Radiología. 2015;57(2):131–141

RADIOLOGÍA

www.elsevier.es/rx

ORIGINAL ARTICLE

Diagnosis of lesions of the acetabular labrum, of the labral–chondral transition zone, and of the cartilage in femoroacetabular impingement: Correlation between direct magnetic resonance arthrography and hip arthroscopy☆

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Received 27 April 2013; accepted 13 November 2013

KEYWORDS
Hip joint;
Femoroacetabular impingement;
Labrum;
Labral–chondral transitional zone;
Cartilage;
Chondral;
Magnetic resonance imaging;
MR arthrography;
Arthrography;
Arthroscopy

Abstract
Objective: To determine the sensitivity and accuracy of direct MR arthrography in the diagnosis of intra-articular lesions associated with femoroacetabular impingement.
Material and methods: We used direct MR arthrography to study 51 patients with femoroacetabular impingement who underwent arthroscopic hip surgery. Surgery demonstrated 37 labral tears, 44 lesions in the labral–chondral transitional zone, and 40 lesions of the articular cartilage. We correlated the findings at preoperative direct MR arthrography with those of hip arthroscopy and calculated the sensitivity, specificity, positive predictive value, negative predictive value, and validity index for direct MR arthrography.
Results: The sensitivity and specificity of MR arthrography were 94.5% and 100%, respectively, for diagnosing labral tears, 100% and 87.5%, respectively, for diagnosing lesions of the labral–chondral transition zone, and 92.5% and 54.5%, respectively, for diagnosing lesions of the articular cartilage. The negative predictive value of MR arthrography for lesions of the labral–chondral transitional zone was 100%. MR arthrography accurately defined extensive

☆ Please cite this article as: Crespo Rodríguez AM, de Lucas Villarrubia JC, Pastrana Ledesma MA, Millán Santos I, Padrón M. Diagnóstico de lesiones del labrum acetabular, de la unión condrolabral y del cartílago en el pinzamiento femoroacetabular: correlación entre artrografía mediante resonancia magnética directa y artroscopia de cadera. Radiología. 2015;57:131–141.

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lesions of the cartilage and the secondary osseous changes (the main factor in poor prognosis), although its diagnostic performance was not so good in small chondral lesions.
Conclusion: In patients with femoroacetabular impingement, direct MR arthrography can adequately detect and characterize lesions of the acetabular labrum and of the labral–chondral transitional zone as well as extensive lesions of the articular cartilage and secondary osseous changes.

PALABRAS CLAVE
Cadera;
Pinzamiento femoroacetabular;
Labrum;
Unión condrolabral;
Cartílago;
Condral;
Resonancia magnética;
Artrografía mediante resonancia magnética;
Artrografía;
Artroscopia

Diagnóstico de lesiones del labrum acetabular, de la unión condrolabral y del cartílago en el pinzamiento femoroacetabular: correlación entre artrografía mediante resonancia magnética directa y artroscopia de cadera

Resumen
Objetivo: Determinar la sensibilidad y la precisión de la artrografía mediante resonancia magnética (artro-RM) directa para diagnosticar lesiones intraarticulares asociadas al pinzamiento femoroacetabular.
Material y métodos: Estudiamos con artro-RM directa a 51 pacientes con pinzamiento femoroacetabular que se operaron mediante artroscopia de la cadera la cual demostró 37 roturas del labrum, 44 lesiones en la unión condrolabral y 40 lesiones del cartílago articular. Correlacionamos los hallazgos de la artro-RM directa preoperatoria con los de la artroscopia de la cadera y calculamos la sensibilidad, especificidad, valor predictivo positivo, valor predictivo negativo e índice de validez de la artro-RM directa.
Resultados: La sensibilidad y la especificidad de la artro-RM directa para diagnosticar la rotura labral fueron del 94,5 y del 100%, para la lesión de la unión condrolabral del 100 y del 87,5%, y para la lesión del cartílago articular del 92,5 y del 54,5%, respectivamente. El valor predictivo negativo de la artro-RM fue del 100% para las lesiones de la unión condrolabral. La artro-RM definió con precisión las lesiones extensas del cartílago y los cambios óseos secundarios, principal factor pronóstico desfavorable, mientras que su rentabilidad diagnóstica fue menor en pequeñas lesiones condrales.
Conclusión: La artro-RM directa detecta y caracteriza adecuadamente las lesiones del labrum acetabular, de la unión condrolabral, lesiones extensas del cartílago articular y los cambios óseos secundarios en pacientes con pinzamiento femoroacetabular.

Introduction

The hip is a complex anatomic region that has historically been a therapeutic challenge for trauma-orthopedic surgeons. The introduction of the secure hip luxation technique in 2001 allowed us to treat it securely.[1] The interest for hip arthroscopy during the last years has improved our knowledge on the anatomy, biomechanics, and pathology of coxofemoral joint.

Hip pain is a common clinical issue in patients of all ages. The role of acetabular labrum and cartilage in pain and hip degenerative change is very well established[2–5] especially in hip dysplasia.[6] In femoroacetabular impingement (FAI) certain acetabular morphologic or proximal femur anomalies condition contact or ''ahead'' touch usually between the anterior–superior region and the femoral head–neck joint and the acetabular ring causing chondral and labrum lesions. Recent studies claim that the FAI is an important cause of early onset hip arthrosis especially in young active populations.[7–12] Even though the diagnosis of FAI is clinical the role of image tests is essential. X-rays allow us to adequately diagnose the morphological anomalies characterizing FAI, bone dysplasia and arthrosis.[13] MRIs allow us to exclude other causes of inguinal pain and arthrosis in early stages and the magnetic resonance arthrography (MR-arthro) clearly outlines lesions at labrum-level.[14] Since 1996 several studies have established that direct MR-arthro is better than conventional MR[15,16] to find and characterize lesions at the labrum acetabular and articular capsule-level by comparing the direct MR-arthro with hip arthroscopy that until that moment was the standard diagnosis.[1,17] Recently the pathogenic role of the chondrolabral joint or transition in labrum and acetabular cartilage lesions in patients with FAI[18] has been highlighted. In this article we tried to study the lesions at labrum and chondrolabral joint-level by correlating the arthroscopic findings with those of direct arthro-MR. The goal was to determine both the sensitivity and accuracy of direct arthro-MR for the diagnosis of lesions at labrum and chondrolabral joint and articular cartilage-level in patients who underwent arthroscopies to treat their FAI.