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Usefulness of Sagittal MRI for Ligament Rupture Assessment after Elbow Dislocation

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Introduction and Background

Magnetic Resonance Imaging (MRI) assessment of elbow ligaments typically prioritizes T2-weighted and STIR coronal images. Current guidelines suggest obtaining coronal views aligned with the humeral long axis, often in 20-30 degrees of elbow flexion when full extension is difficult. However, the specific utility of the sagittal plane in diagnosing ligamentous tears following elbow dislocation has not been adequately reported. The purpose of this study was to investigate the usefulness of the sagittal plane for evaluating ligamentous ruptures after traumatic simple elbow dislocation.

Material and Method

This was a retrospective observational study. We included nine consecutive cases (9 elbows; mean age 45 years) diagnosed with traumatic simple elbow dislocation between July 2015 and July 2024 who underwent surgical treatment. The average elbow flexion angle during MRI acquisition was 37 degrees. Tears of the Lateral Collateral Ligament (LCL) and Medial Collateral Ligament (MCL) were evaluated using T2-weighted and STIR images in both the sagittal and coronal planes, and the results were validated against the intraoperative surgical findings.

Results

Intraoperative findings confirmed complete ligament tears in all cases (LCL-only: 4, MCL-only: 1, combined: 4), totaling 8 LCL rupture sites and 5 MCL rupture sites. For LCL tears, the sagittal view demonstrated superior diagnostic accuracy with a sensitivity of 75.0% and specificity of 100.0%, compared to the coronal view (sensitivity 50.0%, specificity 100.0%). Conversely, for MCL tears, the coronal view showed excellent precision with 100.0% sensitivity and specificity, while the sagittal view sensitivity was 60.0%. The positive predictive value was 100.0% across all assessments.

Conclusions

The sagittal view offers superior sensitivity for depicting LCL ruptures compared to the conventional coronal view. Therefore, combining both sagittal and coronal MRI planes is expected to improve the overall diagnostic precision of ligament assessment following elbow dislocation. This information is particularly valuable for patients presenting with limited elbow extension.