



**ORIGINAL RESEARCH PAPER**

**Orthopaedics**

**A CASE REPORT ON TREATMENT OF KIENBOCK'S DISEASE BY IMPLANTATION OF VASCULAR PEDICLE AND BONE GRAFTING**

**KEY WORDS:** vascularised pedicle, bone graft, Kienbock's disease, immobilise, cancellous bone

<b>Dr Nishant Patel*</b>	3rd Year Resident, Department of Orthopaedics, GCS Medical College, Ahmedabad, Gujarat *Corresponding Author
<b>Dr Jyotish Patel</b>	Professor and Head, Department of Orthopaedics, GCS Medical College, Ahmedabad, Gujarat
<b>Dr Vaibhav Vyas</b>	3rd Year Resident, Department of Orthopaedics, GCS Medical College, Ahmedabad, Gujarat

**ABSTRACT** Numerous literatures have described various procedures in the treatment of Kienbock's disease depending upon the severity of the symptoms, patient characteristics and radiological staging. These range from conservative management to surgical procedures. The case under study had Lichtman stage \*\* disease. Vascularised bone grafts provide improved blood flow, osteocyte preservation, and accelerated healing rates. We inserted pronator quadratus pedicled bone graft into our case of lunate osteonecrosis and temporarily fixed the graft. Clinically, the patient reported pain subsidence with improvement in range of motion and grip strength. Vascularised pedicle and bone grafting is an effective way for treatment of early and middle stages of osteonecrosis of lunate.

**INTRODUCTION**

Kienbock's disease is an isolated disorder characterized by osteonecrosis of the carpal lunate. There are several risk factors like age between 15 and 40 years, male sex, dominant hand and increased manual labour. If symptoms are ignored and the disease is left untreated, it results into further fragmentation and collapse of lunate with carpal shortening and secondary arthritic changes. Numerous surgical procedures performed for treatment of Kienbock's disease are (i) core decompression (ii) joint levelling procedures that further include ulnar lengthening & radial or capitate shortening (iii) lunate revascularization and (iv) prosthetic lunate replacement. Since the introduction of biological approach for revascularization of necrotic bones by Hori et al. there have been several donor sites available for vascularised pedicle bone graft in treatment of Kienbock's disease.

**Case Study**

The case is of 47 year old female diagnosed with left lunate avascular necrosis and radiologically classified into Lichtman stage II. Patient was given a fair amount of conservative trial at the end of which patient did not have any relief and was planned for surgical intervention. The patient had neutral ulnar variance

**METHOD**

The patient is placed supine on the operating table with elbow and wrist extended and forearm pronated. Tourniquet was tied but not inflated for better visualization of vessels. After a curvilinear incision centered over the lunate and distal radius, the interval between the fourth and fifth compartments is used. Superficial branch of radial nerve is carefully identified and retracted.

The fourth extensor compartment artery (ECA) is identified and traced proximally to its origin. A ligament sparing capsulotomy is performed to expose the lunate & is prepared for vascularised bone graft. Necrotic bone is removed using a burr or curette while leaving the shell intact. The appropriately sized bone graft is then raised and set into the lunate bone defect. The cortical strut of the graft is kept along the axial alignment to prevent any collapse. Cancellous bone from the donor site is scooped and tightly filled in the cavity to prevent dislodgement of the pedicle. Kirschner wires were inserted for added stability. Postoperatively, the patient is placed into a below elbow cock-up slab for 2 weeks followed by cock- up cast for 6 weeks. Then intermittent mobilization was done after removal of K-wires with removable cock-up splint.

**Table – 1 Range of Motion**

Movement	Pre-op	Post-op
Wrist flexion	71°	75°
Wrist extension	68°	72°
Modified Mayo Wrist Score	75	85



**Image 1: Lunate corticotomy and preparation for vascular pedicle bone graft**



**Image 2: Vascular bone graft pedicle**

**DISCUSSION**

Revascularisation procedures with vascular pedicle bone graft have shown good outcome in treatment of early or mid-stages of Kienbock's disease. In a study of 6 patients treated with 4+5th extensor compartment vascularised bone graft by Hori et al., 4 patients had excellent and 2 had good outcomes of wrist function with no further progression of lunate necrosis.

Based on their classification, Lichtman recommended treatment options at various stages as follows : Stage I – immobilization and consideration for revascularization

procedure; Stage II & IIIA with negative ulnar variance – joint levelling procedure and with positive ulnar variance –

revascularization procedures; Stage IIIB : proximal row carpectomy or STT (scaphoid trapezium trapezoid) fusion and Stage IV : proximal row carpectomy or wrist arthrodesis. While placing the bone graft, the cortical piece was kept longitudinally to prevent further collapse and to resist compressive forces on the lunate. Several donor sites for vascular pedicle bone graft are available over the dorsal radius from which either can be chosen depending on surgeon's skills and requirement.



**PRE-OP**



**POST-OP**



**PRE-OP X-RAY**



**POST-OP X-RAY**

**CONCLUSIONS**

Distal radius vascularised bone graft is an effective method for treatment of Kienbock's disease. The most commonly used 4+5 ECA vascularized radius graft requires less extensive dissection with preservation of the radiocarpal palmar stabilizing ligaments. In the past the authors have concluded that the precise role of the ulna minus variance in Kienbock's disease is unknown because those with the disease can be ulnar positive or negative. The patient under study is working as a housewife and had no history of trauma. This study shows significant alleviation in pain and improved range of motion and grip strength post-operatively. Currently at 6 months follow up, the patient has equal and painless range of motion and equal grip strength on comparison with contralateral normal wrist. The patient did not report any complication and worsening of the symptoms. No limitation of physical activity was reported in follow-up.

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