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AVASCULAR NECROSIS OF LUNATE BONE: KIENBOCKS DISEASE

Radiology

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ABSTRACT

Kienböck's disease also referred to as osteonecrosis of lunate bone or called lunatomalacia, is a rare condition in which lunate bone loses its blood supply leading to avascular necrosis. Radiography is the initial imaging technique for assessing Kienböck's disease. MRI is likely to be the next best imaging examination after routine radiography and most sensitive and specific in differentiating all disease stages. We are presenting a case of osteonecrosis of lunate bone.

KEYWORDS

Kienböck's disease, lunate osteonecrosis, magnetic resonance imaging

INTRODUCTION:

Kienböck's disease is a rare condition characterised by sclerosis, cystic changes, fragmentation and progressive osteonecrosis of lunate which may ultimately progress to lunate collapse, and wrist instability (1). Magnetic resonance imaging (MRI) can aid in the diagnosis and staging of Kienböck's disease. In particular, MRI is helpful early in the disease when plain radiographs may not reveal abnormalities. We are presenting a case of osteonecrosis of lunate bone.

CASE PRESENTATION:

A 27-year-old male, complained of progressive right wrist pain with restricted movements since last 10 months with preceding history of trauma. Patient also complained of substantial loss of grip strength. Clinical examination revealed marked tenderness over the dorsal aspect of the wrist. Patient had restricted, painful active and passive movement of his right wrist. Neurologic and vascular status findings were satisfactory. Radiograph demonstrated collapse and sclerosis of lunate bone. MRI examination (T1_tse, T2, STIR sequences) were subsequently performed.MR imaging revealed collapsed lunate bone with diffuse abnormal decreased signal on T1 and T2 sequences (Figure 1,2). There is also mild STIR hyperintense signal in the lunate bone. Scar and volume loss is present in the subcutaneous fat in the distal forearm. Small degenerative osteophyte is seen in the distal end of the radius.Diagnosis of avascular necrosis of lunate bone with early osteoarthritis was made on the basis of MR imaging findings(Figure 2).Patient underwent joint levelling procedure to shorten the radius. Conservative therapy was provided pre and post surgical management.

Figure 1. T1-weighted sequence, coronal section showing diffuse hypointense signal in lunate bone (white arrow).

Figure 2.T2-weighted sequence, coronal section showing diffuse hypointense signal in lunate bone (red arrow). T2-weighted sequence, coronal section showing degenerative osteophyte in the distal end of radius (white arrow).

Figure 3.T2 weighted sequence showing scar and loss of subcutaneous plane in distal forearm (white arrow)

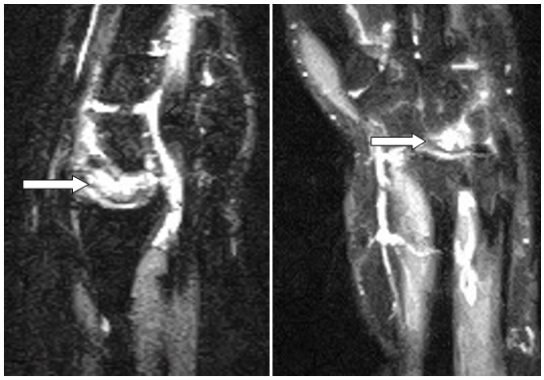

Figure 4.STIR sequence showing hyperintense signal on coronal and sagittal sections. (White arrows)

DISCUSSION:

Kienböck's disease is also known as osteonecrosis, lunatomalacia, and aseptic or ischemic necrosis of the lunate bone (1). Kienböck's disease most often involves the dominant hand in patients between 20 and 40 years of age affecting men more than women. Patients usually present with recurrent history of trauma. The pathophysiology is multifactorial involving avascular and skeletal variations, combined with varying degrees of trauma and insults (1,4) . Clinically picture includes pain, swelling, decreased wrist movement, and weakness of grip. Typically pain and tenderness are localized to the radio carpal joint (4,5).

Radiography is the initial imaging technique for assessing Kienböck's disease. Plain radiography allows the disease to be classified into 4 stages according to Lichtman and associates. Although CT and MRI are more accurate for staging this disease with the same imaging criteria. This classification is highly reliable and reproducible and has the most clinical relevance because it helps in determining the most appropriate treatment (1,3). MRI is likely to be the next best imaging examination after routine radiography and most sensitive and specific in differentiating all disease stages(4). Especially in stage I Kienböck's disease, plain radiographs appear normal and Bone Scintigraphy or Magnetic resonance imaging is required for diagnosis. MRI allows assessment of the lunate and also facilitates in ruling out other disorders (pseudo- Kienböck lesions) such as ganglion cysts and osteoarthritis among others (2). In our patient, MRI revealed signal change and deformity of lunate suggesting avascular necrosis.

The treatment of Kienböck's disease depends on the radiographic stage. More advanced disease is usually treated operatively. The most common procedure is to level the joint by either radial shortening or ulnar lengthening (2).These surgical procedures aim to relieve the pressure on the lunate and thereby reduce the compressive forces and any additional fragmentation and collapse, theoretically restoring the blood flow within the lunate bone.

Kienböck's Disease is a progressive disease and leads to bone destruction and collapse as well as secondary wrist osteoarthritis leading to disruption of its function. Early diagnosis and treatment may prevent progression of necrotic changes and bone collapse.

CONCLUSION:

Kienböck's disease is fundamentally avascular necrosis of the lunate bone. MRI has a vital role in accurately visualising the bone anatomy and staging the process of lunate necrosis and also ruling out other alternative diagnoses that can mimic Kienböck's disease (pseudo – Kienböck lesions). Therefore MRI should be considered after conventional radiography in the care of patients with suspected Kienböck's disease.

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