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Imaging Study of a Meniscal Transplant: A Novel Technique

Khizer Razak[1], Surbhi Gupta[2] and GL Meena[3]*

Department of Radiodiagnosis, SP Medical College, India

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***Corresponding author:** GL Meena, Department of Radiodiagnosis, Sardar Patel Medical college, Bikaner, Rajasthan, India, Email: meenabkn@yahoo.co.in

Abstract

Aim & Objectives: The meniscal transplant has been proposed for the symptomatic relief of young patients with meniscal pathology and to prevent the risk of early joint degeneration. We review the indications, techniques and complications of this procedure and describe the most important radiological findings.

Material & Methods: We retrospectively reviewed the meniscus transplants performed at Dept. of Radio diagnosis P.B.M hospital, Bikaner, with a minimum follow-up of 1 year using adiography, magnetic resonance and / or MR arthrography. The results of 10 patients with an average age of 34.5 years (21-45) were analyzed [1].

Conclusion: The radiologist must know the surgical technique of meniscal transplantation and be familiar with the normal findings of post-transplant imaging in MRI for the accurateevaluation of these patients and recognize the signs of probable complications. It is very important to correlate the morphological alterations with the patient's clinic.

Keywords: Meniscus; Imaging; MR; Technique

Introduction

The main indications of meniscal transplantation are limited to patients <50 years old and with:

a. Postmeniscectomy symptoms.

b. Unicompartmental pain that does not improve with conservative treatment, which makes it impossible to carry out the activities that the patient usually performed and without other relevant pathological findings.

c. Meniscal injury associated with another pathology (ACL insufficiency, malalignment, signs of joint instability).

The ideal candidate for a meniscal transplant would be a young patient under 45 years of age, with stable knee and athlete with a history of meniscectomy.

The contraindications are the following:

a. Pre-existing inflammatory arthritis (RA)

b. Degenerative, postinfectious or metabolic joint disease.

c. Obesity

d. Major cartilage damage (advanced joint degeneration (Outerbridge> 2) (Figures 1 & 2).

Figure 1: The coronal resonance image in T2-weighted sequence shows postoperative changes after previous external meniscectomy with marked degenerative changes of the hyaline cartilage of the articular facets of the lateral femorotibial compartment, which contraindicates a transplant.

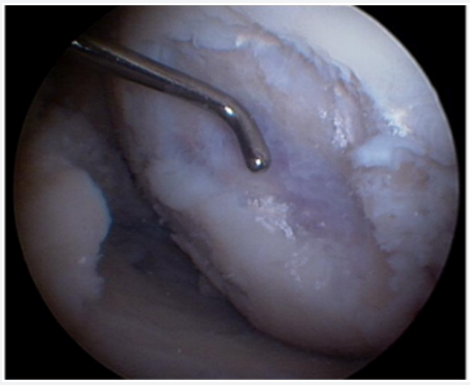

Figure 2: The marked degenerative changes of the hyaline cartilage visualized in this photograph during arthroscopy contraindicate the meniscal transplant technique.

e.Changes grade III-IV of Fairbank in tibia and femur (lesions "in kiss") (Figure 3).

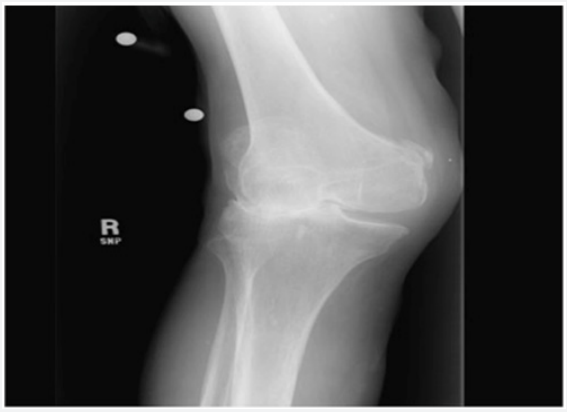

Figure 3: PA conventional radiograph of the right knee showing valgus deformity in the right knee with marked degenerative changes, especially at the level of the external femorotibial compartment, with significant reduction of the joint space ("kissing injury"), loss of joint cartilage and osteophytes, radiographic findings that contraindicate a meniscal transplant.

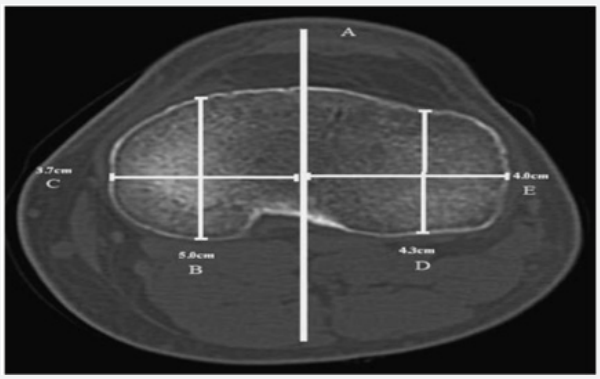

Figure 4: A: Sagittal interspinous line B: AP distance between the sagittal interspinous line (A) and the posteromedial tibial cortex C. Distance between the posteromedial tibial cortex (B) and the sagittal interspinous line (A) D. AP distance of the lateral tibial plate between the sagittal interspinous line (A) and the lateral tibial cortex E. Distance between the lateral tibial cortex and the sagittal interspinous line.

For the presurgical measurement of the meniscal graft, the simple radiograph has been shown to be the most accurate method (Figure 4).

The allograft is obtained from the tibial plate of the corpse (Figure 5 & 6), it is kept frozen at -80º, thus maintaining the collagen but the donor cells are destroyed (they remain almost acellular, which conditions a minimum risk of immunological rejection).

Figure 5: Photograph of the allograft obtained from a corpse tibial plateau (donor) with subsequent preparation.

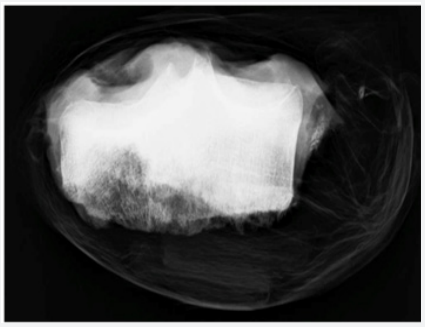

Figure 6: Radiographic image of the tibial plate containing both meniscus, obtained from the corpse.

Given the limited visualization of the surgical field offered by arthroscopy, the preparation of the allograft requires a precise location in the space to facilitate the orientation of the surgeon: with cable markings of different colours (Figure 7) and identifying the anterior and posterior horns (Figures 7 & 8), we proceed to the preparation of the allograft for its correct localization during the procedure (Figures 8 & 9).

Figure 7: Photograph showing the placement of the three instruments used during arthroscopy.

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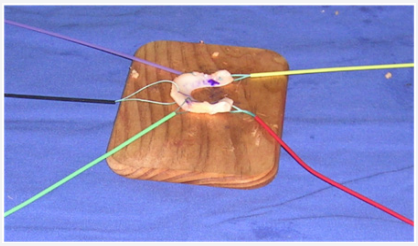

Figure 8: The presurgical photograph shows the placement of 5 wires of different colors that serve as orientation for the surgeon when introducing the meniscal allograft into the knee of the host by means of arthroscopy: in this image, for example, the red wire corresponds to the posterior horn, the yellow to the anterior horn, the black wire to the body, and the green and purple wires are placed in between, offering greater orientation.

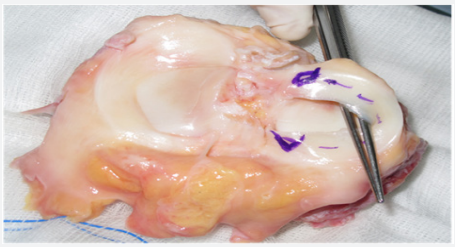

Figure 9: Photograph of the allograft of the tibial plateau in which the anterior and posterior horns were marked.

The graft bed should be properly prepared to facilitate healing. Debridement of the meniscal remnant and scar tissue is performed. In the periphery, the meniscus is sutured to the capsule. The meniscal transplant is performed arthroscopically (Figure 10) assisted with small cutaneous injections (<12mm). The standard techniques are based on the solid bony fixation of the meniscal horns (Figure 11).

Figure 10: Intraoperative photograph showing the introduction of the graft into the host's joint.

There are different methods for the two meniscus allowing a correct anatomical location of the meniscal horns:

i. For the internal meniscus the method with double bone pill is used; Tunnels are drilled at the corresponding anatomical sites of the recipient's meniscal horns, and the bone pellets are inserted into the host bone with sutures passed through the tunnels that are tied around an anterior bridge of tibial bone.

ii. However, given the proximity of the horns of the lateral meniscus, the "keyhole" technique is used, in which a graft is placed that has a bony bridge connecting the anterior and posterior horns. This block of bone, or bridge, conforms and adapts to a similar tunnel ("keyhole") carved into the anterolateral plateau of the recipient.

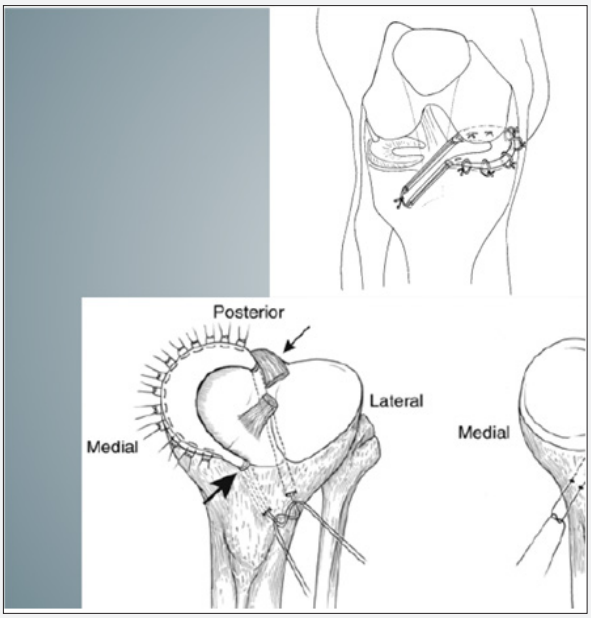

Figure 11: Figures showing the location of the bone anchors in the tibial plates according to the different techniques of the corresponding menisci.

The maintenance of the natural insertion of the meniscus [2] to the bone reduces the risk of extrusion of the graft towards the medial and lateral leak, which leads to its failure. Also, the native inserts allow a correct mobility of the meniscus.

Material & Methods

We retrospectively reviewed the meniscus transplants performed at Dept. of Radio diagnosis P.B.M hospital, Bikaner with a minimum follow-up of 1 year using radiography, magnetic resonance and / or MR arthrography. The results of 10 patients with an average age of 34.5 years (21-45) were analyzed.

Results

The 10 patients have been treated successfully and none of them has presented affectation of the joint space 5 years after the transplant. If the indications are respected and with a correct procedure, the clinical results are good in 90% of the cases [3].

As imaging tests are used

i. Conventional radiography

ii. Magnetic resonance or arthro-CT

iii. Direct visualization by arthroscopy.

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The following radiological findings must be taken into account:

Normal (not to be confused with pathological findings):

i. The presence of mild signal hyperintensity (Figure 12) and a certain degree of extrusion of the transplanted meniscus (Figure 13) should be considered normal and should be distinguished from disinsertion.

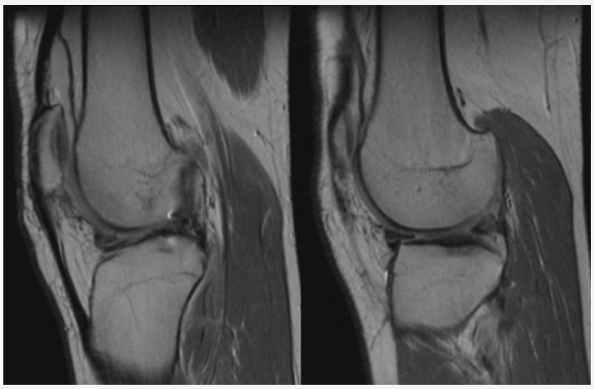

Figure 12: Sagittal images of MRI enhanced in DP sequence that show alterations of the signal in the transplanted meniscus: a horizontal hyper-signal is observed at the level of the meniscal body and another diffuse hypersignal at the level of the posterior horn, common and normal findings in a meniscus transplanted that should not be confused with pathological findings.

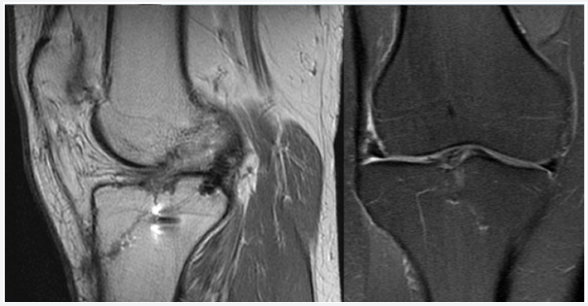

Figure 13: MR images showing normal alterations: the sagittal image on the left, enhanced in T1, shows artifacts of magnetic susceptibility by surgery at the level of the tibial epiphysis in relation to the anchor point and diffuse alterations of the signal at the level of the joint space. In the coronal image of the right, enhanced in DP with fat suppression, an extrusion of the transplanted meniscus body towards the external interline was observed.

ii. Slight irregularities of the free edge of the transplanted meniscus [4].

iii. Expected postoperative changes (Figure 14) and micrometallic artifacts due to surgery (Figure 15).

Complications to rule out radiologically are:

i. New meniscal tear (Figure 16)

ii. Size reduction (meniscal degeneration)

iii. Arthrofibrosis

iv. Hematoma

v. Infection.

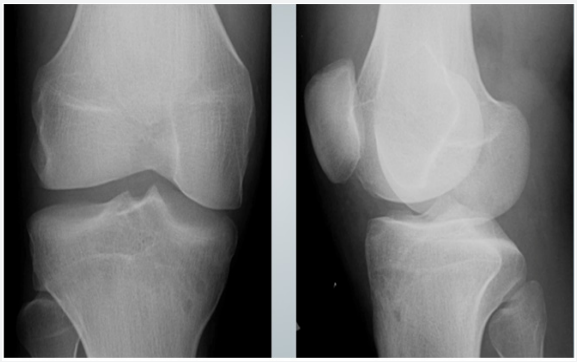

Figure 14: AP and Lat X-rays of the right knee showing the linear translucency of the bone tunnels at the level of the tibial plateau.

Figure 15: Coronal images of MRI enhanced in DP sequence with fat suppression (both on the left) and in FSE T1 (the one on the right) showing various artifacts of magnetic susceptibility by the surgical material: artifacts by sutures and by tunnels bone at the tibial level.

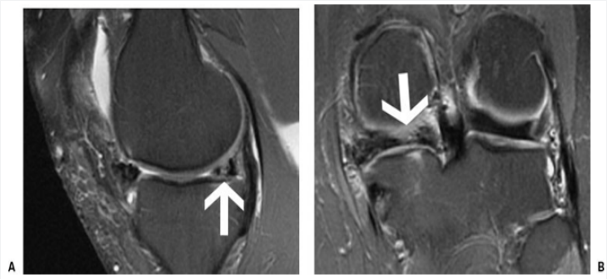

Figure 16: Sagittal (A) and coronal (B) images, enhanced in long TR sequences, demonstrate a linear vertical hyper signal (arrow) in the posterior horn of the transplanted medial meniscus. This break was confirmed with arthroscopy.

Conclusion

The radiologist must know the surgical technique of meniscal transplantation and be familiar with the normal findings of post-transplant imaging in MRI for the accurate evaluation of these patients and recognize the signs of probable complications. It is very important to correlate the morphological alterations with the patient's clinic.

The allogeneic meniscal transplant is a novel and complex therapeutic alternative that requires a good multidisciplinary

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collaboration and that with an appropriate selection of patients shows good results in the medium term in the series that we present. However, we will have to wait for the long-term results [5,6].

References

1. Angela G Gopez, Eoin C Kavanagh (2006) MR Imaging of the Postoperative Meniscus: Repair, Resection, and Replacement. Semin Musculoskelet Radiol 10(3): 229-240.
2. Johnson DL, Swenson TM, Livesay GA, Aizawa H, Fu FH, et al. (1995) Insertion-site anatomy of the human menisci: gross, arthroscopic, and topographical anatomy as a basis for meniscal transplantation. Arthroscopy 11(4): 386-394.
3. Veltri DM, Warren RG, Wickiewicz TL, O'Brien SJ (1994) Current status of meniscal transplantation. Clin Orthop Relat Res 303: 44-45.
4. Garrett JC, Aichroth PC, Canon WD, Patel DV (1997) Meniscal transplantation. In Knee Surgery. Current Practice. Kölln deutscher Ärzteverlag. Faven, New York, USA, 1992: 95-103.
5. Cameron JC, Saha S (1997) Meniscal allograft transplantation for unicompartmental arthritis of the knee. Adv Orthop Surg 21: 91-92.
6. Jon K Sekiya, Christopher I, Ellingson MD (2006) Meniscal Allograft Transplantation. J Am Acad Orthop Surg 14: 164-174.

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