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Is the MRI really telling us what is wrong with the knee!

By: Ricardo A. Nieves, M.D. and Nadia Wesche, OMS-III

MRI is a common procedure used for diagnosing a large number of problems throughout the body and is believed by some to be the best choice for examining major joints such as the knee. However, it is imperative that providers keep in mind that the MRI is not sufficient alone to determine a patient's treatment nor should a diagnosis be made simply by looking at an isolated MRI without taking into consideration the patient's history and physical exam findings.

The clinical exam vs. MRI

Many physicians already develop their diagnosis based upon physical exam findings before even receiving the actual MRI, but can a diagnosis be made from only an MRI? Is MRI more accurate for picking up abnormalities than a clinical exam alone?

In a study by Kocabey et al, their purpose was to compare the accuracy of clinical exam versus MRI in diagnosing meniscal and ACL pathology. Ultimately their results showed no statistical difference and therefore the accuracy was equal. From this they concluded that a “well trained, qualified surgeon can safely rely on clinical exam” and that routine ordering of MRI before an exam is not recommended (Kocabey, et al; 2002).

Gelb et al had a similar goal while establishing the clinical value and cost effectiveness. In their study they ascertained that information from the scans contributed to treatment in only 14 of 72 patients. Furthermore, they determined that clinical assessment equaled or surpassed the MRI in accuracy by illustrating that clinical evaluation had 100% sensitivity and specificity for diagnosing ACL injuries compared to the 95% sensitivity and 88% specificity of MRI. In regards to isolated meniscal lesions, clinical evaluation again had a higher sensitivity and specificity of 91% while MRI was 82% sensitive and 87% specific. The most drastic discrepancy between the two was shown in evaluating articular surface damage with 100% positive predictive value for clinical assessment and only 33% for MRI. These findings led to their conclusion that MRI is overused in evaluation of knee disorders and not a cost-effective method for evaluating injuries when compared with a skilled examiner (Gelb et al; 1996).

Likewise, a study by Miller involving patients with an initial diagnosis of a torn meniscus aimed to prove that routine preoperative MRI could improve the accuracy over clinical diagnosis alone, but the results showed contrary. In fact, with the accuracy of clinical diagnosis being 80.7% versus the 73.7% with MRI, the authors concluded that "relying blindly" on MRI without using clinical judgment to determine surgical intervention would have led to inappropriate treatment in 35.1% of the knees. Therefore, MRI did not prevent “unnecessary surgery” and, in their opinion, should be “reserved for confusing or special cases” (Miller, GK; 1996).

Abnormalities and asymptomatic patients

The previously discussed studies also underscore a very important point: when clinicians evaluate an MRI it is essential to know the prevalence of abnormal findings in an asymptomatic patient.

LaPrade et al concluded that clinicians must match clinical signs and symptoms with MRI findings before recommending surgical treatment when their study examining asymptomatic knees found a 5.6%

prevalence of meniscal and a 24.1% prevalence of Grade II signal changes of posterior horn of medial meniscus (LaPrade et al; 1994). A Japanese study also found a 13% prevalence for discoid menisci along with evidence of subchondral changes in some of their subjects older than 40 years (Fukuta et al; 2002).

Comparing symptomatic and asymptomatic knees in the same patients, Zanetti et al found meniscal tears in 36 contralateral asymptomatic knees out of the 57 symptomatic knees, producing 63% prevalence. Even though meniscal tears were frequently encountered and may not always be related to symptoms they also found that collateral ligament, pericapsular soft-tissue and edema-like bone abnormalities were almost exclusively on the symptomatic side, thus appearing to be more clinically meaningful (Zanetti et al; 2003). These findings were similar to an earlier study showing a high incidence of abnormal findings in asymptomatic volunteers without any history or symptoms of knee injuries with an increased prevalence of 36% in patients older than 45 years. These authors ended their study by stressing the importance of access to relevant clinical data when interpreting MRI (Boden et al; 1992).

Taking all this into consideration, MRI can still be a very useful tool especially when it comes to ambiguous clinical findings in patients with acute knee injury. In 23 patients with an average age of 26 MRI was shown to have a sensitivity 90%, specificity 67%in ACL injury, sensitivity 50%, specificity 86% in Medial meniscal tears and sensitivity 88%, specificity 73% in lateral meniscal tears (Munshi et al 2000).

What about athletes?

From swimmers to basketball and football players, several studies have found that many of the asymptomatic athletes had abnormalities on MRI. In a population of professional basketball and college football players, 50% had significant irregularities with half of them unaware of any significant injury and no previous surgeries (Brunner et al; 1989). Another study involving 14 asymptomatic NBA players provided results showing 25 of the 28 knees (89.3%) had one or more abnormality on their MRI (Walczak et al, 2008). Finally, 69.2% of the knees evaluated in a group of adolescent asymptomatic swimmers also had one or more abnormalities upon imaging (Bernardi et al; 2012).

Bottom line: Clinicians must match clinical signs and symptoms with MRI findings before instituting surgical treatment. Due to the prevalence of abnormalities in asymptomatic patients, it is not recommended to perform routine ordering of MRI before an exam and MRI should be reserved for more complicated cases with vague findings in patients with acute knee injury. Finally, a skillful clinician can safely rely on clinical exam findings, which is also more cost-effective.

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