ROLE OF MAGNETIC RESONANCE IMAGING IN EVALUATION OF ANTERIOR KNEE PAIN

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By

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Yasir Hussain Motlaq

List of Contents

Subject *Page No.*

List of Abbreviations

Abbrev.	Full-term
ACL	: Anterior cruciate ligament
AKP	: Anterior knee pain
CT	: Computed tomography
FOV	: Field of view
FSE	: Fast spin echo
IBP	: Infrapatellar bursitis
LCL	: Lateral collateral ligament
LM	: Lateral meniscus
MCL	: Medial collateral ligament
MM	: Medial meniscus
MRI	: Magnetic resonance imaging
OSD	: Osgood Schlatter disease
PCL	: Posterior cruciate ligament
PDWI	: Proton density weighted image
PD	: Proton density
PPB	: Prepatellar bursitis
SD	: Standard deviation
SI	: Signal intensity
STIR	: Short-TI inversion recovery
TE	: Echo time
TR	: Time Repetition
TSE	: Turbo spin echo

List of Tables

List of Figures

Abstract

Background: The knee joint is one of the most commonly injured joints in the body. Because of its complex structure, this joint is subjected to numerous pathologies and due to the recent increase in various sport activities, there has been a parallel increase in sport-induced internal derangements of the knee. The main strength of knee MRI is the assessment of articular and Peri-articular diseases. The specific structures best suited for MRI assessment include tendons, muscles and ligaments, as well as peri-articular soft tissue masses.

Objective: The purpose of this study is to detect the accuracy of MR imaging as a diagnostic tool in the evaluation of different knee joint pathologies that cause anterior knee pain, with emphasis on some of their grades and types for better assessment.

Methodology: This study included 20 patients (6 female and 14 male). Their ages range between 10-60 years (average age 30 years). All presented by anterior knee pain and were referred to radiology department of Ain Shams University hospital or private centers for MRI examination after orthopedic consultation.

Results: 5% of the patients presented with anterior knee pain showed MRI evidence of patellar tendinopathy (66% below the age of 30 years and more in females). In all cases the hyperintense focal thickening was at the proximal third of the tendon, with the AP diameter of the patellar tendon greater than 8mm**.** In our results about 10% of the patients in the study sample, had MRI evidence of tear in the anterior horn of lateral knee meniscus with a female equal to male (50% females and 50% males). Cartilage injuries were detected in 5% of the study sample, showing male predominance (100% were male and 0% were female) with average age 32 years. All have a past history of trauma.

Conclusion: MRI is generally safe, accurate, and specific modality which has been proven to be the modality of choice in the diagnosis of different knee pathologies that cause anterior knee pain in different age groups. Also, it has a high specification in detecting the grades and types of some of these diseases.

Keywords: MRI, Anterior Knee Pain

Introduction

Anterior knee pain (AKP) is the most common knee complaint, usually occurring in adolescents and young adults **(Collado and Fredericson, 2010).**

It is more common in athletic individuals, particularly common in adolescents, between the ages of 12 and 17 years and may limit an individual's ability to perform common activities of daily living such as stair climbing and prolonged sitting **(Nunes et al. 2013).**

It also has the tendency to become chronic, especially in active individuals, adding an additional aspect of complexity to the treatment There is agreement among recent reviews that conservative approaches are the preferred choice of treatment for AKP **(Leibbrandt, D.C. & Louw, Q., 2017).**

Magnetic resonance imaging (MRI) in the recent decades has become the gold standard imaging modality for different knee pathologies as it is safe, and RF pulses used in MRI do not cause ionization **(Nunes et al. 2013).**

With MRI, we can obtain direct coronal and oblique image which is impossible with radiography and CT. Particularly useful for the scanning and detection of

abnormalities in soft tissue structures like the cartilage tissues, tendons, and ligaments. MRI also can help determine which patients with knee injuries require surgery. MR imaging is recognized as a standard procedure and has replaced diagnostic arthroscopy as the primary diagnostic modality for many knee pathologies **(Escala et al., 2006).**

Aim of the Work

The aim of the current study is to determine the diagnostic accuracy of magnetic resonance imaging (MRI) in evaluation of patients with history of anterior knee pain

Review of Literature

Technique and normal anatomy of knee MRI

Positioning and Coil Selection:

Knee MRI is possible using a variety of magnet designs (closed bore whole body, open whole body, dedicated extremity and field strengths. Regardless of magnet design, a local coil is mandatory to maximize signal-to-noise ratio. Typically, a cylindrical coil (often called an extremity or knee coil) surrounds the knee. Newer multichannel knee coils containing eight or more coil elements will further increase signal-to-noise ratios, and are required when using techniques like parallel imaging, which decrease the time of the scan **(Magee, Shapiro and Williams, 2004).**

Typically, the patient is positioned supine with the affected knee completely or nearly completely extended in the coil. Mild external rotation of the leg is often comfortable for the patient and may orient the anterior cruciate ligament into the sagittal plane to facilitate its evaluation. Gentle immobilization of the extremity and use of comfort measures for the entire body will help to reduce