

AKURASI DIAGNOSTIK *MAGNETIC RESONANCE IMAGING* DALAM MENGIDENTIFIKASI KEJADIAN ROBEKAN *ANTERIOR CRUCIATE LIGAMENT* DIBANDINGKAN DENGAN ARTROSKOPI

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INTISARI

Latar Belakang: Cedera *anterior cruciate ligament* (ACL) merupakan salah satu trauma lutut yang paling sering dijumpai, terutama pada populasi muda dan aktif. Diagnosis yang akurat sangat penting untuk menentukan terapi yang tepat. Artroskopi dikenal sebagai *gold standard* dalam menegakkan diagnosis robekan ACL, tetapi bersifat invasif, mahal, dan tidak selalu tersedia. *Magnetic Resonance Imaging* (MRI) menjadi modalitas non-invasif yang mampu mengevaluasi struktur jaringan lutut dengan sensitivitas dan spesifisitas tinggi, sehingga berpotensi menjadi alternatif diagnostik.

Metode: Penelitian ini menggunakan desain observasional retrospektif dengan melibatkan 64 pasien yang telah menjalani MRI dan artroskopi lutut di RSUP Dr. Sardjito periode 2021–2024. Citra MRI dinilai ulang secara independen oleh dua dokter spesialis radiologi berpengalaman. Parameter diagnostik yang dianalisis mencakup sensitivitas, spesifisitas, nilai prediksi positif (PPV), nilai prediksi negatif (NPV), serta akurasi. Uji reliabilitas antar-pemeriksa dilakukan menggunakan nilai Cohen's kappa untuk menilai konsistensi interpretasi MRI.

Hasil: Sebanyak 48 pasien terkonfirmasi memiliki robekan ACL melalui artroskopi, sementara 16 lainnya tidak. MRI menunjukkan sensitivitas 100%, spesifisitas 81,3%, PPV 94,1%, NPV 100%, dan akurasi 95,3% terhadap artroskopi. Tingkat kesepakatan antar-pemeriksa sangat tinggi ($\kappa = 0,867$ untuk keberadaan robekan, $\kappa = 0,808$ untuk klasifikasi jenis robekan; $p < 0,001$), menegaskan reliabilitas interpretasi MRI. MRI terbukti sangat akurat dalam mendeteksi robekan total ACL, tetapi pada robekan parsial ditemukan kecenderungan misklasifikasi, dengan 9 kasus yang seharusnya robekan total terbaca sebagai parsial.

Kesimpulan: MRI memiliki akurasi diagnostik yang sangat baik dalam mendeteksi robekan ACL dibandingkan artroskopi, terutama dalam memastikan keberadaan robekan total. Namun, interpretasi pada robekan parsial memerlukan kehati-hatian karena risiko misklasifikasi.

Kata kunci: *Anterior cruciate ligament*, *magnetic resonance imaging*, artroskopi, akurasi diagnostik.

DIAGNOSTIC ACCURACY OF MAGNETIC RESONANCE IMAGING IN IDENTIFYING ANTERIOR CRUCIATE LIGAMENT TEARS COMPARED TO ARTHROSCOPY

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ABSTRACT

Background: Anterior cruciate ligament (ACL) injury is one of the most common knee injuries, especially in the young and active population. Accurate diagnosis is crucial for determining appropriate therapy. Arthroscopy is known as the gold standard for diagnosing ACL tears, but it is invasive, expensive, and not always available. Magnetic resonance imaging (MRI) is a non-invasive modality capable of evaluating knee tissue structures with high sensitivity and specificity, making it a potential diagnostic alternative.

Methods: This study used a retrospective observational design involving 64 patients who underwent MRI and knee arthroscopy at Dr. Sardjito General Hospital between 2021 and 2024. MRI images were independently reassessed by two experienced radiologists. Diagnostic parameters analyzed included sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy. Inter-examiner reliability was performed using Cohen's kappa to assess consistency of MRI interpretation.

Results: A total of 48 patients were confirmed to have an ACL tear by arthroscopy, while 16 were not. MRI demonstrated 100% sensitivity, 81.3% specificity, 94.1% PPV, 100% NPV, and 95.3% accuracy compared to arthroscopy. Inter-examiner agreement was very high ($\kappa = 0.867$ for tear presence, $\kappa = 0.808$ for tear type classification; $p < 0.001$), confirming the reliability of MRI interpretation. MRI proved highly accurate in detecting complete ACL tears, but a tendency for misclassification was observed for partial tears, with 9 cases of complete tears being read as partial.

Conclusion: MRI has excellent diagnostic accuracy in detecting ACL tears compared to arthroscopy, especially in confirming the presence of a complete tear. However, interpretation of partial tears requires caution due to the risk of misclassification.

Keywords: Anterior cruciate ligament, magnetic resonance imaging, arthroscopy, diagnostic accuracy.