Interest of MRI in injuries of discoid menisci

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Learning objectives

- Anatomy reminder of disoid meniscus
- Illustration of its appearance on MRI and injuries that can present.

Background

Discoid meniscus is a rare congenital condition affecting most often the lateral meniscus and whose radiological diagnosis is currently done by MRI that provides well-established diagnostic criteria.

It is a meniscal dysplasia whereby the meniscus occupies excessive space in the inter femoro-tibial space and makes it therefore more vulnerable to injury.

Findings and procedure details

Retrospective study of 5 cases of discoid meniscus collected from January 2005 until March 2012.

All patients consulted following a knee injury and were explored by a GE 1.5 Tesla MRI.

The protocol included:

- Axial sequences, moderately weighted coronal and sagittal T2, proton density with saturation of fat signal.
- Sagittal T1 weighted sequences without saturation of the fat signal.

The cuts were chosen with respect to basic anatomical landmark.

Definitive diagnosis was obtained by arthroscopy.

RESULTS:

- Age: 32-58 years
- Sex Ratio = 2/5: female predominance
The call signs were external meniscal syndrome (n = 4), a bilateral meniscal syndrome (n = 1).

Five cases of discoid meniscus were noted. Traumatic lesions observed in these cases were a horizontal crack (n = 3), a tongue (n = 1), a radial crack (n = 1).

Horizontal cracks were limited to a single meniscal segment: anterior horn (n = 1), middle segment (n = 1), dorsal horn (No = 1). Unstable lesions were extended to more than a meniscal fragment.

The results of arthroscopy in those cases were consistent with those of MRI in 60% of cases, confounded types and seats.

**Case 1**

Patient 33 years. Domestic accident right knee. (Fig. 1)

**Case 2**

Patient aged 17, suffered a domestic accident with injury in his left knee. External meniscal syndrome on clinical examination. (Fig. 2)

**Case 3**

Patient aged 32. Domestic accident with injury in her right knee. (Fig. 3)

**Case 4**

Patient 37 years. Domestic accident left knee. External meniscal syndrome. (Fig. 4)

**Case 5**

Patient 48 years, bilateral meniscal syndrome. (Fig. 5)

**ANATOMICAL REMINDER:**

Menisci are fibrocartilage located between the femur and the tibia. They are thicker towards the periphery.

Essential roles:
-articular congruence

-Optimization of the distribution of mechanical constraints

-Amortization loads

Medial meniscus:
- Shaped like an open crescent (C)
- Anterior horn thinner than the posterior horn
- Adherent periphery to the articular capsule

Lateral meniscus:
- Shaped like a very closed crescent (O)
- Anterior and posterior horns of the same size
- Lateral edge adherent to articular capsule except in posterior where it adheres directly to the popliteus muscle’s tendon

DISCUSSION

The meniscus is a discoid meniscal dysplasia which causes the meniscus occupies excessive space in the inter femoro-tibial space.

The lateral meniscus is most interested. Some cases of internal discoid meniscus (DM) are reported, as well as bilateral involvement.

The DM is not an unusual condition in adults since the meeting in 15% of the population.

The exact etiology of the MD is not clear. However, congenital theory has been advanced.

Discoid meniscus would be the result of incomplete regression of mesodermal blastema which starts normally escalate to 8 weeks of gestation.

The second theory is the absence of posterior tibial attachments. This anomaly would be responsible for repetitive meniscus which then takes a discoid shape.
The clinical symptomatology is made of, in general, knee pain, derobment and especially creack. This last is the most evocative of the external manifestation MD.

It can also be asymptomatic incidental finding during an MRI or arthroscopy of the knee.

**Diagnostic criteria on MRI**

- Transverse diameter measured in the coronal plane (length) greater than 14 mm = best diagnostic criterion.

- Meniscus visible on 3 or more adjacent sagittal sections of 5 mm thick (reflecting the continuity between the anterior horn and posterior horn)

- The difference in height between the meniscus and the external pathological normal internal meniscus is greater than 2 mm

- The ratio between the minimum and maximum length meniscal tibial length measured in the coronal plane must be greater than or equal to 20%.

- The ratio of the sum of the thicknesses of the anterior and posterior horns of the meniscus with the biggest meniscal diameter measured in the sagittal plane must be greater than or equal to 75%.

**Complications**

On these discoid meniscus, associated meniscal lesions are present in 67-90% of cases.

- A discoid meniscus is subject to degeneration and tear because of its abnormal structure. Indeed, the thickness of the meniscus, his poor vascularization associated in some cases to a thinness of the capsular insertion device would expose him to a greater risk of tearing compared to a "normal" meniscus.

- A central cystic degeneration.

**Traumatic lesions of DM**

- Symptomatic lesions in adults are usually central horizontal cracks

- Peripheral vertical lesions

- Meniscal contusion
- Capsular ligament desinsertion

- Fragmentation more or less associated with the migration of a meniscal fragment

**Treatment**


- Symptomatic or complicated MD: surgery (arthroscopic meniscectomy complete)

- Short and medium term prognosis: risk of early degenerative evolution and severe osteochondritis of the lateral condyle.

- Long-term prognosis based on the volume meniscus resected: best if partial meniscectomy "saucerization".

**Images for this section:**

**Fig. 1:** MRI sagittal, coronal and axial DP Fat SAT: visible lateral meniscus out of 5 successive sagittal sections, seat of a signal abnormality of the anterior horn: discoid meniscus outer seat of a horizontal crack of his anterior horn with a para cyst meniscus. Arthroscopy confirms the lesions found in the IRM.
**Fig. 2:** MRI coronal DP Fat SAT cuts: quadrangular lateral meniscus arriving until the notch inter condylar seat of a horizontal linear hyperintensity at its anterior horn and its middle segment. Arthroscopy concluded discoid meniscus with complex lesions its anterior horn and average segment.

**Fig. 3:** MRI sagittal DP Fat SAT cuts: visible lateral meniscus over 5 successive sagittal, dislocated at its anterior horn and its middle segment: external meniscus discoid with tongue lesion Arthroscopy confirmed the lesion of that discoid lateral meniscus.
**Fig. 4:** MRI coronal DP Fat SAT cuts: unusually long outer meniscus with a body reaching inter condylar notch, seat of a linear signal abnormality in the anterior horn interpreted as a horizontal crack. Arthroscopy revealed a discoid lateral meniscus without traumatic injury.

**Fig. 5:** MRI coronal and sagittal DP Fat Sat: External discoid meniscus seat of a radial crack found during the surgical procedure.
Conclusion

The DM infrequent pathology.

It is more fragile than normal morphology meniscus.

MRI is the modality of choice for the positive diagnosis and assessment of the lesions.

Personal information

References


