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Heterotopic Ossification Within an Arthroscopic Portal After Uneventful Partial Meniscectomy

Running head: HO after uneventful partial meniscectomy

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ABSTRACT

We report the case of a 44-year-old man who underwent a partial medial meniscectomy for a meniscal tear whose postoperative course was complicated by the development of heterotopic ossification (HO) within the medial arthroscopic portal. Following a routine initial procedure, the patient presented with ongoing pain and a palpable, painful lump around the previous medial arthroscopy portal. Plain radiographs and MRI were suggestive of a bony structure within the soft tissues. Histopathological examination at repeat arthroscopy confirmed osseous tissue consistent with HO. Recovery after the second procedure was rapid and resulted in normal knee function and complete pain relief. HO within an arthroscopy portal is a rare complication following arthroscopic partial meniscectomy in the knee and has not previously been described in the literature.

Key Words: Knee; Heterotopic ossification; Arthroscopy portal; Partial meniscectomy

Word count: 124 words, 4 keywords

INTRODUCTION

Heterotopic ossification (HO) is the abnormal formation of true bone in the soft tissues. Various predisposing conditions have been described including direct muscular trauma, arthroplasty, spinal cord and head injury, prolonged sedation and mechanical ventilation. It can occur in periarticular structures including muscle, tendon and fascia. It is differentiated histologically from pathological calcification by the presence of osteoid formation. HO following routine knee arthroscopy where no bony procedure is undertaken has not previously been described in the literature to our knowledge. We describe a rare case of HO within the medial arthroscopic portal following knee arthroscopy for partial medial meniscectomy.

CASE REPORT

A 44-year old man presented in May 2005 with immediate onset of right knee pain following standing from a crouched position while at work. Clinical assessment was suggestive of medial meniscal pathology. Initial radiographic study did not reveal any abnormal findings (Fig. 1A). Magnetic Resonance Imaging (MRI) confirmed a horizontal tear of the posterior horn of the medial meniscus of the right knee. Arthroscopic partial medial meniscectomy was performed subsequently by an experienced arthroscopy surgeon. The procedure was uncomplicated and there was no violation of bony, cartilaginous or tendinous architecture, including the patella tendon. Postoperative recovery was uneventful and the patient was discharged on

regular pain relief medication and referred for routine postoperative physiotherapy. The patient resumed light work duties within a month of the procedure, and was upgraded to full duties 6 weeks postoperatively.

The patient returned 6 months after the arthroscopy with ongoing swelling and pain in the right knee, severe enough to wake him at night. However there was no clinical evidence of internal derangement of the knee at this stage. A repeat MRI scan was performed which demonstrated no further pathology of the knee. The patient was reassured, and discharged back to the care of his general practitioner. For the next 12 months the patient continued to work, but ongoing symptoms in his knee prompted him to attend his general practitioner again in November 2006. Continuous swelling and pain was noted and the patient was referred for a second opinion to a senior Orthopaedic Surgeon. Clinical review revealed pain localised to the medial portal. There was no clinical evidence of instability. A third MRI was performed that confirmed the presence of a bony ossicle at the medial margin of the patellar tendon, at the site of the previous medial arthroscopic portal (Fig. 2). There was also a suggestion of a recurrent medial meniscal tear. The ossicle was confirmed on repeat plain radiographs to lie on the infero-medial aspect of the patella (Fig. 1B).

The patient was offered repeat diagnostic arthroscopy with concurrent excision of the medial portal ossicle. Arthroscopic evaluation of the knee joint utilising the previous arthroscopic portals excluded recurrent intra-articular pathology, in particular the medial meniscal remnant was intact. A palpable ossicle measuring 18 X 10 X 10 millimetres was excised from the medial

arthroscopic portal, immediately beneath the original scar and sent for histological evaluation.

Postoperative recovery was uneventful and the patient was discharged home after day surgery on no specific HO prevention regimen. He was reviewed clinically 6 weeks later. At this stage he had recovered completely, and his knee function had returned to normal.

Histology confirmed the presence of mature bone as a circumscribed focus of ossification. The histological report described that the mature bone ossicle lay within tendinous tissue.

DISCUSSION

The pathogenesis of HO is still not fully understood. It is thought to result from over-expression of bone morphogenetic protein in the para-articular soft-tissues stimulating mesenchymal stem cell differentiation along the endochondral pathway¹. It is known to occur in procedures such as hip arthroplasty, where extensive soft tissue violation and seeding of soft tissues with mesenchymal stem cells with osteogenic potential has occurred. Head injury and spinal cord injury predispose to the formation of HO and cases have been reported in the knee following encephalitis². Other predisposing conditions include ankylosing spondylitis, diffuse idiopathic skeletal hyperostosis and trauma.

The patient in this case report had no predisposing factors for the development of HO. The history given was consistent with a medial meniscal tear, and did not suggest the significant trauma that has been associated with

HO. Further, the localisation of the ossicle both clinically and radiographically to the medial arthroscopic portal immediately below the scar suggests that the HO was a direct consequence of the surgery, rather than the precipitating minor trauma that resulted in the medial meniscal tear, or a spontaneously arising parapatellar ossicle.

HO within an arthroscopic portal has been described as a complication of hip arthroscopy³. This occurred after removal of loose osteochondral bodies from the hip joint. It only occurred in the portal through which the loose bodies were extracted. There are several reports in the literature of HO complicating elbow⁴ and shoulder arthroscopic procedures⁵. In these reports the ossification has not occurred within the portals, and bony procedures were often undertaken concurrently.

Arthroscopic debridement of intra-articular knee pathology is one of the most frequently performed orthopaedic operations⁶. It is a clinically successful procedure rarely complicated in the short term. To our knowledge, this is the only case of HO complicating recovery from a simple partial meniscectomy. We do not believe that this justifies routine prophylaxis against HO as it is suggested for hip arthroplasty in patients with increased risk profile by the use of perioperative non-steroidal-anti-inflammatory drugs or radiation, but it may provide insight into the pathogenesis of this condition.

The histological finding of HO within tendon tissue suggests that musculotendinous structures may be capable of providing osteogenetic stimulation.

Figures

Figure 1A



Figure 1B



Figure 1. (A) Plain lateral radiograph taken at the time of the initial injury with normal appearance of the right knee. (B) Plain lateral radiograph of the right knee taken 18 months following arthroscopic surgery showing the presence of a bony ossicle on the infero-medial aspect of the patella.

Figure 2A



Figure 2B



Figure 2. Magnetic resonance image showing the localization of the bony ossicle in relation to the patella in the coronal (A) and the sagittal (B) plane.

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Conflict of interest statement

None of the authors have any financial or personal relationships with other people or organisations that could inappropriately influence or bias this work.