ePoster #98
Patella Alta Measurements On Magnetic Resonance Imaging (MRI): Which Ones Are Most Relevant, and Does Sex Matter?

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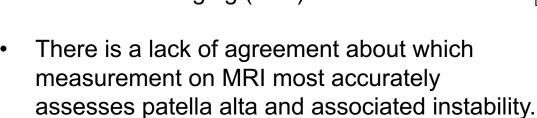SPORTS MEDICINE

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Disclosures

The authors report no relevant commercial third-party disclosures related to the subject of this study/ePoster.

Background

- Patellar instability is a debilitating knee problem with an estimated incidence of about 29 per 100,000.

- Patella alta is a known risk factor for patellar instability and radiographic measurements can be useful to help guide treatment.

- Although originally described on x-ray, more recent studies have applied these measurements of patellar height to magnetic resonance imaging (MRI).

- There is a lack of agreement about which measurement on MRI most accurately assesses patella alta and associated instability.

Study Aims

- 1) To identify the most accurate measurements and thresholds for patella alta on MRI that can identify the presence of patellar instability.

- 2) To describe these differences between males and females.

Methods

- MRIs of knees of patients with symptomatic patellar instability were identified and were compared with MRIs of age- and sex- matched control knees.

- The following measurements of patella alta were performed on midline sagittal images:

  - Insall-Salvati Ratio (ISR)
  - modified Insall-Salvati Ratio (mISR)
  - Caton-Deschamps Index (CDI)
  - Patellar Trochlear Index (PTI)
  - Blackburne-Peel Index (BPI)

Methods (Cont.)

- For each measurement, non-parametric receiver operating characteristic (ROC) curve analysis was performed, with area under the ROC curve (AUC) describing the accuracy of each diagnostic test determined.

- For each AUC, 95% confidence intervals were also identified.

- Youden's *J* statistic was calculated to determine optimal cut-off values to predict knees with and without patellar instability.

- AUC and cut-off values were determined for each measurement and compared between men and women.

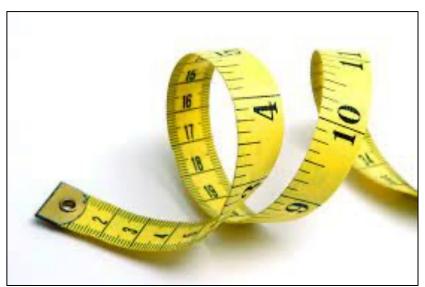- For all ROC curves, AUC > 0.7 was considered to be a valuable diagnostic test.

Results

- A total of 259 patients were included (61% female; mean age: 27 years [SD: 10]).

- Across all patients, ISR had the greatest diagnostic value with an AUC of 0.74 (95% CI: 0.68 to 0.81), and similar diagnostic value was noted between women (AUC 0.77 (95% CI: 0.69 to 0.84)) and men (AUC 0.70 (95% CI: 0.59 to 0.81)).

- Across all patients and by sex, no other measurement demonstrated diagnostic value on MRI, with all AUCs < 0.7.

Results (Cont.)

- Optimal ISR cut-off values for patellar instability were equal between female (1.3, Sensitivity: 68.29%; Specificity: 72.73%

- Positive Predictive Value (PPV): 71.46%; Negative Predictive Value (NPV): 69.64 %) and males (1.3, Sensitivity: 59.57%; Specificity: 81.13%; PPV: 75.94%; NPV: 66.74%).

Conclusion

- On MRI measurements, patella alta as measured by ISR has the greatest ability to identify knees with patellar instability and demonstrated similar utility and cutoff values between males and females.

- However, all other measurements did not reach diagnostic value.

- These findings call into question how accurate the use of MRI may be when calculating these measurements as a means of assessing patella alta as a risk factor for patellar instability.