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Kienbock's disease-avascular necrosis of lunate operated with excisional arthroplasty and Palmaris longus graft interposition

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Abstract

A vascular necrosis of the Lunate bone is also termed as Kienbock's disease. It's a rare disease of unknown etiology and occurs mainly in the age group between 20 – 40 years with males affected twice as commonly as females. Here we present an 29 year old Female presented with pain in her left (non-dominant) wrist for the past one year. The pain was progressively increasing in nature with difficulty in carrying out activities of daily living like holding a glass and toilet activities. MRI revealed a diagnosis of grade 3 Kienbock's disease. Interposition arthroplasty with ipsilateral coiled Palmaris longus tendon was done and followed up for the end result and functional outcome.

Keywords: Kienbock's disease, lunate excision, Palmaris longus, interposition arthroplasty

Introduction

Avascular necrosis of the Lunate bone is also termed as Kienbock's disease. It's a rare disease of unknown etiology and occurs mainly in the age group between 20-40 years with males affected twice as commonly as females. Kienbock in his original article noted that the disease is more common in laborer. Treatment is based on the stage of the disease with surgery being preferred in advanced stages. Various treatment options have been proposed, none of them being proven completely effective. The treatment options include immobilization in cast, joint leveling by ulnar lengthening or radial shortening, revascularization of lunate, scapho-trapezio-trapezoid arthrodesis, scapho-capitate arthrodesis, vascularised bone grafting, lunate resection and vascularised bone capitate/pisiform, prosthetic replacement, proximal row carpectomy and wrist arthrodesis^[1]. We report a case of Kienbock's disease with lunate excision and filling of defect by coiled palmaris longus tendon unit.

Materials and Method

An 29 year old Female presented with pain in her left (non-dominant) wrist for the past one year. The pain was progressively increasing in nature with difficulty in carrying out activities of daily living like holding a glass and toilet activities. Patient had no history of trauma or strenuous activity. Wrist movements were painful and decreased range of motion with 30° of palmar flexion and 60° of dorsiflexion, in comparison to the uninvolved wrist. Patient had a Visual Analogue Scale (VAS) score of 6 for wrist pain. Antero-posterior and lateral radiographs of the wrist showed a collapsed and sclerotic lunate bone with of the wrist. MRI revealed a diagnosis of grade 3 Kienbock's disease (progressive carpal collapse and osteoarthritis) according to the Lichtman *et al.* grading system.

Interposition arthroplasty with coiled Palmaris longus tendon was done. Dorsal incision used to excise the lunate bone and from volar the palmaris longus muscle was identified, detached from its origin, keeping its insertion intact. The muscle belly was removed and tendon was coiled, sutured with ethilon then placed into the void space of lunate. Since tendon rolled formed a good size roll, it fitted snugly in the void. Postoperatively, wrist was immobilized in below elbow volar slab for four weeks. Gradual mobilization was started after four weeks and patient was able to do activities of daily living pain free at final follow up.



Fig 1: Pre Op X-ray



Fig 2: MRI Pictures



Fig 3: Palmaris Longus Graft Preparation and Fixation



Fig 4: Post-OP X-Ray

Discussion

Vascular stasis of the lunate has been proposed as the most important mechanical risk factor for Kienbock's disease^[2]. As a part of reparative process there is a zonal osteopenia of lunate which is the basis for pathological fracture. The Fibrovascular tissue at the fracture site fails to ossify leading to separation and osteonecrosis resulting in bone collapse. Collapse of lunate is associated with carpal instability and decrease in height of proximal carpal row. This finally results in osteoarthritis of radiocarpal joint leading to pain, stiffness and restricted wrist movements. Lichtman Classification^[3] which is a modification of Stahl classification has proven reproducibility and is reliable. The treatment of Kienbock's disease is determined by the stage of the disease Joint leveling procedures are recommended for stage 2 and stage 3a Kienbock's disease. However the role of this procedure in stage 3b is debatable. In late stages of Kienbock's disease with carpal osteoarthritis this procedure is not very effective and a salvage procedure is recommended. Recently advocated is the use of vascularised bone grafts from the distal end of the radius with excellent results being achieved. Excision of lunate is a time tested procedure recommended for late stage Kienbock's disease which results in pain relief and functional improvement. However, filling the void with a coiled tendon after excision of the lunate is recommended to prevent carpal collapse. Silicone replacement arthroplasty vascularised pisiform transposition and coiled tendon grafts are current methods of filling the void^[4]. Coiled tendon grafts are currently the procedure of choice and Palmaris longus tendon is preferred as the graft can be harvested through the same limb. One major issue with palmaris longus tendon is that the volume is often insufficient but in our case after excision of lunate bone the void created was of the same size to be filled with coiled palmaris longus tendon alone with the hope to reduce the chances of post-operative carpal collapse^[5].

Take home message

Kienbock's disease grade 3 can be successfully treated with lunate excision and interposition arthroplasty using same side coiled palmaris longus tendon to give excellent functional results in short-term.

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