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Occult Femoral Neck Stress Fracture Presenting as Knee Pain: A Diagnostic Challenge in Primary Care

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Abstract

Femoral neck stress fractures (FNSFs) are uncommon injuries that may present with atypical and misleading symptoms, resulting in delayed diagnosis. Although classically associated with athletes and military personnel, these fractures can also occur in non-athletic individuals exposed to repetitive mechanical stress. We report the case of a 35-year-old male who presented with isolated knee pain without antecedent trauma. Initial clinical evaluation suggested primary knee pathology, and knee radiographs were unremarkable. Persistent symptoms and abnormal findings on hip examination prompted extension of the diagnostic workup to the hip. Magnetic resonance imaging (MRI) revealed an occult nondisplaced compression-side femoral neck stress fracture. The patient was managed conservatively with protected weight-bearing and close orthopaedic follow-up, resulting in complete recovery. This case highlights the importance of considering proximal sources of pain when evaluating unexplained knee symptoms. MRI is particularly useful when persistent symptoms and examination findings raise suspicion for occult proximal pathology despite negative radiographs.

Subject Areas

Orthopedics

Keywords

Femoral Neck Stress Fracture, Knee Pain, Occult Fracture, Magnetic Resonance Imaging, Primary Care, Orthopaedics

1. Introduction

Femoral neck stress fractures (FNSFs) are rare but potentially serious injuries

caused by repetitive subthreshold loading that exceeds the bone's capacity for remodeling. Although commonly reported in athletes and military personnel, they may also occur in the general population without obvious predisposing factors [1].

FNSFs are frequently underdiagnosed because of their insidious onset and nonspecific presentation. Patients commonly report groin or hip pain; however, referred pain to the thigh or knee may occur and contribute to diagnostic confusion [2]. Occult fractures, defined as fractures not visible on plain radiographs, further complicate early diagnosis and often require advanced imaging modalities such as magnetic resonance imaging (MRI) for confirmation [3].

In primary care settings, isolated knee pain is often attributed to local pathology, potentially delaying recognition of proximal causes. Failure to diagnose FNSFs early may result in fracture displacement, nonunion, or avascular necrosis of the femoral head [4]. This case report describes an unusual presentation of an occult femoral neck stress fracture manifesting solely as knee pain and emphasizes the importance of comprehensive clinical assessment and appropriate imaging.

2. Case Presentation

A 35-year-old previously healthy male presented to the family medicine clinic with a 2-week history of progressive right knee pain. The pain was insidious in onset, worsened with weight-bearing, and was not associated with trauma, swelling, locking, or instability. Initial differential diagnoses included patellofemoral pain syndrome, meniscal pathology, tendinopathy, early degenerative disease, and referred pain from the hip or lumbar spine. The patient reported recent increased physical activity related to manual labor but denied participation in sports.

The patient denied smoking, excessive alcohol consumption, corticosteroid use, prior stress fractures, endocrine or metabolic bone disease, nutritional deficiencies, or recent weight loss. There was no known history of osteoporosis or chronic systemic illness.

Physical examination demonstrated a normal right knee with full range of motion, no effusion, no joint-line tenderness, and no ligamentous instability. However, discomfort was elicited during internal rotation of the right hip, raising suspicion for a proximal source of pain and prompting extension of the diagnostic workup to the hip. Neurovascular examination was otherwise unremarkable.

Initial plain radiographs of the right knee were normal. Conservative management with nonsteroidal anti-inflammatory drugs (NSAIDs), activity modification, and rest was initiated.

Due to persistent symptoms after 10 days and lack of clinical improvement, further evaluation was undertaken. Radiographs of the pelvis and hip were inconclusive and showed no visible fracture. Because persistent symptoms and hip examination findings remained unexplained despite negative radiographs, MRI was obtained as the preferred imaging modality for suspected occult femoral neck stress fractures due to its high sensitivity for early bone stress injury and bone

marrow edema [5] [7].

MRI of the right hip revealed a nondisplaced inferomedial (compression-side) femoral neck stress fracture associated with surrounding bone marrow edema [5].

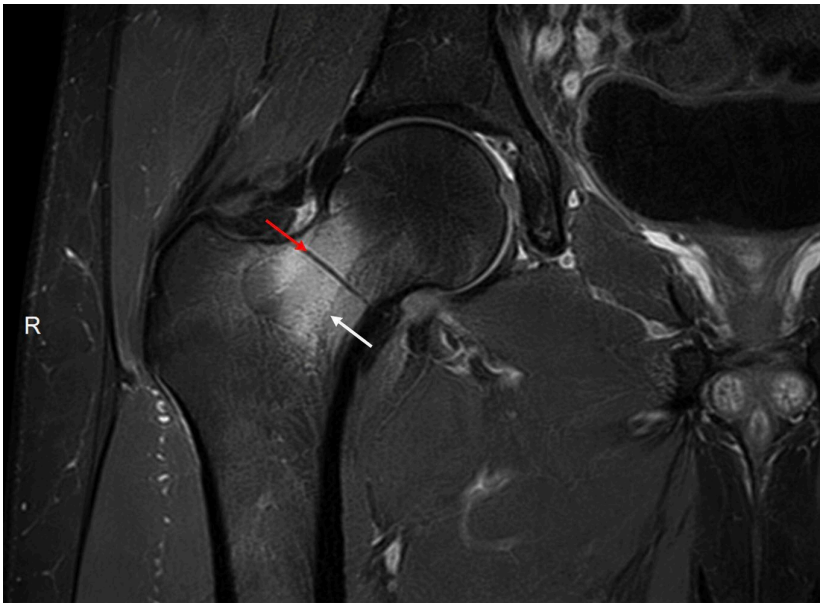

Figure 1. Coronal fat-suppressed T2-weighted MRI of the right hip demonstrating a linear hypointense fracture line (red arrow) at the superolateral aspect of the femoral neck with surrounding bone marrow edema (white arrow), consistent with an occult nondisplaced femoral neck stress fracture.

Following diagnosis, the patient was urgently referred to orthopaedics (see **Figure 1**). Management consisted of strict non-weight-bearing with crutches for 6 weeks and serial clinical and radiographic follow-up. Repeat radiographs obtained at 6 weeks demonstrated interval fracture healing without displacement. Progression to partial and subsequently full weight-bearing was guided by complete resolution of pain during ambulation and evidence of radiographic healing. Surgical intervention was not required because the fracture remained stable throughout follow-up.

At 3-month follow-up, the patient had resumed normal daily activities without pain or functional limitation.

3. Discussion

3.1. Atypical Presentation and Referred Pain

Femoral neck stress fractures represent a diagnostic challenge because of their rarity and frequently atypical clinical presentation. Although traditionally associated with athletes, increasing evidence suggests these fractures may also occur in non-athletic individuals exposed to repetitive mechanical stress or sudden increases in activity levels [6].

The most notable aspect of this case was the presentation with isolated knee

pain. Referred pain from the hip to the knee is explained by shared innervation through the femoral and obturator nerves, which may mislead clinicians toward a primary knee disorder [2].

Recent literature has emphasized that occult proximal femoral fractures may mimic a variety of musculoskeletal conditions, contributing to significant diagnostic delay [3]. Consequently, clinicians should maintain a high index of suspicion when symptoms persist despite appropriate initial management and imaging findings do not correlate with the clinical presentation.

3.2. Diagnostic Challenges and Imaging

Plain radiographs are typically the first-line imaging modality for musculoskeletal pain but have limited sensitivity for early or nondisplaced stress fractures. Several studies have demonstrated that occult fractures may not be visible on initial radiographs, particularly during the early stages of injury [5] [7].

MRI is considered the gold standard for the diagnosis of occult femoral neck stress fractures because it provides excellent sensitivity for detecting both fracture lines and associated bone marrow edema. Early MRI evaluation enables prompt diagnosis and treatment before fracture progression or displacement occurs.

Early recognition is essential because delayed diagnosis may result in fracture displacement requiring surgical fixation and may increase the risk of avascular necrosis, nonunion, and long-term disability [4].

3.3. Clinical Implications in Family Medicine

From a family medicine perspective, this case underscores the importance of holistic musculoskeletal assessment. Evaluation of adjacent joints and consideration of referred pain patterns are critical when clinical findings do not fully explain the patient's symptoms.

Persistent pain despite conservative treatment should prompt reconsideration of the diagnosis and further investigation. In patients with unexplained knee pain and subtle hip examination findings, proximal pathology should remain within the differential diagnosis.

3.4. Orthopaedic Perspective and Management

Management of femoral neck stress fractures depends largely on fracture location, stability, and risk of displacement. Compression-side fractures occurring along the inferomedial femoral neck are generally considered biomechanically stable and may be managed conservatively with protected weight-bearing and close radiographic follow-up.

In contrast, tension-side fractures located on the superior aspect of the femoral neck carry a substantially greater risk of displacement and frequently require surgical fixation [6].

Early diagnosis and appropriate management are associated with favorable outcomes and significantly reduced rates of complications such as avascular necrosis

and nonunion [6].

3.5. Importance of Early Recognition

Delayed diagnosis of femoral neck stress fractures remains a major clinical concern. Multiple reports describe cases in which atypical symptoms resulted in diagnostic delay and progression of injury [3].

This case highlights the importance of maintaining clinical suspicion for proximal pathology in patients with persistent unexplained knee pain, particularly when physical examination findings extend beyond the knee joint itself.

4. Conclusions

Occult femoral neck stress fractures may rarely present with atypical symptoms such as isolated knee pain, potentially delaying diagnosis. Clinicians should consider proximal pathology when persistent symptoms and examination findings are not adequately explained by knee pathology alone.

MRI is particularly valuable when ongoing symptoms and clinical suspicion raise concern for an occult proximal source despite negative radiographs. Early recognition and appropriate multidisciplinary management are essential to prevent complications and optimize patient outcomes.

5. Limitations

This report describes a single clinical case, limiting the generalizability of the findings. In addition, long-term follow-up was not available to evaluate for late complications such as avascular necrosis or recurrent stress injury.

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Patient Consent and Ethics Statement

Written informed consent was obtained from the patient for publication of this case report and accompanying images. Ethical approval was not required according to institutional guidelines for single case reports.

Author Contributions

[Sandy M]: Conceptualization, patient evaluation, manuscript drafting.
[Zayd A]: Orthopaedic management, literature review, manuscript revision.

AI Use Statement

No artificial intelligence tools were used in the preparation of this manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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