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Case Report

The Hidden Meniscal Flap Tear: Don't Miss It

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Abstract

Background

Meniscal tears are an extremely common pathology. Patients may experience mechanical symptoms such as locking and catching with joint line pain. Arthroscopic partial meniscectomy is used to treat symptomatic tears that are refractory to conservative management. A certain type of meniscal tear, the hidden-flap tear, can be missed if not carefully evaluated.

Case Description

The patient was a 53-year-old female with anteromedial knee pain for three months. The pain was more anterior than classic meniscal tears. Her radiographic imaging was consistent with a medial meniscus tear with an incarcerated flap in the medial gutter. At the time of the arthroscopy, the meniscus appeared "auto-meniscectomized" and careful evaluation and reduction was necessary to fully treat the pathology. She experienced immediate pain relief post-operatively.

Literature Review

Meniscus tears are frequently encountered and most commonly are readily identifiable with knee arthroscopy. A lesser characterized tear is the meniscal flap tear with incarceration in the gutter. These tears were originally described as more commonly superiorly displaced, but recent radiographic evaluations have reported more common inferior displacement. The classic pain symptoms associated with these tears is posteromedial at the middle third and posterior third junction.

Purpose and Clinical Significance

This case illustrates that a common pathology could easily be missed without adequate arthroscopic evaluation. Patients with a meniscal flap tear displaced in the gutter typically see immediate relief of pain post-operatively.

Introduction

Meniscus tears are very common in the adult population. Meniscal tears typically present with knee joint line pain with tenderness to palpation, but mechanical symptoms may also be present which include locking and catching [1]. Symptoms from degenerative meniscus tears frequently improve with time and physical therapy [2]; however, those with mechanical symptoms or persistent pain should be considered for knee arthroscopy and partial meniscectomy. We present a case of a hidden meniscal flap tear of the medial meniscus which could be missed at the time of arthroscopy due to the appearance of an auto-meniscectomy.

Case Report

A 53-year-old woman presented to the office with anteromedial left knee pain of three months duration without a specific injury. Her pain was insidious in onset and prevented her from exercising. Her past medical history is notable only for being overweight.

Her left leg alignment was neutral. She demonstrated full range of motion with anteromedial knee pain with deep flexion. She had medial joint line tenderness to palpation but with greater pain anteriorly than normally encountered at the junction of the posterior and middle third of the joint line. Rotation of the leg elicited anteromedial pain. Her knee was otherwise stable. Review of the radiographs revealed minimal medial joint space narrowing and small medial femoral and tibial osteophytes (Figure 1A). The magnetic resonance imaging (MRI) demonstrated a medial meniscus tear with extrusion and a hidden flap trapped in the medial gutter on the coronal plane (Figure 1B,C).

The patient elected to proceed with knee arthroscopy and partial medial meniscectomy due to her unsuccessful non-operative treatment. The patient is positioned supine on a standard operating table with a lateral post for performing knee arthroscopy. We prefer not to use a tourniquet for routine arthroscopy, but one may be used at the surgeon's discretion. Arthroscopy is initiated from the standard anterolateral portal and the

medial portal established under direct visualization using spinal needle localization for optimal placement. At the time of arthroscopy, the medial meniscus appeared as though the meniscus tear underwent an "auto-meniscectomy" (Figure 1D). There was surrounding synovitis in the medial gutters. The hidden flap was identified with the use of a standard arthroscopic probe and hooking the flap to reduce it into the joint (Figure 1E). The probe was placed on the inferior meniscus and rotated to hook the inferiorly displaced flap. For a superiorly displaced flap, the probe is placed along the superior aspect of the meniscus and rotated to hook the flap and bring into the joint. The flap was debrided with an arthroscopic basket biter (WideBiter, Arthrex, Inc) and shaver (Figure 1F). A free edge is created with the arthroscopic biter and then the flap debrided with the shaver, or alternatively, the flap may be amputated and removed. The meniscus borders were debrided to a stable margin of healthy tissue. Additional pathology included ICRS Grade 3 chondromalacia of the trochlea which did not require treatment. The remainder of the diagnostic arthroscopy revealed no additional intra-articular abnormalities. The patient's knee pain was relieved by the night of surgery and, at final follow-up, the patient reported complete resolution of her symptoms with full range of motion.

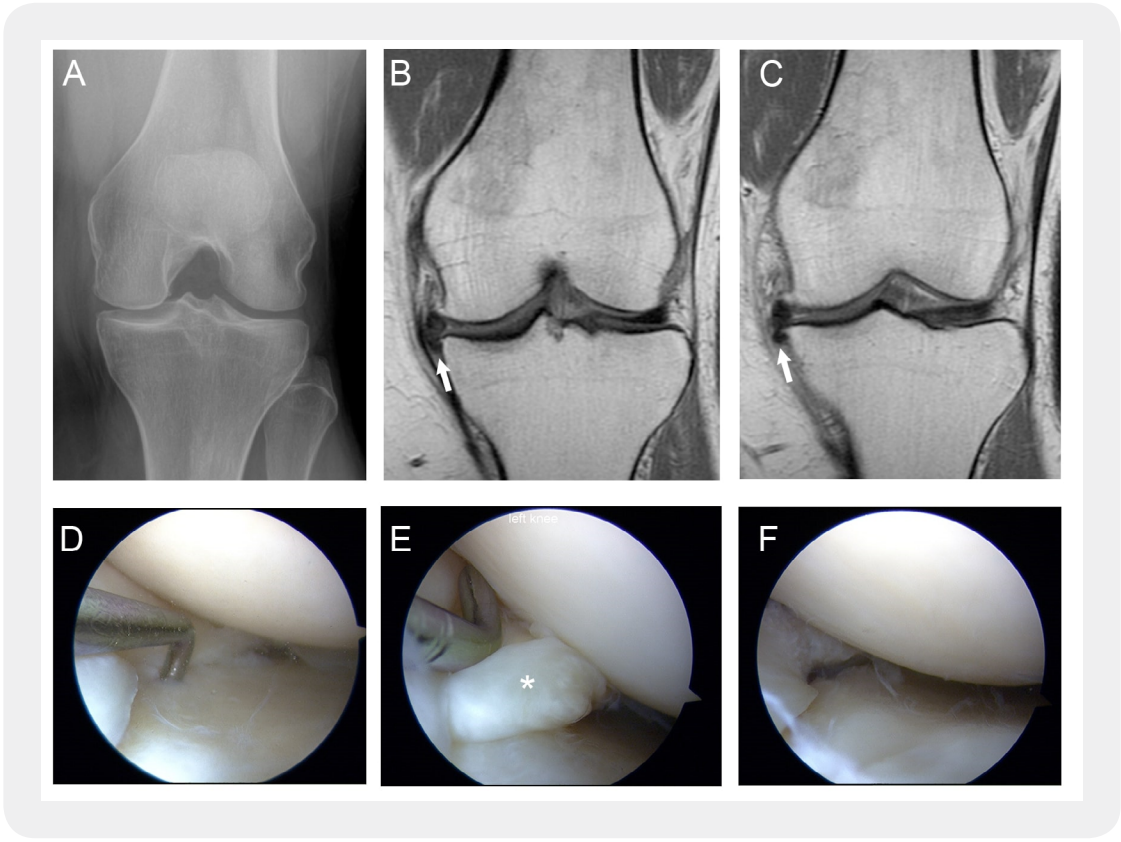
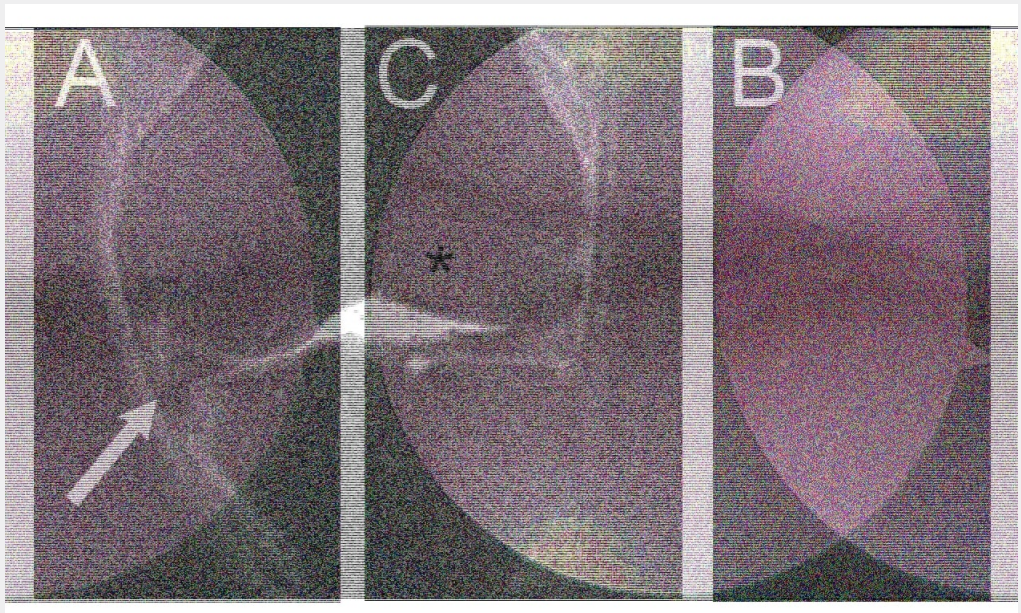


Figure 1: *Radiographs, Magnetic Resonance Imaging (MRI) and arthroscopic findings of a left knee medial meniscus hidden flap tear. A) Anterior-posterior radiograph of the left knee demonstrating minimal medial joint space narrowing with small subtle medial osteophyte formation. B and C) T1-weighted MRI of the left knee demonstrating a medial meniscus hidden flap tear in the medial gutter (white arrows). D) Arthroscopic evaluation of the medial meniscus with the probe highlighting the auto-meniscectomized appearance of the medial meniscus. E) Reduction maneuver with the arthroscopic probe bringing the meniscal tear (*) into the medial joint. F) Appearance of the medial meniscus after flap debridement.*

Discussion

The hidden meniscal flap may be easily missed on both imaging studies and at the time of knee arthroscopy. The medial meniscus is the most common site for flap tears and flaps are most commonly inferiorly displaced [3,4] despite previous suggestion that flaps are commonly superiorly displaced [4,5]. The patients typically present with greater knee pain than common degenerative horizontal or radial tears in our experience. This pain is also commonly more anterior than classic joint line tenderness at the posteromedial soft spot. This area of pain is frequently at the junction of the posterior and middle third of the joint line. Pain may be increased by concomitant tibial cartilage loss that may confound the presentation [3]. We speculate that the increased pain is due to the incarcerated flap. Our patient developed persistent and worsening symptoms rather than improved pain following an injection. Patients with persistent symptoms are more likely to have a positive McMurray test [3].

Meniscal flap tears are often best seen on the MRI coronal cuts (Figure 2A). These images typically demonstrate a flap tear that is inferiorly located and trapped in the medial or lateral gutters. Flap tears which are hidden in the gutter give the appearance of an auto-meniscectomy (Figure 2B). Since the flap is inferiorly displaced, it must be hooked with a probe and reduced into the joint (Figures 2C,D,E). The flap may then be removed using a meniscal biter or shaver (Figure 2F).



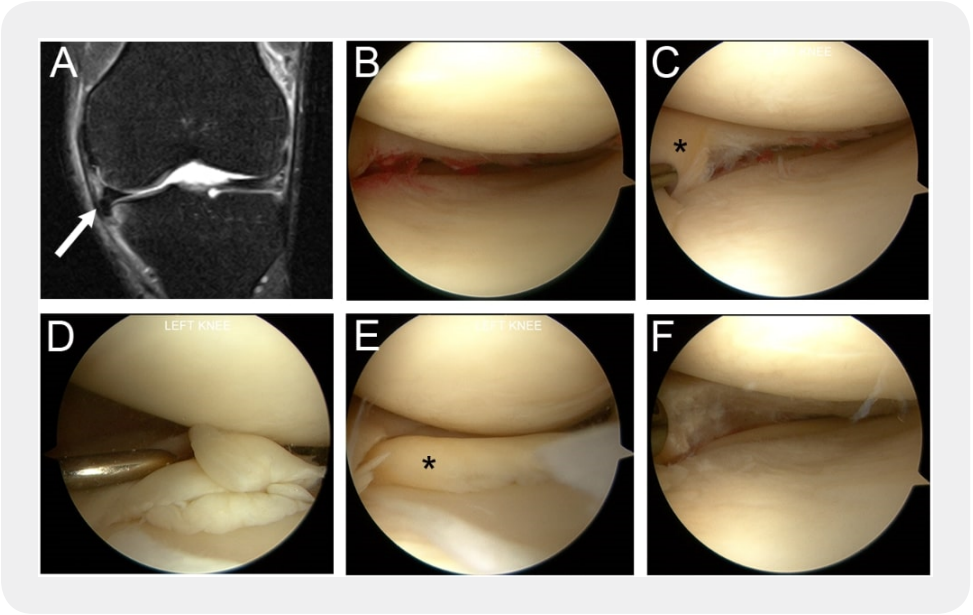


Figure 2: *Meniscal flap tear of the medial meniscus of a left knee. A) Coronal MRI of the left knee demonstrating the inferiorly displaced flap (white arrow). B) Arthroscopy of the medial meniscus of the same knee with an "auto-meniscectomy" appearance. C) The meniscal flap is probed (*) in preparation for reduction. D) The flap is reduced with a probe. E) The flap (*) is now accessible in the medial compartment. F) Appearance after arthroscopic shaver and meniscal biter debridement.*

These flap tears are distinct from horizontal tears associated with meniscus extrusion, which may be one reason why our patient experienced immediate pain relief. Meniscal extrusion is associated with inferior outcomes and greater osteoarthritis [1,6]; however, we believe this particular type of tear behaves more like a bucket-handle meniscus tear and thus reduction and removal (since the tear type is irreparable) is the most effective way to relieve pain [7,8]. This tear pattern also is associated with clear mechanical symptoms that behave differently than more common degenerative tear patterns [1]; non-obstructive tears can often be treated with physical therapy and cortisone injections [2,9,10]. We would emphasize that it is the incarceration of the meniscus tear that is the most likely pain generator. Several studies examined non-operative treatment compared to operative treatment of meniscus tears associated with osteoarthritis. Many of these studies identified no significant benefit of surgery for degenerative tears [9,10]; however, there was a large cross-over effect for mechanical and obstructive symptoms and subsequent studies and reports found this treatment beneficial [7,8,11]. Meniscal tears should be identified on the pre-operative imaging and the meniscus thoroughly probed at the time of arthroscopy to ensure displaced tears are identified and treated.

Conclusion

This case illustrates that a common pathology could easily be missed without adequate arthroscopic evaluation. Patients with a meniscal flap tear displaced in the gutter typically see immediate relief of pain post-operatively and should be considered for arthroscopic intervention.

Conflicts of Interests

The authors have no conflicts of interest related to the content of this article to disclose.

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