

Congenital Incomplete Discoid Lateral Meniscus of the Knee Joint – A MRI Case Report

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Case Report

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ABSTRACT

The knee joint is a compound, double condylar articulation between the patella and the femur divided by the menisci. Lateral meniscus is about 4/5 of a circle, with peripheral vascularization, richly innervated articular horns. The structural arrangement of meniscus defines the biomechanical function of medial compression and lateral tension. During the routine radiological interpretation (MRI) of the left knee joint in a 25 yrs old woman in the department of radiology, Kasturba Medical College, we observed an incomplete discoid lateral meniscus. Discoid lateral meniscus is a congenital intra articular knee disorder, appears as thickened, full crescent shaped disc. It is incomplete due to deficient coverage (<80%) of the lateral tibial plateau. The thickness of the meniscus, its diminished vascular blood supply, weak capsular attachment, makes it more prone to tears. Discoid meniscus is an atavistic anomaly, common in Asian population, in which the meniscus of the knee, predominantly the lateral meniscus, is discoid (3%) rather than semilunar in shape. The abnormality is diagnosed infrequently and may go unrecognized or untreated. Treatment can be of either partial or complete meniscectomy performed either arthroscopically or by open arthrotomy. Management of the disorder should be directed toward the resolution of the symptoms while preserving meniscal tissue and function. Modern surgical techniques enable suturing and preservation of meniscal tissue.

INTRODUCTION

The lateral meniscus forms four-fifths of a circle, and covers a larger area than the medial meniscus, which is grooved posterolaterally by the popliteal tendon, which separates it from the fibular collateral ligament ^[1].

A discoid lateral meniscus occurs in 2-5% of the population, often bilaterally. The distinguishing features of a discoid lateral meniscus are its shape and posterior ligamentous attachments. The classification of this abnormality is based on Watanabe et al (1979). At times, the meniscus between the femur and tibia accounts for the classic 'clunking knee'. The etiology of discoid meniscus is not clear. Most are asymptomatic, and are often found by chance at arthroscopy ^[1].

Discoid lateral meniscus is an intra-articular knee disorder presented in the young population. The normal menisci differentiate within the limb bud from mesenchyme tissue early during fetal development. They are defined at the 8th week of gestation and gain mature anatomical shape at the 14th week, without ever possessing a discoid shape.

The menisci serve as load distributors, shock absorbers, play a role in joint stability, synovial fluid distribution and cartilage nutrition. Their peripheral blood supply recedes during maturity. It covers 70% of the lateral tibial plateau and has firm anterior and posterior attachments^[2,3,4].

CASE PRESENTATION

During the routine radiological interpretation (MRI) of the left knee joint in a 25 year old woman in the department of radiology, Kasturba Medical College, we observed an incomplete discoid lateral meniscus.

INTERPRETATION

Lateral Meniscus is large, measures 13.0mm in the medio-lateral length and extends only upto the mid-point of the tibial plateau. The anterior horn, posterior horn, body of the Lateral Meniscus are normal in morphology and signal intensity.

DIAGNOSIS

Incomplete Discoid Lateral Meniscus

DISCUSSION

Stable discoid meniscus is often an incidental finding in asymptomatic patients. It can become symptomatic in the presence of a tear. The most common tear pattern is the degenerative horizontal cleavage, the anomaly is asymptomatic; however, a tear of the meniscus can result in pain, swelling, snapping of the affected knee. The snap occurs as the result of sudden alteration in the usual relationship between the meniscus and the femoral and tibial condyles, the actual sound being produced by backward or forward movement of the meniscus at the moment that the femoral condyle rides over^[2].

Discoid meniscus is an anatomical, atavistic variant in which the meniscus is thickened and disc-shaped, covering a greater area of the tibial plateau than the normal semilunar meniscus. Discoid lateral meniscus is associated with an increased risk of lateral meniscal tears.

A meniscus-deficient knee carries a high risk of early cartilage degeneration and early degenerative changes. Bearing in mind the detrimental effect of meniscectomy on the knee's function, the goal in treatment planning should be preservation of meniscal tissue. Management of the disorder should be directed towards the resolution of the symptoms while preserving meniscal tissue and function^[2].

The "developmental" theory, proposed by Kaplan, claimed that insufficient posterior meniscal attachment to the tibia causes increased meniscal excursion during flexion and extension and repetitive micro trauma produces morphological changes. In 1948, Smillie postulated that failure of absorption of the central portion persist during the fetal state (congenital discoid meniscus). The 'congenital' theory considers the discoid meniscus as an anatomical variant and increased shear stress causes menisco capsular separation and secondary hypermobility^[2,4,5].

Magnetic resonance imaging (MRI) is widely used to diagnose musculoskeletal pathologies affecting the knee since it gives a clear picture of soft-tissue structures.

Arthroscopic partial meniscectomy (saucerization) is the treatment of choice for symptomatic stable, complete, or incomplete discoid lateral meniscus. Allograft meniscal transplantation also improves the therapeutic outcome. Treatments of the symptomatic meniscus consist of subtotal meniscectomy, total meniscectomy, and partial meniscectomy followed by repair for all radial, degenerative, and complex tears for the incomplete discoid menisci^[6].

Since the introduction of the arthroscopy in the evaluation and management of knee intra articular lesions, arthroscopic partial meniscectomy in terms of saucerization is more preferable. The complete type refers to complete meniscal coverage of the tibial plateau,

while the incomplete type covers <80% of the tibial plateau. The etiology of discoid lateral meniscus is still debatable, although opinions in the literature tend toward a congenital origin [7,8].



Fig 1: Fat saturated MR Image revealing width of lateral meniscus in coronal slice more than 14mm.



Fig 2: Three consecutive sagittal MR slices over discoid lateral meniscus show continuity between anterior and posterior horn (bow-tie sign).

Arthroscopic partial meniscectomy is recommended only when the posterior attachment of the discoid meniscus is stable. Arthroscopic partial lateral meniscectomy is recommended for torn, complete or incomplete discoid menisci with stable posterior menisco-tibial attachment.

It is believed that regeneration of the lateral meniscus after total excision is unlikely to occur because there is no blood supply at the area of the popliteal tendon. Total meniscectomy of a lateral non-discoid meniscus often leads to osteoarthritis and further complications [9,10,11].

The abnormality is diagnosed relatively infrequently and may even go unrecognized or be untreated. Treatment has consisted of either partial or complete meniscectomy performed either arthroscopically or by open arthrotomy.

For symptomatic discoid meniscus, non-operative treatment consisting of a short-course of knee immobilization, restricted activities and strengthening exercises of the quadriceps muscles is recommended. It has been postulated that the increased thickness of the discoid meniscus, its unstable attachment to the tibial plateau and its poor vascularization increase susceptibility to mechanical stress [11,12,13,14].

CONCLUSION

Magnetic resonance imaging has become the imaging modality of choice for evaluation of internal derangements of the knee. Anatomical variants are often an incidental finding on these examinations. Traditionally, the treatment of choice for symptomatic stable or unstable discoid lateral meniscus was open total meniscectomy. Better understanding and documentation of the importance of the menisci to normal articular function has led to preservation of stable meniscal tissue as part of treatment planning.

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