Anterior approach for knee arthrography

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Abstract Objective. To develop a new method of magnetic resonance arthrography (MRA) of the knee using an anterior approach analogous to the portals used for knee arthroscopy.

Design. An anterior approach to the knee joint was devised mimicking anterior portals used for knee arthroscopy. Seven patients scheduled for routine knee MRA were placed in a decubitus position and under fluoroscopic guidance a needle was advanced from a position adjacent to the patellar tendon into the knee joint. After confirmation of the needle tip location, a dilute gadolinium solution was injected.

Results and conclusion. All the arthrograms were technically successful. The anterior approach to knee MRA has greater technical ease than the traditional approach with little patient discomfort.

Keywords Knee arthrography · Magnetic resonance arthrography ·

Introduction

Conventional knee arthrography was once a common procedure frequently utilized for the diagnosis of meniscal tears. Magnetic resonance imaging (MRI) has now replaced knee arthrography in the diagnosis of most knee pathology, but MR arthrography (MRA) of the knee is becoming more frequently used for certain indications. We have developed a new approach to knee injection that we have utilized in MRA of the knee.

Material and methods

Seven patients (age range 24–53 years; 3 female, 4 male) underwent MRA of the knee. The indication for most patients was prior knee surgery with new or recurrent symptoms. Informed consent was obtained from each patient before the procedure.

Each patient was place on a fluoroscopy table in a decubitus position with the symptomatic knee placed dependently against the tabletop. The symptomatic knee was flexed slightly or kept in full extension. After comfortable positioning was assured, often with propping of the nonsymptomatic leg by a pillow, the dependent knee was palpated. The patella was identified and a spot marked on the skin with indelible ink just medial to the medial edge of the patellar tendon approximately 1.5 cm below the patellar enthesis. This location was determined by palpation or a combination of palpation and fluoroscopy (Fig. 1) and is analogous to the anteromedial portal of knee arthroscopy [1]. The knee was then prepared with povidone-iodine solution and draped with sterile towels.

A standard MRA tray was utilized for the procedure. The tray contained three sterile towels, a 1 1/2 inch 25 gauge beveled needle, 1 cm³ syringe containing Omniscan (Nycomed, Princeton, N.J.), 1 cm³ syringe containing 1:1000 epinephrine, 10 cm³ syringe with iodinated contrast, 20 cm³ syringe with normal saline, and two sets of short length sterile tubing. The MRA contrast solution was prepared by the radiologist by adding 0.1 cm³ of Omniscan and 0.1–0.3 cm³ epinephrine to the 20 cm³ of normal saline. One set of tubing is attached to the iodinated contrast syringe and flushed; the second set of tubing is attached to the 20 cm³ syringe and flushed.

After preparation of this solution and after the povidone-iodine preparation had dried, the 25 gauge needle was placed in the subcutaneous tissue of the knee where previously marked. With intermittent fluoroscopy the needle was advanced with slight cephalic angulation perpendicular to the medial femoral condylar surface (Fig. 1). Local anesthetic was not administered as we found it often caused greater discomfort than the high-gauge needle. When the condyle was reached, a few drops of the iodinated contrast were administered through the preflushed tubing to confirm the needle position. Intra-articular positioning of the needle was con-
confirmed by free flow of contrast away from the needle tip (Fig. 2). If resistance to the injection was felt, the needle was withdrawn slightly, as the beveled edge may become fully embedded in cartilage. After confirmation of the needle position, the tubing/syringe was removed and the MRA contrast syringe and preflushed tubing was attached to the 25 gauge needle. The entire volume of MRI contrast was then injected, taking care to avoid the injection of air bubbles. The knee was passively exercised and the patient sent for imaging.

Results

All the procedures were technically successful, with no extravasation or other complications. All MRI images were considered of diagnostic quality, and patients complained of very little discomfort in comparison with the moderate discomfort we observe during patellofemoral injection. We did not find any intracartilaginous contrast at the point of injection or other abnormality of the injection tract at MRI examination.

Discussion

The traditional approach to knee arthrography [2] accesses the patellofemoral joint. In this technique the patella is palpated and pulled medially or laterally and a needle advanced under the patella. This approach can be difficult when patients tense the extensor mechanism, in obese patients, and in patients with patellofemoral arthrosis. The procedure is usually uncomfortable for patients and even painful if access is difficult. Gerber and Resnick [3] have briefly described an anterior approach in patients with prior patellectomy utilizing the tibial tuberosity as a landmark. They did not advocate more general use of their approach. Lomasney and Cooper [4] have described an approach to distal radioulnar joint arthrography (DRUJ) that is conceptually similar to our procedure. Instead of interposing a needle between two articular surfaces to enter a joint, their technique accesses the DRUJ by placing a needle on the articular cartilage of the ulnar head just medial to the actual articulation but within the joint capsule.

Our anterior approach is designed for patient comfort and technical ease. The approach is patterned after stan-