Critically Appraised Paper

The Lachman test is the most sensitive and the pivot shift the most specific test for the diagnosis of ACL rupture

Synopsis


Objective: To assess the validity of three physical diagnostic tests for the demonstration of rupture of the anterior cruciate ligament (ACL): the anterior drawer test, the Lachman test, and the pivot shift test. Design: Meta-analysis of diagnostic studies. Data sources: From computerised searches of Medline (1966–2004) and Embase (1980–2004), publications were selected that were written in English, French, German, or Dutch and in which the value of at least one physical diagnostic test for rupture of the ACL was assessed in comparison with the findings from arthrotomy, arthroscopy, or MRI as the reference standard. Study selection and assessment: Two investigators independently selected the publications, assessed the methodological quality, and extracted data using a standardised protocol. Outcomes: Wherever appropriate and possible, an estimate was made of the (pooled) sensitivity, specificity, and positive and negative predictive value of each test with the aid of a meta-analysis. Main results: There were 17 studies identified. None of these reported blinded assessment of test, and only 2 performed the gold standard in all included patients. Summary estimates of sensitivity and specificity were 62% (95% CI 42 to 78%) and 88% (95% CI 83 to 92%) for the anterior drawer test, 86% (95% CI 76 to 92%) and 91% (95% CI 79 to 96%) for the Lachman test, and 32% and 98% (95% CIs could not be calculated) for the pivot shift test, respectively. Conclusions: Physical diagnostic tests may be useful in the diagnosis of ACL ruptures. The clinical relevance of the test results, however, depends largely on the prior probability of the presence of such a rupture and is therefore different for general practitioners and specialists.

Commentary

None of the 17 studies in this review was conducted in general practice or reported that the clinical tests were performed without knowledge of the gold standard. Moreover, in 15 of the studies there was verification bias. Both forms of bias are known to inflate estimates of diagnostic accuracy (Lijmer et al 1999). Hence, while the review was conducted expertly, the results may over-estimate the diagnostic accuracy of these tests.

Sensitivity was highest for the Lachman and specificity for the ‘pivot-shift’. Obviously, the usefulness of posterior probabilities depends largely on the management options under consideration. Options in general practice include referral to a secondary care centre and in hospital-based orthopaedic care referral for more imaging tests or direct intervention via arthroscopy. The review shows that given a prior probability above 50%, the posterior probability of disease with a negative test result will never fall below 10%, even with a negative Lachman, which is the most useful test for exclusion. In patients with a low probability (< 10%) of a rupture, however, a negative Lachman test makes a rupture quite unlikely (< 3%), while a positive pivot shift test increases the probability of rupture to 40 to 60%. Hence, these two tests could be useful in situations where there is a low prior probability: a negative Lachman test to withhold referral based on the low probability, and a positive pivot shift test to select patients for immediate referral. On the other hand, a positive pivot shift test in patients with a high clinical probability makes an anterior cruciate rupture probably so likely (> 90%) that further imaging seems unwarranted and the strategy could revert to an immediate arthroscopic intervention, a statement that is certainly not true for the other two physical diagnostic tests.

In summary, a negative Lachman test makes a rupture unlikely in patients with a low prior probability and the positive pivot shift test helps to select patients for further diagnostic procedures, or even therapy in case of high prior probability. Unfortunately, while the discussion of the article seems to reflect this opinion, the abstract (in Dutch as well as in the English translation) in the original publication concludes the opposite.

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Reference