

KIENBOCK'S DISEASE: DIAGNOSIS BY MRI (MAGNETIC RESONANCE IMAGING) IN A PATIENT WITH NORMAL RADIOGRAPHIC FEATURES

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ABSTRACT

Kienbock's disease was first described by Austrian radiologist Robert Kienbock in 1910 in Vienna, Austria. It is avascular necrosis of the lunate, generally found in the dominant hand of young active males, usually in their 3rd or 4th decades with a prolonged history of wrist pain. MRI (magnetic resonance imaging) is the diagnostic modality of choice in a clinically suspected case of Kienbock's disease with normal radiographic findings. Herein we have reported a similar case.

Keywords: Kienbock's disease, avascular necrosis, lunate, MRI

Case History

A 28 year old mason presented to our institution with pain in the left wrist for the last five months, which did not subside completely with rest or analgesic medications. There was no history of any major trauma. The patient had been suggested plain radiographs previously, which did not reveal any significant abnormality. An MRI examination of the wrist was thereafter suggested, which revealed the characteristic findings of Kienbock's disease (hypointense signal in T1 and T2 weighted image with reduction in size of the lunate).

Discussion

Kienbock's disease represents avascular necrosis of lunate.¹ Although no definite etiology could be ascertained, Kienbock's disease is a progressive disease² associated with a few conditions, namely negative ulnar variance³ and repetitive trauma, owing

to shearing stress.^{4,5} Patients with Kienbock's disease present with wrist pain of prolonged duration, the diagnosis of which is usually delayed due to minimal findings in conventional radiography, which is generally normal unless the disease has progressed. MRI examination successfully reduces the time to reach the exact diagnosis by detecting the pathology at an early stage. The stages demonstrable by conventional radiography involve decrease in height of the lunate, proximal migration of capitate, scapholunate dissociation, leading to an end result of osteoarthritis of the radiocarpal joint. The avascular necrosis of the lunate is related to its intraosseous blood supply,⁶ which can be categorised into three main types:

- 1) Y pattern (majority of individuals).
- 2) I pattern
- 3) X pattern

Trauma (acute or repetitive microtrauma) compromises these vessels leading to avascularity of the susceptible areas (predominantly the subchondral bone adjacent to the radial articular surface). Symptoms

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and radiological features progress according to the stage of the disease.⁷ MRI staging is based on the Lichtman staging (mentioned within parentheses) of Kienbock's disease:

1. Stage I: (normal radiograph, however compression fracture of lunate and associated negative ulnar variance may be present):

T1 weighted images show focal or diffuse hypointensity. Normal hyperintense marrow may be interspersed within the hypointense areas. T2 weighted images also show hypointense foci demarcating the involved areas (Fig. 1,3).

2. Stage II: (sclerosis involving the lunate):

T1 hypointense areas are noted corresponding to the sclerotic foci, which are also low to intermediate signal intensity in T2 weighted images. Edema and granulation tissue at this stage appears hyperintense in T2 weighted images (Fig. 2). Bone contour and height is still preserved.

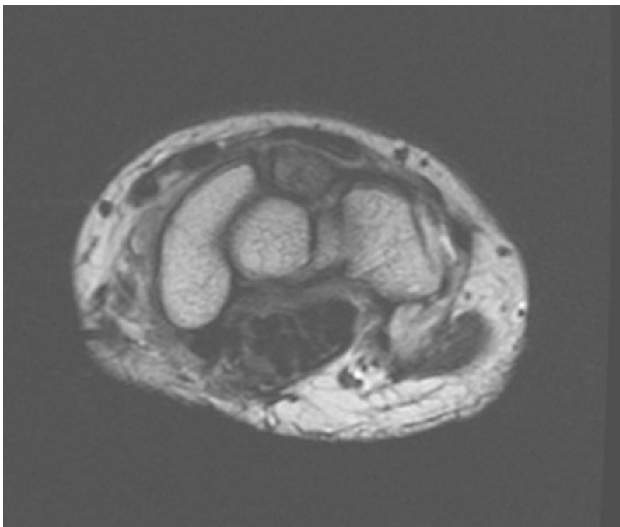


Figure 1: Axial T2WI showing hypointense signal within lunate

3. Stage III: (proximal to distal flattening of the lunate with or without scapholunate dissociation and rotation of scaphoid. Proximal migration of capitate occurs):

MR findings correspond to plain film findings, in addition cartilage destruction is demonstrated (Fig. 4).

4. Stage IV: (Features of stage three and degenerative arthrosis of the radiocarpal and intercarpal joints):



Figure 2: Coronal T2FS CUBE showing hyperintensity in lunate

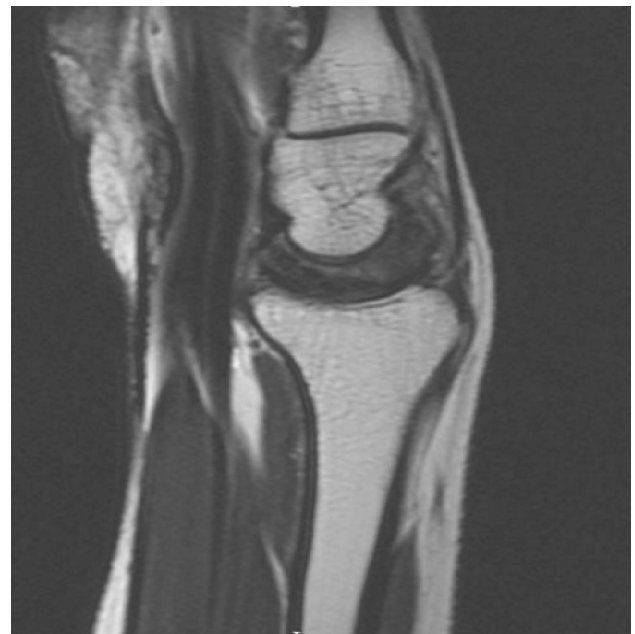


Figure 3: Sagittal T2WI showing hypointense lunate

Both T1 and T2 weighted images show the morphological features as seen in plain films, sclerotic areas appearing hypointense. Bone fragments maybe visualised, appearing hypointense in both the sequences. There is no associated edema, hence no hyperintense foci in T2 weighted images.



Figure 4: Coronal T2WI showing distal to proximal flattening and hypointense signal

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Conclusion

Kienböck's disease is a cause of persistent wrist pain, the early stage of which is generally undetectable in plain films, thus delaying management at a time where the bone can be salvaged. MRI examination hastens the diagnosis and consequently aids in prompt management and relief.

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