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CASE REPORTS

Medial Collateral Ligament Calcification, Presenting as Knee Pain. An unusual Case Report.

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Abstract

Background: The tibial collateral ligament, also known as the medial collateral ligament (MCL), is a ligament extending from the medial epicondyle of the femur to the posteromedial crest of the tibia. The ligament is a broad and strong band that mainly functions to stabilize the knee joint in the coronal plane on the medial side Since MCL calcification is not a frequent knee pain manifestation, exclusion of other confusing clinical mimicries is of paramount importance. Here, in this report, we describe a well-circumscribed calcific deposit in the left femoral condylar attachment of MCL reported very rarely in the medical literature.

Case Report: A 37-year-old laborer presented to the Outpatient department with pain and flexion deformity of the Right knee for 6 months. He walked on a flexed knee with a limping gait. A plain radiograph of the right was taken in AP and Lateral view which showed a massive well-defined calcification at the medial side of the knee joint. Considering the large size of the lesion, surgical treatment was chosen. Intra-operatively, as the MCL was involved a reconstruction was done using the semitendinosus tendon.

Conclusion: Chronic pain located at the medial side of the knee is not always osteoarthritic pain. Thorough clinical and radiological investigation with plain radiographs and MRI in some cases is mandatory. Calcification or ossification of the medial collateral ligament of the knee responds well to conservative treatment. Surgical resection is needed in some cases with larger lesions.

Keywords: MCL, calcification, knee pain

Introduction

The tibial collateral ligament (TCL), known as the medial collateral ligament (MCL), is a ligament that runs from the femur's medial epicondyle to the tibia's posteromedial crest. The ligament is a broad, powerful band that primarily serves to stabilize the medial side of the knee joint in the coronal plane [1,2].

The MCL is divided into two layers: the superficial MCL (sMCL) and the deep MCL (dMCL) (dMCL). The distal half (meniscotibial ligament) and the proximal half (meniscofemoral ligament) of the deep MCL have been separated [3]. The meniscofemoral ligament attaches to the medial meniscus and has a proximal insertion on the femur just distal to that of the sMCL. The meniscotibial ligament is thicker and shorter than the tibial ligament. It runs from the medial meniscus to the distal margin of the medial tibial plateau's articular cartilage [4]. However, the superficial MCL, which has been identified as a medial knee ligament connecting the tibia to the neighboring femur, has received the most attention in the literature. The sMCL's proximal insertion is at the femur's medial epicondyle, where it merges with the semimembranosus tendon. The distal connection is located on the tibia's posteromedial surface.

The MCL is the primary responder to valgus stress and a secondary restraint to rotational forces due to the distinct functions of the superficial and deep ligaments. Through all degrees of knee flexion, the sMCL, specifically the proximal division, resists valgus stresses. At 30 degrees of flexion, the sMCL's distal division aids to support external rotation of the knee. From full extension to 90-degree flexion, the dMCL aids to stabilize internal rotation of the knee. Despite

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the dMCL's interaction with the medial meniscus, the MCL has no effect on the stability of the medial meniscus.

When a tensile force is applied, the MCL works together to guide the knee joint through its full range of motion. The ligament is somewhat compliant when under low load; as the load increases, the ligament stiffens and becomes almost linear. The MCL will continue to absorb energy until it fails after this. Due to the role of the posterior cruciate ligament, the MCL also prevents hyperextension of the joint and posterior translation of the tibia (PCL). This role is performed by the posterior oblique ligament, which is made up of a continuous strand of oblique fibers near the back of the MCL [5].

Due to valgus strain, the MCL is one of the most commonly injured ligamentous components of the knee joint, especially in activities like ice hockey, skiing, and football [6]. Perpetuated calcification has been found with both traumatized and non-traumatized MCL in previous studies [7]. Aside from physical examination, a single X-ray of the knee [8] or computed tomography (CT)/magnetic resonance imaging (MRI) scanning has been found to be sufficient for identifying MCL calcification [9].

Because MCL calcification is a rare cause of knee discomfort, it's critical to rule out other potentially confusing clinical mimics. In this study, we describe a well-circumscribed calcific deposit in the left femoral condylar attachment of MCL that has only been recorded in medical literature on a few occasions.

Case Report

A 37-year-old labourer presented to the Outpatient department with pain and flexion deformity of Right knee for 6 months. He walked on a flexed knee with a limping gait. He had history of convulsions and was not compliant with his medication. In one of these convulsions, he injured his Right knee. There is history of massage and physiotherapy being done. there was no medical history of diabetes mellitus, hypertension, gout, trauma, endocrine or metabolic disorders. On Examination, there was a flexion deformity of 50 degrees and range of movements of the knee consisted between 50 to 70 degrees. Clinically there were no signs of inflammation.The patella movement was restricted superior, inferior or side to side. No anterior or posterior laxity was found on examination. A thickened hard mass could be felt ,posteromedial to the Rt. knee non mobile, non-pulsatile or no collapsible. There was no deformity in the hip or abnormal/pathology in the hip on clinical examination. Plain radiograph of the right was taken in AP and Lateral view which showed a massive well-defined calcification at the medial side of the knee joint [Figure 1]. The calcification's upper margin was near the origin of the medial collateral ligament (MCL) and the lower edge was at the level of the medial tibial condyle. Full blood count, inflammation markers and calcium levels were within normal limits. Considering the large size of the lesion, surgical treatment was chosen. No Arthroscopy done because clinically there were no signs of internal derangement.

Figure 1: Plain Radiographs of the Right Knee in AP and Lateral showing a massive calcification extending from the origin of the medial collateral ligament to the level of the medial tibial condyle.

A medial longitudinal incision was taken. The tophus like mass was removed by en-bloc resection [Figure 2]. Intraoperatively it was found that there was complete involvement of the MCL with the mass and it had thinned out, hence it was decided to reconstruct the MCL. The semitendinosus tendon was taken from the pes anserinus, with the insertion intact. The tendon was sutured in the free end with No. 2 Fiber wire suture. The insertion position of the femoral MCL was discovered. In the proximal center of the femoral MCL insertion, a K-wire was bored. The diameter of the double-looped tendon was used to drill a femoral tunnel. The semitendinosus tendon was then threaded through the fascia and into the femoral drill tunnel, with the tendon loop being sutured using No. 2 Fiber wire suture. To reconstruct the MCL, the sutured loop was pulled through the drill tunnel and fastened with a resorbable interference screw of the same diameter as the drill tunnel. With the knee at 10° of flexion and neutral rotation, the MCL repair was tightened. From anterior to posterior, a tibial tunnel was drilled to the posterior corner of the medial tibial condyle. The drill hole was designed to exit 10 mm below the tibial plateau, posterior and lateral to the insertion of the semimembranosus. The semitendinosus graft, which was generally 6 mm in diameter, determined the tunnel diameter. The free end of the graft was transferred from the femoral condyle through the posterior tibial tunnel opening using a conventional suction tube through the tunnel in the medial tibial condyle. To restore the posteromedial corner, the graft was anchored here with a resorbable interference screw [Figure 3]. At 60 degrees of flexion and neutral rotation, the POL repair was tightened. On the medial aspect of the knee, the reconstruction will appear as an inverted V [Figure 4].

Figure 2: Tophus like mass removed by en-bloc resection

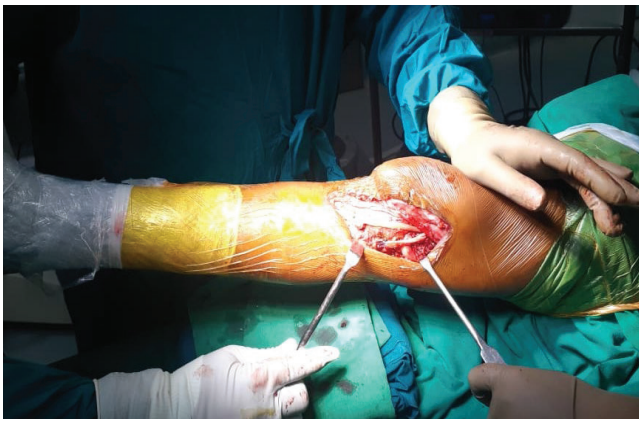

Figure 3: MCL Reconstruction done with the Semitendinosus tendon.

Figure 4: Intra-operative representation of the MCL with the POL reconstruction being tightened at 60 degrees of flexion and neutral rotation.

A hinged brace was worn for 6 weeks after surgery. Partially weightbearing and 0° to 90° of motion were permitted for the first two weeks. Free range of motion and weightbearing when standing and walking were allowed from week 3 to week 6. After 6 weeks, the brace was removed, and free activity was allowed. After two months, the patient had regained full range of motion [Figure 5]. Histopathological evaluation showed nodular degeneration with calcium depositions. The patient was relieved from his symptoms immediately postoperatively and remained asymptomatic until 1 year of follow-up.

Figure 5: Full Range of Movements achieved by the patient at 2 months.

Discussion

Calcification of the MCL is an uncommon clinical condition. Osteoarthritis of the tibio-femoral joint (TFJ), medial plica syndrome, anserine syndrome, medial meniscus tear, semi-membranous tendinitis (SMT), fibromyalgia, Pellegrini Stieda disease, and other clinical scenarios are sometimes confused with this type of medial knee discomfort [10-11].

Aside from medial knee pain, OA-TFJ is linked to joint line soreness, joint space constriction, tibio-femoral

condylar osteophytes, bony sclerosis, and a subchondral bone cyst. A medial meniscus tear causes inner aspect knee discomfort, joint swelling, and joint locking. Plica—a duplication of the joint synovium—develops medially in people with medial plica syndrome, causing abrupt medial knee discomfort after completing normal activities.

Pes Anserine syndrome, a disorder characterized by inferior-medial knee discomfort caused by an overworked pes anserine tendon or an inflammatory underlying bursa, is commonly misdiagnosed and treated incorrectly as a knee joint-related clinical entity, leading to diagnostic confusion. SMT, with or without semi-membranosus bursitis, is similar; while it is more common in young athletes, it has also been recorded in middle-aged and older individuals [11]. Secondary SMT can also occur in OA knees (because to osteophytic irritation of the neighboring semi-membranosus tendon) and after total knee replacement [11]. The fibromyalgia diagnostic criteria also include a specific area of discomfort near the knee, just proximal to the joint line [10]. Patients with Pellegrini Stieda syndrome [12] typically have distal medial thigh pain. Another differential diagnosis for medial knee pain is avulsion fracture of the medial femoral condyle at the insertion of the proximal section of the medial collateral ligament. All these alternatives were ruled out in our analysis.

In the shoulder, soft tissue calcification in the form of tendinitis is widespread, with the supraspinatus tendon (80%) being the most usually affected location. The hip is the second most common site for tendinitis after the shoulder, followed by the elbow, wrist, hand, and ankle/foot. Calcification is common at osseous ligament attachments or the popliteal tendon in the knee [12]. Because the patient in this study had neither systemic nor regional knee problems, past knee trauma with subsequent dystrophic calcification in the MCL could exacerbate the patient's pain. According to the literature, post-traumatic calcific deposit develops in 2–6 weeks [12], whereas the patient in this investigation reported six months after the occurrence.

Soft tissue calcification can occur because of tissue injury, chondrocalcinosis, hyperparathyroidism, renal failure (following chemo-radiotherapy), injection granulomas, tumoral calcinosis (soft tissue over joints), calcific tendinitis, soft tissue osteosarcoma, metastatic osteosarcoma, dermatomyositis, CREST (calcinosis, Raynaud phenomenon, esophageal dysmotility, sclerodactyly, and telangiectasia) syndrome, and sarcoidosis, cysticercosis (rice-grain calcification) [13]. However, the most common condition is of dystrophic variety, which develops when tissues get injured, being often microscopic; nonetheless, it can be apparent on radiographic examination [13].

MCL calcification is more likely to be diagnosed if there is digital soreness around the medial femoral condyle. Radio-imaging techniques, in addition to clinical examination, aid in the evaluation of medial knee discomfort. Six clinical reports have revealed calcific deposits in MCL to date. MCL calcification was reported by Kamawal et al. utilizing both conventional X-ray and MRI of the knee [12]. Chang et al. [8] used both methods to portray the disease. Gokcen et al. characterized the problem in a young guy who had knee disarticulation utilizing both X-ray and CT/MRI scanning simultaneously in an interesting article [14]. A 46-year-old lady was the subject of a similar investigation by Song et al. Muschol et al. found that a conventional knee X-ray was sufficient for identifying MCL calcification in the knee [9]. Nonetheless, Vampertzis et al. [15] recently demonstrated MCL calcification in a patient with asymptomatic knee OA, similar to the patient in our investigation.

Treatment of a typical calcification or ossification of the MCL includes observation, infiltration with corticosteroids, shockwave therapy and surgical resection. Considering the large size of the lesion, surgical treatment was chosen in our study which led to full resolution of the symptoms. Intra-operatively, as we found the involvement of the MCL, we did a MCL reconstruction for better stability post-operatively.

Conclusion

Osteoarthritis is not usually the cause of chronic discomfort on the medial side of the knee. A thorough clinical and radiological examination, including conventional radiographs and, in certain circumstances, MRI, is required. The medical collateral ligament of the knee calcification or ossification responds favorably to conservative therapy. In some circumstances, surgical resection of bigger lesions is required.

Compliance with Ethical Requirements

Acknowledgement: The authors have nothing to disclose.

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Informed consent: Informed consent was obtained from the participant included in the study.

Institutional Ethical Committee Approval (for all human studies): Appropriate Ethical Committee approval was taken for the study.

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References

1. Bourne M, Sinkler MA, Murphy PB. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Aug 11, 2021. Anatomy, Bony Pelvis and Lower Limb, Tibia.
2. Gupton M, Imonugo O, Terreberry RR. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Mar 6, 2021. Anatomy, Bony Pelvis and Lower Limb, Knee.
3. Liu F, Yue B, Gadikota HR, et al. Morphology of the medial collateral ligament of the knee. *J Orthop Surg Res* 2010; 5: 69–69.

4. Sprouse RA, McLaughlin AM, Harris GD. Braces and Splints for Common Musculoskeletal Conditions. Am Fam Physician. 2018 Nov 15;98(10):570-576.

5. Tadlock BA, Pierpoint LA, Covassin T, Caswell SV, Lincoln AE, Kerr ZY. Epidemiology of knee internal derangement injuries in United States high school girls' lacrosse, 2008/09-2016/17 academic years. Res Sports Med. 2019 Oct-Dec;27(4):497-508.

6. LaPrade RF, Moulton SG, Nitri M, et al. Clinically relevant anatomy and what anatomic reconstruction means. *Knee Surg Sports Traumatol Arthrosc* 2015; 23: 2950–2959.

7. Phisitkul P, James SL, Wolf BR, et al. MCL injuries of the knee: current concepts review. *Iowa Orthop J* 2006; 26: 77–90.

8. Chang WC, Huang GS, Lee CH, et al. Calcification of medial collateral ligament of the knee: an uncommon cause of medial knee pain. *J Clin Rheumatol* 2006; 12: 204–205.

9. Muschol M, Muller I, Petersen W, et al. Symptomatic calcification of the medial collateral ligament of the knee joint: a report about five cases. *Knee Surg Sports Traumatol Arthrosc* 2005; 13: 598–602.

10. Calmbach WL, Hutchens M. Evaluation of patients presenting with knee pain: part II. Differential diagnosis. *Am Fam Physician* 2003; 68: 917–922.

11. Helfenstein M, Jr, Kuromoto J. Anserine syndrome. *Bras J Rheumatol* 2010; 50: 313–327.

12. Kamawal Y, Steinert AF, Barthel T. Case report – calcification of the medial collateral ligament of the knee with simultaneous calciifying tendinitis of the rotator cuff. *BMC Musculoskelet Disord* 2016; 17: 283–283.

13. Steewart VL, Herling P, Dalinka MK. Calcification in soft tissues. *JAMA* 1983; 250: 78–81.

14. Gokcen N, Kelle B, Kozanoglu E. Intraligamentous Calcification of the medial collateral ligament mimicking Pellegrini-Stieda syndrome in a lower-extremity amputee. *Turk J Phys Med Rehab* 2015; 61: 70–72.

15. Vampertzis T, Agathangelidis F, Gkouliopoulou E, et al. Massive non-traumatic calcification of the medial collateral ligament of the knee. *BMJ Case Rep* 2016; 23: 2016–2016.