

Diagnosis of Concomitant Anterolateral Ligament and Anterior Cruciate Ligament Injuries in the Knee: Is MRI a Valuable Tool?

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Summary:

The purpose of this study was to examine the ability of MRI to identify the anterolateral ligament in ACL-deficient patients.

Abstract:

INTRODUCTION

There has been a renewed interest in the anterolateral ligament (ALL) of the knee following recent characterization of this structure as a distinct ligament. In addition to the qualitative and quantitative anatomy, the role of the ALL in controlling rotational stability, and its association with anterior cruciate ligament (ACL) injury have also been studied. Diagnosing injury to the ALL is challenging, particularly given the subjective nature of physical examination. Consequently, focus has turned to magnetic resonance imaging (MRI) to reach a preoperative diagnosis. The purpose of this study was to examine the ability of MRI to identify the ALL in patients with an ACL rupture compared to a control group without ACL injury. A further objective was to determine the inter-observer reliability in assessing this structure.

METHODOLOGY

A prospective case control study was performed comparing the 3-Tesla MRI scans of 60 patients with an ACL rupture with a matched control group without an ACL injury. An experienced musculoskeletal radiologist and an orthopaedic surgeon evaluated the scans performed using standard knee protocols. The ALL was divided into three portions for analysis: femoral, meniscal, and tibial. The course of the ALL was evaluated according to known structural parameters previously studied. The status of the ALL was described as visualised or not visualised, and, when visualised, the integrity was assessed as intact, focal discontinuity, or attenuated at each portion. Additional qualitative MRI findings were noted.

RESULTS

The overall MRI evaluation of the ALL demonstrated moderate to substantial inter-observer reliability (average $k=0.71$; 95% CI=0.42-0.92). Visualisation of the ALL was considered inadequate in the ACL-injured group; the tibial portion was most frequently seen (44 %), followed by the meniscal (40%) and femoral (37%) portions. Although viewed with greater clarity in knees without ACL injury, identification of the ALL was nonetheless suboptimal: femoral (70%), meniscal (55%), and tibial (52%). The ability to distinguish the ALL in the ACL-injured knee was impeded by the presence of an effusion and oedema in the vicinity of the lateral capsule at the level of the meniscus. Qualitatively, bone bruising adjacent to the lateral cortical margin of the tibia was seen commonly in ACL-injured group (52%). Although this finding in conjunction with oedema of the lateral capsule may be suggestive of potential injury the ALL, no focal discontinuity of the ligament was observed in any case. Second fractures were identified in 4 cases (6.6%).

DISCUSSION

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This study demonstrated that MRI is not a reliable modality for identifying the ALL in ACL-injured or ACL-intact knees. Although, a portion of the ALL could be visualised on MRI in the majority of the control group, it could not be identified dependably in the presence of an ACL rupture. These results indicate that MRI alone should not be used to make a preoperative diagnosis of ALL injury.

SIGNIFICANCE

MRI, while valuable in assessing the integrity of most ligamentous structures of the knee, cannot be relied upon to make a definitive diagnosis of ALL injury. Further correlation is required between clinical, arthroscopic and radiological findings to enhance the diagnosis of ALL injury.