Received: 2014.09.03
Accepted: 2014.09.27
Published: 2015.01.12

ISSN 1941-5923
© Am J Case Rep, 2015; 16: 12-15
DOI: 10.12659/AJCR.892389

Avascular Necrosis of the Metacarpal Head: A Case of Dietrich's Disease and Review of the Literature

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABCDEFG **Niall P. McGoldrick**
EF **Fergal J. McGoldrick**

Department of Trauma & Orthopaedic Surgery, Hermitage Medical Clinic, Dublin,
Ireland

Corresponding Author: Niall P. McGoldrick, e-mail: niallmcg@gmail.com
Conflict of interest: None declared

Patient: Male, 36
Final Diagnosis: Dietrich's disease
Symptoms: —
Medication: —
Clinical Procedure: —
Specialty: Orthopaedics

Objective: Rare disease

Background: Isolated avascular necrosis of the metacarpal head, also known as Dietrich's disease, is a rare entity with few cases reported previously in the literature. It has been associated with steroid use, lupus, and trauma. We describe the clinical presentation, pathogenesis, and treatment options associated with this uncommon condition.

Case Report: A 36-year-old man presented with a 1-year history of a painful right middle finger metacarpophalangeal joint (MCPJ). There was no preceding history of trauma. Routine blood investigations and plain-film imaging were unremarkable. Magnetic resonance imaging (MRI) revealed a focus of osteonecrosis in the middle finger MCPJ consistent with Dietrich's disease. Given the patient's excellent functional status, conservative therapy was been successfully undertaken.

Conclusions: Dietrich's disease, although a rare entity, must be considered in the differential diagnosis of painful MCPJ, where routine blood investigations and plain-film imaging studies are unremarkable.

MeSH Keywords: Metacarpal Bones • Metacarpophalangeal Joint • Osteonecrosis

Full-text PDF: <http://www.amjcaserep.com/abstract/index/idArt/892389>

Background

There have been few reports in the literature of avascular necrosis of the metacarpal head, also called Dietrich's disease. The earliest description of the disease process appeared in the early 1930s [1]. Dietrich's disease has been associated with systemic lupus erythematosus (SLE) [2], steroid use [3], and trauma [4], although it is more commonly idiopathic. The disease process is generally a diagnosis of exclusion, and more commonly affects men.

Here we report a case of Dietrich's disease in a young patient, and emphasize the importance of considering this unusual diagnosis in cases of unexplained metacarpal pain. We present an overview of the presentation, pathogenesis, investigation and treatment of this uncommon entity.

Case Report

A 36-year-old male electrician presented with a 1-year history of pain associated with crepitation involving his right middle finger metacarpophalangeal joint (MCPJ). Stretching his finger afforded him only short-term pain relief. Clinical examination was unremarkable except for subtle crepitation involving his

Figure 1. Plain film radiograph of the patient's right hand (antero-posterior view).

Figure 2. Plain film radiograph of the patient's right hand (lateral view).

dorsal right middle MCP joint. There was no visible asymmetry, and he had normal range of motion in the joint. His flexor and extensor mechanisms were uninvolved.

Routine blood investigations, including full blood count and renal profile were normal. Markers of acute inflammation including C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) were within normal limits. Serology for rheumatoid factor, smooth muscle, mitochondrial, and antinuclear antibodies were also negative.

Initial plain-film radiographs of his right hand were non-contributory (Figures 1–3). Subsequent MRI demonstrated a 7-mm focus of osteonecrosis in the distal end of the head of the third metacarpal on the volar surface (Figure 4). A diagnosis of idiopathic Dietrich's disease was made. Further imaging, including bone scan and SPECT computed tomography (CT), demonstrated secondary multi-focal low-grade arthropathy involving bilateral first carpometacarpal articulations, and the third MCP joints bilaterally, more marked on the right side. Arthropathy was also noted in several of the proximal and distal interphalangeal joints bilaterally. Given his excellent functional status, a conservative approach to treatment was preferred. He responded to rest, non-steroidal anti-inflammatory medication,

Figure 3. Plain film radiograph of the patient's right hand (oblique view).

and hand therapy. An MRI done at 6-month follow-up demonstrated no interval progression of disease.

Discussion

Dietrich's disease is an uncommon condition affecting the metacarpal bones. Although any of the metacarpals may be involved, the middle (or long) finger metacarpal head, as in our case, has been recognized as the most common site of avascular necrosis (46%). The index (19%), ring (19%), and little fingers (12%) are less commonly involved. The thumb is only involved in 5% of cases. There is a slight male preponderance, with the male-to-female ratio of 3:2 quoted in the literature. Patients usually present in the 3rd decade of life, but may present at any age [3]. Flattening and collapse of the metacarpal head may be seen on plain-film radiography, although additional scintigraphy or MRI may be required for diagnosis [5,6].

The underlying pathogenesis of Dietrich's disease is not clearly understood. Wright and Dell report that in 35% of specimens in their cadaveric study, the metacarpal head lacked a central arteriole. As such, the metacarpal head must derive its blood supply from small circumferential pericapsular blood vessels, with the situation more pronounced in the middle finger. It is

Figure 4. Magnetic Resonance Imaging (MRI) of right hand demonstrating focal area of osteonecrosis in the third metacarpal head.

thought that any compromise to these small pericapsular vessels may contribute to necrosis of the metacarpal head. In cases of SLE, vasculitis of these end-vessels is thought to lead to necrosis [3]. The condition may also share the same underlying pathogenesis as Freiberg disease, and simultaneous presentation of the two conditions has been recently reported [7].

This case demonstrates avascular necrosis of the metacarpal head, which in itself is an unusual radiological finding. The patient presents with no prior history of steroid use, SLE, or trauma. It is suggested that, in his work as an electrician, an element of repetitive stress or microtrauma to his MCP joint may possibly have contributed to developing the condition.

Given the rarity of the condition, there is no clear consensus on treatment. Rest, and use of non-steroidal anti-inflammatory medications may be sufficient to control symptoms, and conservative treatment has been reported to be successful [8]. When conservative treatment fails, surgery may be considered. Curettage and cancellous bone graft from the distal radius to fill the subchondral defect has been described [6]. Other novel techniques, including osteochondral mosaicplasty [9], flexion osteotomy of the metacarpal head [10], and arthroplasty [6], have also been reported.

Whether this patient will be at an increased risk of early arthritic involvement of his MCP joint in the future remains to be seen. Nevertheless, his excellent functional status and resolution of pain demonstrate that conservative therapy can be successful. Surgery can be considered if symptoms return and become refractory to conservative measures.

Conclusions

This report describes the presentation, investigation, and treatment of a rarely described entity. Although uncommon, Dietrich's disease should be considered as a possible diagnosis

in cases of unexplained metacarpal pain, when routine blood investigations and plain-film imaging studies are unremarkable.

Conflicts of interest

The authors report no conflicts of interest.

References:

1. Dietrich H: Die subchondrale Herderkrankung am Metacarpale. *Langenbecks Arch Klin Chir*, 1932; 171: 555–67 [in German]
2. Weissman BN, Rappoport AS, Sosman JL, Schur PH: Radiographic findings in the hands in patients with systemic lupus erythematosus. *Radiology*, 1978; 126(2): 313–17
3. Wright TC, Dell PC: Avascular necrosis and vascular anatomy of the metacarpals. *J Hand Surg Am*, 1991; 16(3): 540–44
4. McElfresh EC, Dobyns JH: Intra-articular metacarpal head fractures. *J Hand Surg Am*, 1983; 8(4): 383–93
5. Karlakki SL, Bindra RR: Idiopathic avascular necrosis of the metacarpal head. *Clin Orthop Relat Res*, 2003; 406: 103–8
6. De Smet L: Avascular necrosis of the metacarpal head. *J Hand Surg Br*, 1998; 23(4): 552–54
7. Conesa X, Gonzalez X, Siles E et al: Simultaneous development of Dieterich disease and Freiberg disease. *J Foot Ankle Surg*, 2013; 52(3): 389–92
8. Wijeratna MD, Hopkinson-Woolley JA: Conservative management of Dieterich disease: case report. *J Hand Surg Am*, 2012; 37(4): 807–10
9. Maes M, Hansen L, Cheyns P: Osteochondral mosaicplasty as a treatment method for bilateral avascular necrosis of the long finger metacarpal: case report. *J Hand Surg Am*, 2010; 35(8): 1264–68
10. Wada M, Toh S, Iwaya D, Harata S: Flexion osteotomy of the metacarpal neck: a treatment method for avascular necrosis of the head of the third metacarpal: a case report. *J Bone Joint Surg Am*, 2002; 84-A(2): 274–76