

## SCINTIGRAPHIC EVALUATION OF KIENBOCK'S DISEASE IN COMPARISON TO PLAIN RADIOGRAPHY

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### ABSTRACT

Kienbock's disease is a rare pathology of uncertain etiology, resulting in osteo-necrosis of lunate bone. The authors present interesting images for comparison of both plain radiography and bone scan findings done in a young male laborer.

### KEY WORDS

Kienbock's disease; bone scan; x-ray; lunate, osteo-necrosis, etiology, osteomalacia, palpable, tenderness, gout, cerebral palsy, sickle cell anemia, tomography, Osteochondral

### INTRODUCTION

It is a disorder clinically evident at the wrist joint. It has been named after Dr. Robert Kienböck from Austria who for the first time described it as osteomalacia of the lunate in 1910 [Kienböck, 1910]. It is presumed to affect people of young age (15-40 years). Clinical manifestation may precede the radiological diagnosis & symptoms mainly include recurrent pain, stiffness, and limitation of extension of wrist. Clinically palpable swelling may also be noted over lunate bone area associated with tenderness on palpation.

### CASE REPORT

The authors present local bone scan and x-ray images of 22 years old male, simple laborer by profession, who sustained a blunt trauma to the right hand about four years ago. He had been treated conservatively and current complaint was intermittent pain in the right hand that worsened on extension & moderately alleviated with oral non-steroidal anti-inflammatory drugs (NSAIDs). Referring physician sent the patient to both the x-ray and nuclear medicine departments with a working diagnosis of Figures.



Figure 1. Plain radiograph of right hand showing sclerotic changes in lunate bone

Kienbock's disease (lunate bone).

The plain x-ray AP view of right hand that showed sclerotic changes of the lunate bone [Figure. 1]. Bone scan was performed

with Tc-99m Methylene diphosphonate (Tc-99m MDP), initial rapid flow & pool phase were obtained in an anterior projection

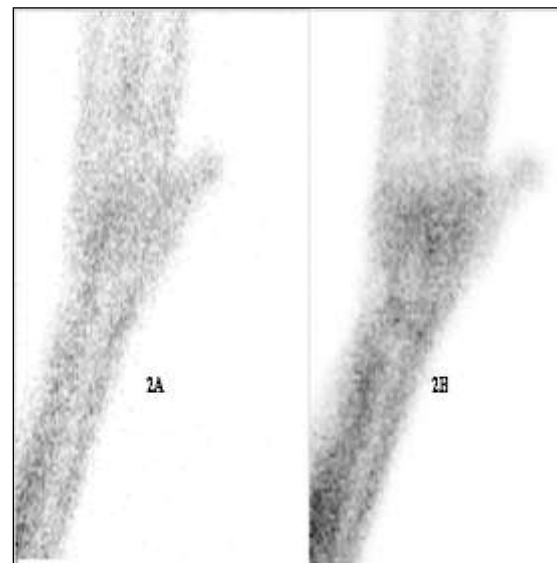


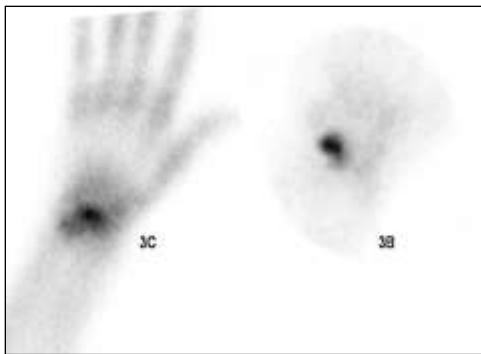
Figure. 2 A & 2 B. The dynamic imaging did not depict any abnormal perfusion of pooling pattern.

Delayed static planar and pin-hole imaging showed abnormally increased focal uptake coinciding with the anatomical location of lunate bone [Figure 3A & 3B]. The scan was reported as positive focal bone pathology of lunate.

## DISCUSSION

Lunate osteomalacia is a peculiar lesion of the lunate or semilunar bone of the wrist resulting in necrosis. Radiographic findings are described as most widely accepted Lichtman's Radiographic Classification of Kienbock's Disease; Stage I-Normal radiograph, Stage II-Sclerosis of lunate with possible decrease of lunate height on radial side only, Stage IIIa-Lunate collapse, no scaphoid rotation, Stage IIIb-Lunate collapse, fixed scaphoid rotation, Stage IV-Degenerative changes around the lunate.

The patho-physiology of the disease mainly includes loss of blood supply to the lunate secondary to multiple probabilities as abnormal blood supply & drainage system, skeletal variations i.e., shorter length of the ulna, any of the forearm bones & the shape of the lunate bone itself. Other possible factors that have also been postulated with reduced blood supply include local trauma, gout, cerebral palsy & sickle cell anemia. Among the limited radionuclide imaging literature on the bone scan appearances of Kienbock's disease, Duong et al were the first to describe a case of Kienbock's disease with correlation of clinical, radiographic, scintigraphic, and pathologic findings [Duong, 1982]. Sowa et al have concluded that magnetic resonance.



**Figure 2 A & 3 B. Delayed static & pin hole bone scan images of right hand showing focal radiotracer uptake in the lunate bone imaging and scintigraphy have almost similar sensitivity but MRI having superior specificity [Sowa, 1989]. Amadio et al re Figure 3 A & 2 B. Initial flow (perfusion) and pool phase of the bone scan.**

Reported a case of false-negative imaging (e.g., plain radiographs, tomography, bone scan, and MRI) after 3 months of symptoms that was found positive for Kienbock's disease during review imaging at one year [Amadio, 1987]. The treatment options vary from case to case depending upon the severity of the disease and may range from simple conservative treatment to more complex surgical interventions. However, the main goal of the treatment is attempted towards restoring the blood supply to the lunate. Attempts have been made for the formation of neolunate by seeding scaffolds of hyaluronic acid and collagen were seeded with autologous stem cells in a rabbit model of Kienbock disease [Peter, 2005]. Future directions in treatment and research of the disease for appropriate management strategies are still a region of interest for researchers [Lichtman, 2010]. Pillukat et al have recommended arthroscopic evaluation to be conducted in addition to radiological parameters claiming that radiological evaluation can over- or under-estimate the articulating cartilage damage [Pillukat, 2010].

Osteochondral reconstruction has also shown promising results [Langer, 2010].

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