

Paper #39

The "Sleeper's Sign" is Suggestive of a Medial Submeniscal Flap Tear: Validity and Diagnostic Performance Compared to Arthroscopy and Agreement with MR Imaging

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Summary:

The "sleeper's sign" is a new, valid, high performance clinical sign for the diagnosis of a medial submeniscal flap tear. It is useful both for the diagnosis (indication for MR imaging) and treatment (indication for surgery) of knee pain.

Abstract:

Introduction

Meniscal injuries are the most frequent indication for knee arthroscopy. Injuries can be simple and respond to appropriate conservative treatment, or more complex and unstable such as meniscal flap tears, requiring arthroscopic suture or resection. Failure to diagnose these injuries results in delayed treatment and is a source of pain and functional impairment. There are no existing specific clinical tests to identify a medial submeniscal flap tear (MSMFT). The main goal of this study was to describe, evaluate and validate the diagnostic performance of a new clinical sign « the sleeper's sign » in the diagnosis of MSMFT .

Materials And Methods

This retrospective single center series included patients aged 18 to 55 years' old who underwent arthroscopic repair between 2013 and 2015 for a medial meniscal tear associated or not with a lateral meniscal tear. Isolated lateral meniscal tears and ligament tears were excluded. This study was performed according Standards for reporting of diagnostic accuracy (STARD) guidelines, and the reference test was a perioperative diagnosis of a MSMFT. The preoperative consultation reports were all analyzed to search for the « sleeper's sign », defined as night time medial tibiofemoral pain, which occurs when the patient is in the lateral, « fetal » position with both knees in contact and of variable intensity. The validity of the sign was evaluated by the kappa coefficient (k) and its performance by determining sensitivity (Se), specificity (Sp), exactitude, positive predictive value (PPV) and negative predictive value (NPV).

Results

Out of 667 initially identified arthroscopic medical files, 310 patients, mean age 41.7±9.7 years old, responded to the study criteria. The "sleeper's sign" was identified in 39 (12.6%) patients and a MSMFT was confirmed during arthroscopy in 47 (15.2%) cases, with significant agreement between this sign and arthroscopy (k=0.78, p<10⁻⁴) as well as with MR imaging (k=0.72, p<10⁻⁴). The performance parameters of the sleeper's sign were: Se=74.5±12.5%,

Paper #39

Sp=98.5±1.6%, exactitude=96.9%, PPV=89.7%, NPV=95.6%. MR imaging was found to be more sensitive (91.5 ±8%). Multivariate analysis identified the sleeper's sign as a risk factor of MSMFT during arthroscopy: OR=131.9 CI95% [26.9-646.2], p<0.0001 and a bone edema on MR imaging: OR=13, CI95% [1.9-7.1], p=0.008.

Conclusion

The "sleeper's sign" is a new, valid, high performance clinical sign for the diagnosis of a medial submeniscal flap tear. It is useful both for the diagnosis (indication for MR imaging) and treatment (indication for surgery) of knee pain.