

The usefulness of high resolution MRI by microscopy coil for diagnosing recurrent lateral patellar dislocation

Y. Iwama¹, M. Fujii¹, K. Sugimura¹, H. Kawamitsu¹, H. Shibamura², S. Yoshiya², M. Kurosaka²

¹Department of Radiology, Kobe University Graduate School of Medicine, Kobe, Hyogo, Japan, ²Department of Orthopaedic surgery, Kobe University Graduate School of Medicine, Kobe, Hyogo, Japan

Synopsis

Recurrent lateral patellar dislocation (RLPD) commonly occurs in young women and requires surgical treatment in case of severe symptoms. MRI is helpful in the diagnosis of RLPD; its findings include joint effusion, osteochondral injury of the lateral condyle and medial patella, and injury of the medial patellar stabilizer of the patella (1,2). The medial patellar stabilizer is composed of various anatomic structures, and among them the medial patellofemoral ligament (MPFL) has been recently considered to be the most important (3). MRI may be able to play a significant role in directing surgical management if it can accurately depict the location and extent of MPFL injury (2).

Introduction of a microscopy coil (diameter of 47mm) allows us to acquire high resolution MRI (HR-MRI). It is well suited to evaluate small structures such as ligaments (e.g. the MPFL) and cartilage in the patello-femoral joint. We used the microscopy coil on the patella and reviewed its advantages in the diagnosis of RLPD. The purpose of this study is to determine the usefulness of high resolution MRI (HR-MRI) using a microscopy coil for the precise evaluation of RLPD.

Materials and Methods

The study group consisted of 15 patients with clinically diagnosed RLPD (1 men and 14 women; age range 15-35 years, mean age 20.8 years) and 10 normal volunteers (4 men and 6 women; age range 21-32 years).

All MRI was performed on a 1.5T Gyroscan Intera (Philips). At first, conventional MRI of the whole knee joint were obtained using the knee coil. Then HR-MRI using microscopy coil in the medial aspect of patella were obtained at the level of the superior pole of the patella, targeting the MPFL. Four pulse sequences were obtained in the axial planes: proton-density weighted (TR/TE/NSA=1542/19/2) images, T1-weighted (550/15/2) images, T2-weighted (3000/66/2) images and T2* (597/18/2/FA=20 degree) images. The axial images were acquired with 2mm-thick contiguous sections, a 60mm field of view, and a 256x256 matrix.

The HR-MRI with RLPD were compared with those of the normal volunteers concerning the following findings of MPFL injury: loosening, thickening, and discontinuity; as well as findings in patellar injury: cartilage injury, subchondral bone injury, and dissection of the medial margin.

Results

In the normal volunteers, the MPFL was visualized as a well-defined low intensity band on each pulse sequence. The layer structure of the patellar cartilage became more apparent than before. (Fig. 1)

In the patients with RLPD, the abnormal findings of the MPFL and patella were clearly demonstrated on HR-MRI (Fig.2). MPFL injury was visualized in 87% (12 of 15 cases), which included loosening (5 cases), thickening (9 cases), and discontinuity (10 cases). Patellar injury was visualized in 73% (11 of 15 cases). Cartilage injuries were visualized in 9 cases, subchondral bone injury in 5 cases, and dissection of the medial margin in 6 cases (table 1).

Discussions and Conclusion

In our study, HR-MRI could clearly demonstrate the MPFL as a low-intensity band, distinctly from other ligaments, in the normal volunteer, and was very useful for evaluating abnormal findings of the MPFL and patella in the patients with RLPD. From the practical standpoint, the extent and location of MPFL injury are important in planning the location and extent of the incision along the medial aspect of the knee for MPFL repair. In conclusion, HR-MRI provides precise information about the MPFL and patellar injury in patients with RLPD.

Reference

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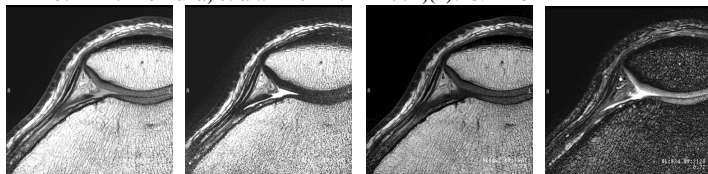


Figure 1. Normal appearance of the MPFL a b c d

a) Proton-density weighted images, b) T1-weighted images, c) T2-weighted images, d) T2* images, MPFL appears as a well-defined low intensity band running from the medial patellar margin to the medial femoral epicondyle, and the patellar cartilage is visualized very clearly.

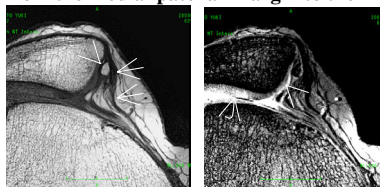


Figure 2 26 year old female with right RLPD a b

a) Proton-density weighted images, b) T2* images. The medial patello-femoral ligament is loose and its surface is irregular (long arrows). There is dissection of the medial patellar margin (short arrowhead). The osteochondral surface is irregular (arrowhead). There is also a high intensity area in the patellar cartilage (curved arrow), which is considered cartilage injury.

Table 1 MRI findings in the patients with MPFL

Injury of MPFL	12/15 (87%)
loosening	5
thickening	9
discontinuity	10
Injury of patella	11/15(73%)
cartilage injury	9
subchondral bone injury	5
dissection of the medial margin	6