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Unusual Finding of Gouty Tophus in Adult Male with Acute Locked Knee: A Rare Case Report

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Abstract

Gout is an inflammatory disease commonly characterized by tophus deposits containing uric acid crystals in the intraarticular joints. An acute locked joint due to gouty tophus formation is a rare finding. This case describes a 36-year-old man with sudden pain and locking in the knee joint. Physical examination, plain radiography, and serum uric acid examination showed unremarkable results. Further investigation with diagnostic arthroscopy confirmed tophaceous gout as the sole cause of an acutely locked knee. The patient exhibited satisfactory clinical results following surgical intervention under arthroscopy and the administration of urate-lowering agents. This case highlights the probability of tophus deposition as the cause of an acute locked knee, despite unremarkable initial presentation. The awareness regarding this case should be raised, especially on emphasizing arthroscopy as a cost-effective diagnostic and therapeutic modality in patient management.

Keywords: Arthroscopy, gouty tophi, knee joint, rare case.

Introduction

Gout is an inflammatory disease characterized by the deposition of uric acid crystals in the joint tissues and synovial fluids [1]. It presents in about 1% to 4% of the worldwide population, with a predominance of morbidity found more in women than men [2]. The risk factors are diverse, including the genetic predisposition and other factors related to metabolic processes and purine-rich intakes from meat, seafood, and alcohol [3]. The high diversity of culinary trends containing these ingredients often results in an increased incidence of gout with various distinctive clinical manifestations. Tophus deposition is one of the most common late manifestations of chronic gout; however, it rarely causes complications of sudden inability in joint movement [4].

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The sudden inability in knee joint movement often causes a condition called an acute locked knee. This abnormality causes the knee to be locked in a fixed position, thereby inhibit the joint movement to allow a full knee bending or straightening. The common causes are mechanical injuries and tumours [5]. This report presented a case of intraarticular tophaceous gout resembling a soft tissue mass causing locking of the knee joint. Therefore, the clinicians should be aware of this extraordinary manifestation of gout, and appropriate treatment must be provided to ensure patient benefit. Informed consent was obtained from the patient to publish this case report and images for medical education purposes.

Case report

A 36-year-old Balinese man presented to the orthopaedic outpatient clinic with a chief complaint of pain and swelling on the right knee one week before the admission. The symptoms gradually progressed into stiffness and eventually caused a knee locking with instability to fully extend the right knee, causing difficulty walking and performing daily activities. There was neither previous history of trauma on the knee nor any known systemic metabolic diseases. History of the medical condition on the contralateral knee was absent. The patient had no medical history in the family.

The vital sign examinations were within normal limit. Physical examination by inspection showed that the patient walked with an antalgic gait with a swollen right knee locked in 15 degrees flexion, preventing a full extended movement. Further palpation and passive extension of the affected knee resulted in pain. However, full knee flexion was within the normal limit. Specific clinical tests for ligaments and menisci tear were performed but revealed unremarkable results. The laboratory results of complete blood counts and specific markers of serum uric acid showed normal results. A plain radiograph on the affected knee showed no significant finding. Further magnetic resonance imaging (MRI) scans was not performed due to financial reason.

The patient was subsequently consented

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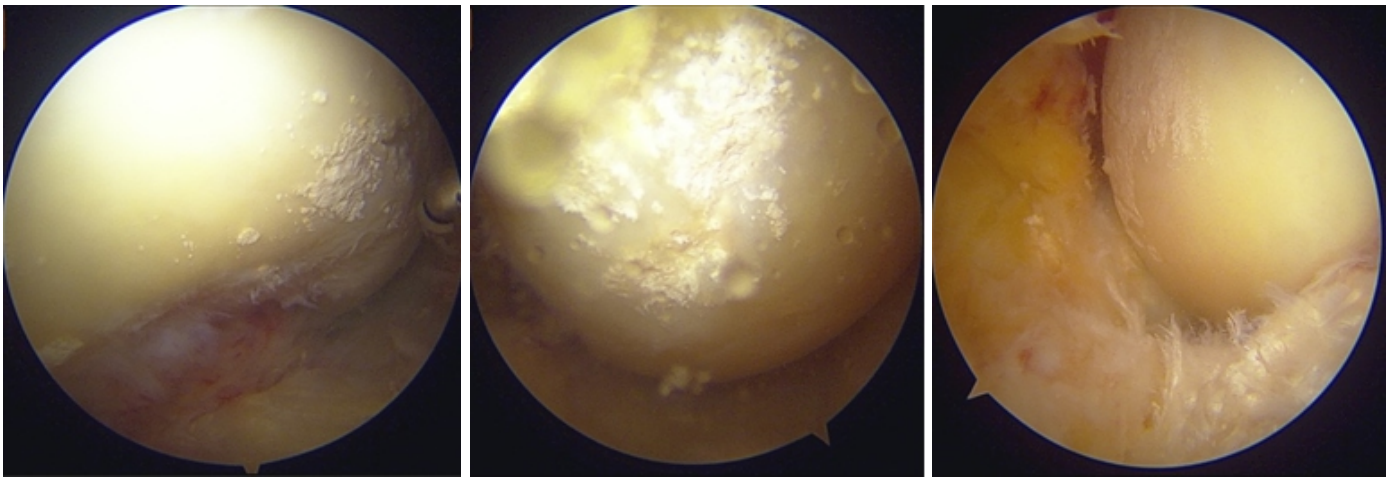

Figure 1: Diagnostic arthroscopy findings on the right knee (a) tophi deposit over the cartilage; (b) curetted tophi deposit; (c) tophaceous lesion visualized from the meniscus preventing a full extension of the right knee

to undergo diagnostic arthroscopy under anaesthesia. Intraoperative examination demonstrated generalized tophi deposit resembling a "white chalky" mass that has infiltrated the cartilage, arising from the medial meniscus and surrounding the anterior cruciate ligament (ACL), preventing a full knee extension (Fig 1). There was no suggestion of medial or lateral meniscal tear, and the ACL or posterior cruciate ligament (PCL) were intact. We decided to curetted the mass carefully, consisting of decompression and partial debridement with excellent results. Histopathological analysis was performed from the mass sample and was identified as the urate crystals present in the knee.

Postoperatively, the patient received the analgesic and urate-lowering agent (allopurinol) 200 mg/day. The first day after surgery, the patient developed swelling in the right knee, which required knee aspiration. However, the further treatment showed an excellent response to the drugs and the patient was discharged after three days of post-operative care. One-week follow-up was later conducted, which showed that the patient was able to regain a full range of motion on the right knee without any pain or swelling.

Discussion

An acute locked knee is one of the orthopaedic emergency cases. The common causes are mechanical factors with various aetiologies, including traumatic injury to the joint adjacent structures, inflammation, masses, or tumours [6]. Masses developing in the intra-articular knee can cause mechanical obstruction, limiting the knee flexion or extension movement [4]. Intraarticular masses involving cartilage, menisci and ACL manifesting as locked knee are rare on diagnostic arthroscopy [7, 8]. On the other hand, research shows that the most common cause of knee locking is a longitudinal tear of the medial meniscus and ACL tear [9].

Gouty tophi can sometimes cause mechanical problems, depending on their location. The development of intra-articular tophi can cause mechanical pain and locking, similar to that caused by an intra-articular loose body [9]. Our case presented an extraordinary case of gouty tophus located inside the right knee. Tophi are rarely observed in patients without a preceding history of gouty arthritis, despite the pathognomonic finding of subcutaneous nodules. On the initial presentation, we found difficulties in determining the differential diagnosis due to the ambiguous nature of the mass in the physical examination and plain imaging modality.

Additionally, the patient did not undergo an MRI scan, so initially, there were still various possible causes of locking, including ACL tear, meniscus rupture, or other causes of trauma. Nevertheless, the cause of trauma can be ruled out because there is no history of significant trauma in the patient prior to complaints. Ragab et al. reported that there are many hyperuricemia cases without significant gout symptoms or the formation of uric acid crystals deposition [10]. Interestingly, a specific investigation of serum uric acid levels in the patient showed no significant results. However, examination of other specific markers was not performed to rule out other possible differential diagnoses based on laboratory tests.

Theoretically, decreased collagen and proteoglycan content in the joint along with increased cartilage degradation products in the joint fluid lowers the urate solubility and promoted the formation of monosodium urate (MSU) crystals. The inflammatory reaction and inflammatory cytokine release found in gout are triggered by the phagocytosis of MSU crystals and promote swelling and pain [11]. Uric acid crystals can be deposited in tendons, ligaments, cartilage, bone bursae, also in other synovial spaces and para-articular spaces in the subcutaneous tissue [12]. In our case, the tophi mass was found in between the medial meniscus and cartilage surrounding the ACL.

Gouty deposits of the knee can be diagnosed using plain radiographs, MRI, and computed tomography (CT) scan. The plain radiographic may show asymmetrical soft tissue swelling, calcification, and bone erosion [13]. Unexpectedly, our case presented a normal finding on the radiography examination. Bloch et al. suggested that plain radiographic features are generally normal in early or even chronic gout patients with intra-articular deposit and bone erosion [14]. Both MRI and CT scans are effective diagnostic modalities; however, the cost-effectiveness of these investigations must be taken into consideration. Knee arthroscopy is considered a more practical procedure because it can simultaneously act as a diagnostic and therapeutic modality. Thus, in this case, diagnostic arthroscopy was performed, followed by surgical debridement under arthroscopy to remove tophaceous gout, which was the leading cause of the patient's symptoms. Pan et al. reported 41 patients with gouty deposits who underwent arthroscopy debridement and irrigation, which resulted in significant improvement in pain and range of motion [15]. Patel et al. suggested that surgical intervention should be considered in cases of tophaceous gout involving severe, intractable pain, loss of motion, and deformities, including a simple tophi enucleation procedure as the treatment option [16]. In this case, we performed classic curettage and debridement to remove the tophi. The excision and debridement of tophi and menisci alone without synovectomy, as applied in our patient, was sufficient to relieve pain or mechanical symptoms.

A previous study demonstrated an alternative treatment for tophaceous ACL by performing continuous conservative management with allopurinol and narcotics, which substantially reduced the symptoms and shrunken the tophi deposition [9]. Ozturk et al. mentioned that the primary treatment of tophaceous gout includes the continuous monitoring of serum uric acid level and controlling by administering urate-lowering medication, such as xanthine oxidase inhibitor [1]. The surgeon should be aware of similar pathologies and consider arthroscopic surgery if the mechanical symptoms persist, as this procedure can promptly provide a definitive diagnosis and pain relief. To our knowledge, this case study is the first extremely rare report of an acute locked knee due to tophaceous gout without any significant findings supporting the investigation and normal uric acid level. This case pictured a successful outcome following surgical and pharmacological therapy for intra-articular tophi without any further mechanical limitation in the patient.

Conclusion

This case report demonstrates that the intraarticular tophi lesion of the knee does not always present with an elevated uric acid serum level. Hence, atypical manifestations of the acute locked knee, presented with swelling and pain with limitations in range of motion, may account for possible causes of mechanical obstruction such as intra-articular tophus deposition. Diagnostic arthroscopy should be the first option to evaluate and provide direct therapeutic action procedures that are cost effective and rapid recovery for the patient, followed by the administration of pharmacological agents to control the disease.

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