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Multimodal Imaging of Kienböck Disease: A Case Report

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Abstract | **Case Report**

Kienböck disease corresponds to avascular osteonecrosis of the lunate, with a chronic course. Its diagnosis relies on both clinical findings and imaging. We report the case of a patient presenting with chronic wrist pain, without any history of acute trauma, in whom radiological investigations established the diagnosis. Conventional radiography showed suggestive findings at an advanced stage, including increased density and deformation of the lunate. Computed tomography (CT) demonstrated fragmentation with increased density of the lunate. Magnetic resonance imaging (MRI) enabled assessment of bone viability. Through this case, we highlight the complementary role of different imaging modalities in Kienböck disease.

Keywords: Kienböck disease, Lichtman classification.

INTRODUCTION

Kienböck disease is a rare condition, also referred to as lunate osteonecrosis, characterized by avascular necrosis of the lunate. Its etiology remains poorly defined and it leads to chronic wrist pain and progressive limitation of motion [5,8,10].

The diagnosis of Kienböck disease relies primarily on imaging, including conventional radiography, computed tomography (CT), and magnetic resonance imaging (MRI), which allow the identification of morphological changes and assessment of lunate bone viability [7].

The Lichtman classification is used to stage this condition and guide therapeutic management. We report a case of stage IV Kienböck disease diagnosed in our department [4,6,9].

CASE PRESENTATION

A 23-year-old male patient, with no significant past medical history, presented with chronic right wrist pain evolving over several months, associated with limitation of motion. Clinical examination revealed tenderness on palpation of the dorsal aspect of the wrist and pain during wrist mobilization, without visible swelling, redness, or warmth.

A standard radiograph of the right wrist was performed and showed increased density of the lunate, decreased height, and irregular contours, associated with radiocarpal osteoarthritic changes (Figure 1).

Computed tomography confirmed fragmentation of the lunate with loss of height, associated with signs of radiocarpal osteoarthritis, particularly marginal osteophytes (Figures 2 and 3).

Magnetic resonance imaging demonstrated a remodeled and heterogeneous lunate with reduced volume, showing low signal intensity on T1-weighted sequences and heterogeneous signal on T2-weighted sequences, with no enhancement after contrast administration. Associated radiocarpal osteoarthritic changes were also observed (Figures 4, 5, and 6).

All radiological findings were consistent with stage IV Kienböck disease according to the Lichtman classification.

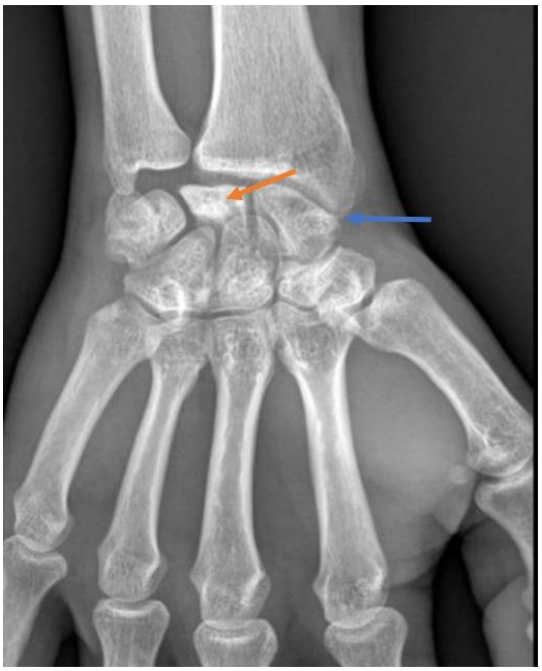

Figure 1: Radiographic image showing increased density of the lunate with decreased height (orange arrow) and irregular contours, associated with radiocarpal osteoarthritic changes (blue arrow)

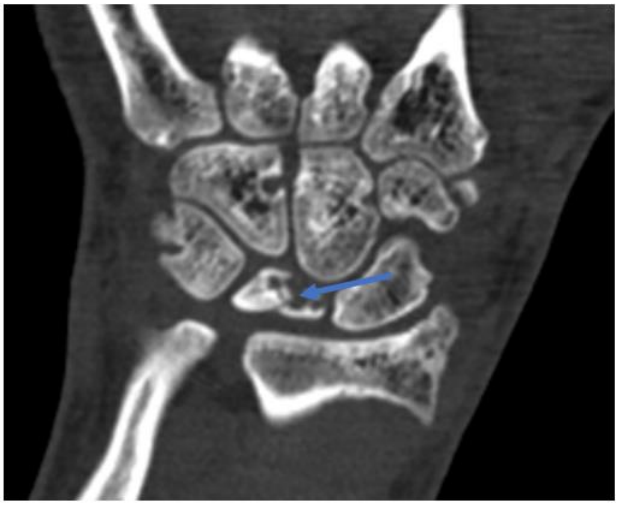

Figure 2: Coronal CT image of the wrist showing a dense and fragmented lunate (blue arrow).

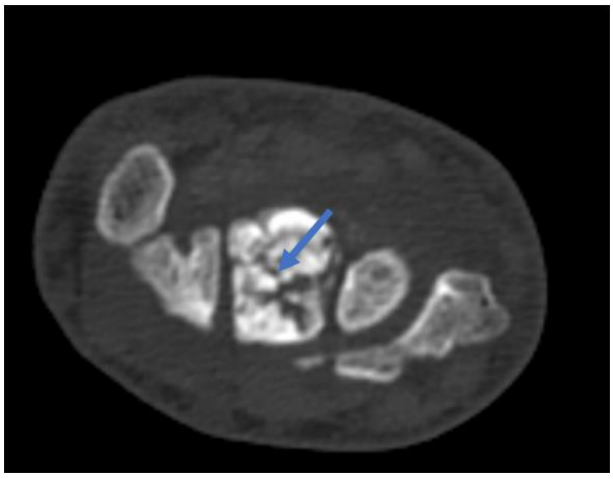

Figure 3: Axial CT image of the wrist showing a dense and fragmented lunate (blue arrow)

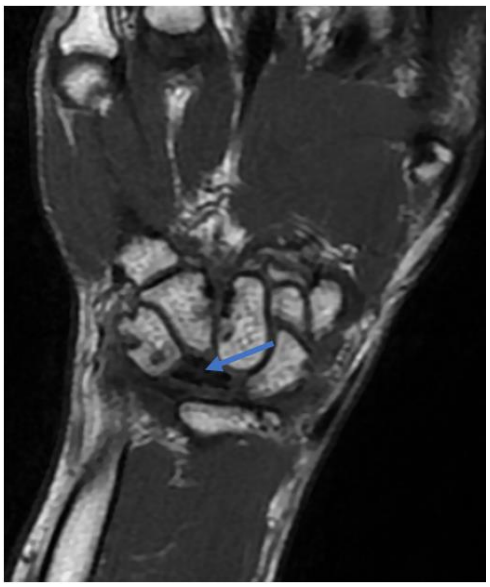

Figure 4: Coronal T1-weighted MRI showing a heterogeneous lunate with reduced volume and low T1 signal (blue arrow)

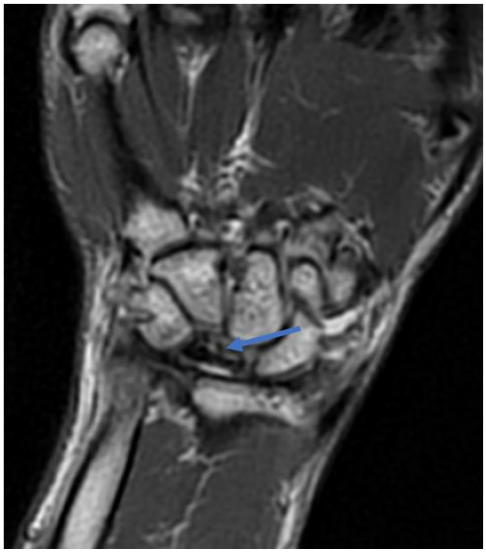

Figure 5: Coronal T2-weighted MRI showing a heterogeneous signal within the lunate (blue arrow)

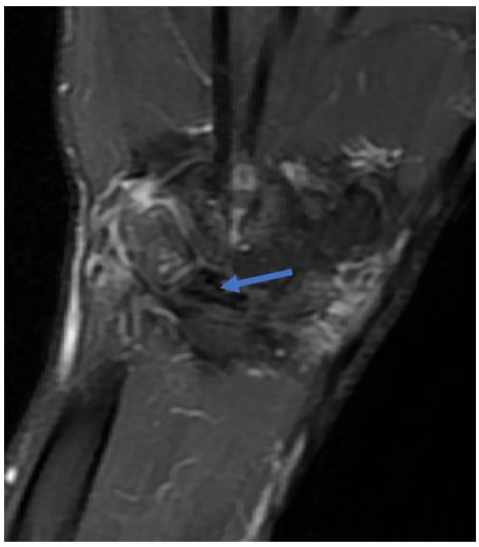

Figure 6: Absence of enhancement on post-contrast T1-weighted images (blue arrow)

DISCUSSION

Kienböck disease is a rare condition that most commonly affects young individuals. Its etiology has remained poorly understood since its first description in 1910 [1]. Its progression may lead to gradual destruction of the lunate and advanced radiocarpal osteoarthritis [3].

Multimodal imaging plays a fundamental role in the management of this condition. Standard radiography is the first-line imaging examination. In the early stages, radiographs may appear normal or demonstrate a subtle increase in lunate bone density. In more advanced stages, osseous sclerosis, fragmentation, and flattening of the lunate become apparent. Posteroanterior and lateral views also allow assessment of ulnar variance and carpal architectural changes [1,4,6].

Computed tomography (CT) provides a better analysis of the osseous structure. It allows a more accurate evaluation of fragmentation fractures, the degree of lunate destruction, as well as associated secondary degenerative radio-carpal or midcarpal joint changes [1].

Magnetic resonance imaging (MRI) is currently considered the most sensitive modality for the early diagnosis of Kienböck disease. The lunate typically demonstrates diffuse low T1 signal intensity reflecting osseous ischemia. T2 signal intensity may vary according to the stage of the disease, ranging from edematous high signal intensity in early forms to diffuse low signal intensity in advanced necrosis and sclerosis. Following contrast administration, MRI also enables evaluation of the degree of residual lunate revascularization, an important factor for therapeutic decision-making and functional prognosis [6].

The Lichtman classification remains the most widely used reference classification for staging Kienböck disease. It is mainly based on radiographic and MRI findings while also integrating carpal architectural changes [1,6].

Lichtman Classification of Kienböck Disease [1,4]:

- **Stage I:** Normal or near-normal radiographs; abnormalities mainly detected on MRI with bone marrow edema and low T1 signal intensity of the lunate.
- **Stage II:** Development of lunate sclerosis without alteration of its morphology.
- **Stage IIIA:** Lunate collapse with preservation of carpal height.
- **Stage IIIB:** Lunate collapse associated with scaphoid rotation and decreased carpal height.
- **Stage IIIC:** Presence of a coronal fracture of the lunate.
- **Stage IV:** Development of secondary radio-carpal or midcarpal osteoarthritis.

CONCLUSION

The combination of radiography, CT, and MRI plays a crucial role in the diagnosis and staging of Kienböck disease, allowing accurate evaluation of bone lesions. The Lichtman classification enables proper staging and guides therapeutic management.

REFERENCES

1. Arnaiz J. Piedra T. Cerezal L. Imaging of Kienböck disease. Am. Roentgenol. 2014; 203:131-139
2. Bain G. MacLean S. Yeo C. The etiology and pathogenesis of Kienböck disease. Wrist Surg. 2016; 05:248-254
3. Rhee P. Jones D. Moran, S.L. The effect of lunate morphology in Kienböck disease. Hand Surg. 2015; 40:738-744
4. Lichtman, D.M. Lesley, N.E. Simmons, S.P. The classification and treatment of Kienbock's disease: the state of the art and a look at the future. Hand Surg. Eur. 2010; 35:549-554
5. Paksima, N. Canedo, A. Kienböck's disease. Hand Surg. 2009; 34:1886-1889
6. Lichtman, D. Pientka, W. Bain, G. Kienböck disease: a new algorithm for the 21st century. Wrist Surg. 2016; 06:002-010
7. Fouly, E. Sadek, A. Amin, M. Distal capitate shortening with capitometacarpal fusion for management of the early stages of Kienböck's disease with neutral ulnar variance: case series. Orthop. Surg. Res. 2014; 9
8. Oh S, Park H, Kang S, Lim D, Park I. Coexisting Kienböck's disease and Preiser's disease of the wrist: experience with proximal row carpectomy and dorsal capsular interposition technique. Orthop Surg. 2023 Sep;15(9):2477-2481.
9. Bain G, Begg M. Arthroscopic assessment and classification of Kienbock's disease. Tech Hand Up Extrem Surg. 2006 Mar;10(1):8-13.
10. Asfuroğlu ZM, Güvenç K, Gümüşoğlu E, Ten B, Eskandari MM. Order of importance of anatomical risk factors in Kienbock's disease: an artificial neural network study. Hand Surg Rehabil. 2022 Jun;41(3):328-333.