raw bone surfaces with soft tissues to prevent excessive bone from forming in the gap.

REFERENCES

1. Wildburger R, Zarkovic N, Dobnig H, Petek W, Hofer HP. Post-traumatic dynamic change of carboxyterminal propeptide of type I procollagen, alkaline phosphatase and its isoenzymes as predictors for enhanced osteogenesis in patients with severe head injury. *Res Exp Med (Berl)* 1994; 194:247-59.
2. Wildburger R, Zarkovic N, Tonkovic G, Skoric T, Frech S, Hartleb M, Loncaric I, Zarkovic K. Post-traumatic hormonal disturbances: prolactin as a link between head injury and enhanced osteogenesis. *J Orthop Trauma* 1996; 10:258-63.
3. Wildburger R, Zarkovic N, Petek W, Egger G, Leopold U, Schweighofer F. Hypertrophic callus formation and craniocerebral trauma: early diagnosis and behavior of basic fibroblast growth factor. *Unfallchirurg* 1996; 99:17-23.
4. Renfree KJ, Banovac K, Hornicek FJ, Lebwohl NH, Villanueva PA, Nedd KJ. Evaluation of serum osteoblastic mitogenic activity in spinal cord and head injury patients with acute heterotopic ossification. *Spine* 1994; 19:740-6.
5. Moore KD, Goss K, Anglen JO. Indomethacin versus radiation therapy for prophylaxis against heterotopic ossification in acetabular fractures: a randomised prospective study. *J Bone Joint Surg* 1998; 80B:259-63.
6. Ritter MA. Indomethacin: an adjunct to surgical excision of immature heterotopic bone formation in a patient with a severe head injury. A case report. *Orthopedics* 1987; 10:1379-81.