



## RESEARCH ARTICLE

### A CASE OF KEINBOCK'S DISEASE WITH NEGATIVE ULNAR VARIANCE AND ITS MANAGEMENT – A RARE CASE REPORT

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#### ABSTRACT

Keinbock's disease or Avascular Necrosis of lunate bone is a rare disorder leading to abnormal carpal motion. Although difficult to diagnose, detection in early stages of the disease and appropriate management can lead to a good functional outcome. Here, the authors present a case of 36 year old male who presented with Avascular necrosis of lunate bone of right wrist with Lichtman's stage IIIA. The patient underwent joint levelling procedure by radial shortening osteotomy and associated benign cyst or geode drained and bone grafted. At 1 year follow up, patient had complete relief of pain and improved range of movement at the wrist joint without any further progression of the disease.

#### INTRODUCTION

Keinbock's disease is an unusual condition leading to osteonecrosis and collapse of lunate bone, which results in chronic wrist pain and dysfunction. It constitutes of less than 1 % of all avascular necrosis seen in the orthopaedic practice. Although the etiology is not well described, history of frequent minor trauma is not uncommon (Schuind, 2008), causing hindrance to the blood supply (Dubey, 2011), of lunate. The treatment of this condition poses a great challenge, as it is rarely detected in early stages. One of the important other proposed etiology is negative variance in the ulna (Beredjiklian, 2009). A decrease in ulnar variance increases the stresses borne by the lunate through the radio-lunate joint. The common staging system used is that of the Lichtman's staging (Saunders and Lichtman, 2011) and the treatment options depend on the stage of the disease the patient presenting with. Here, the authors describe a case of avascular necrosis of lunate of right wrist with Lichtman's stage IIIA for whom operative procedure was done.

#### MATERIALS AND METHODS

A 36 year old male with right hand dominance, presented with chronic wrist pain for 1 year duration and increasing intensity of the pain for 3 months.

The patient gave history of repeated trivial trauma to his right wrist. On clinical examination, tenderness was present in the right wrist over the dorsal aspect overlying the lunate. There was significant reduction in the grip strength. Both dorsiflexion and palmar flexion movements were painfully restricted. There was no wrist joint or carpal instability. Radiological examination of the right wrist showed negative ulnar variance, sclerosis and collapse of lunate with reasonably maintained radio-lunate angle. The Computed Tomography of the affected wrist showed a subchondral cystic lesion (geode) in the distal radial metaphysis, but the other carpal bones were normal. According to Lichtman's staging system, the patient was graded as stage IIIA (Avascular necrosis with collapse of lunate and other carpal bones normal). The patient was planned for joint levelling procedure in the form of radial shortening osteotomy to reduce the radio-carpal stresses and redistribution of stress across the ulno-carpal joint.

#### Procedure

Under regional anaesthesia, upper arm tourniquet control, volar Henry's approach was used for the exposure of radius. Under fluoroscopic control, 4mm shortening of the Radius was done and the osteotomy site was fixed with 3.5mm Dynamic control plating system. The cyst at the distal radial metaphyseal region was opened, fluid drained and the cavity was filled with bone grafting substitute. The patient was immobilised in a above elbow plaster post-operatively. At the 12<sup>th</sup> post-operative day

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the sutures removed, patient advised for mobilisation of elbow and wrist joint and was discharged. The patient was followed up at 6 weeks, 3 months until the osteotomy site was united. At the 3 months follow up period, there was signs of union at the osteotomy site and the distal radial metaphyseal region showed good uptake of the graft. At the final follow up of 1 year, the patient had complete reduction of pain, good regaining of function(both dorsiflexion and palmar flexion) of wrist joint. Radiological examination revealed non-progression of the disease and the other carpal bones remained normal.



Fig. 1. Pre-op Dorsiflexion



Fig. 2. Pre-op Palmarflexion



Fig. 3. Negative Variance



Fig. 4. Radio-Lunate angle



Fig. 5. Lunate collapse

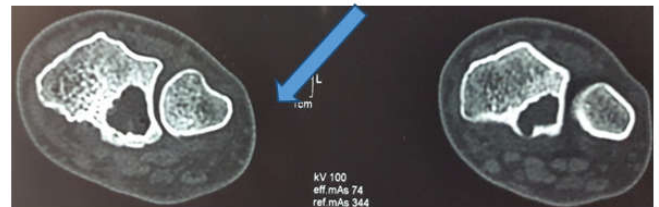


Fig. 6. Distal radial Geode or Cyst



Fig. 7. Lunate collapse, other carpal bones in alignment

## DISCUSSION

Avascular necrosis of lunate per se is a rare entity (Schuind, 2008), diagnosed incidentally for a sprained wrist.



Fig. 11&12. Final Follow up X-rays



Fig. 13 & 14. Final follow up dorsiflexion and palmar flexion

Over the years, various treatment modalities have been proposed and no definite consensus is still available regarding the individualisation of the operative management (Schuind, 2008). Radial shortening osteotomy has been well-accepted as an effective procedure in Keinbock’s disease (Dubey et al., 2011; Beredjikian et al., 2009 and Saunders,2011). Various previous studies have shown that radial shortening is effective in reducing pain, improving the function, range of movements

at the wrist and grip strength for Lichtman’ stages I to IIIA (Khorbi, 2005 and Zenzai et al., 2005).

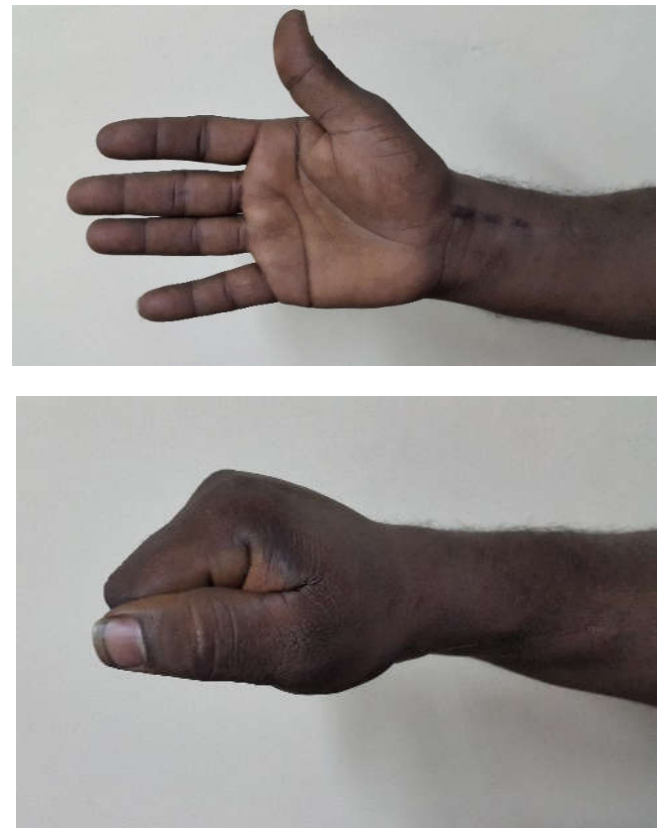


Fig. 15 & 16. Final Follow up Grip strength

In our study, we have performed radial shortening osteotomy of 4mm, for a patient who presented with Lichtman’s stage IIIA keinbock’s disease. The patient had improved grip strength, reduced pain and increased range of movements of his wrist joint at the final follow up.

**Conclusion**

The authors believe that the radial shortening osteotomy procedure is a valuable option for early stages of Keinbock’s disease, as it provides good clinical and functional improvement in these patients with minimal progression of the disease.

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