Effect of Time and Contrast Use for Magnetic Resonance Imaging in Acute Anterior Shoulder Instability: Determining the Accuracy of Labrum Tear Size

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Background

- Magnetic Resonance (MR) Imaging is the modality of choice to detect labral tear following acute anterior shoulder instability[1]

- Inclusion of intra-articular contrast with MR to enhance tear detection is controversial[2]

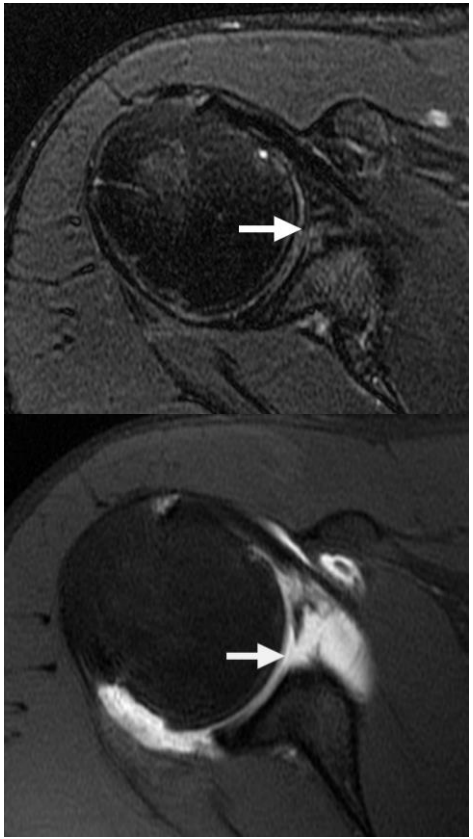

Figure 1. Non-arthrogram MR (top) and MR arthrogram (bottom) are used to detect labral tears[3].

Study Aim

- Compare the accuracy of labrum tear size between MR arthrogram and non-arthrogram MRI in both the acute and delayed setting following anterior shoulder instability

Hypothesis

- No difference in labrum tear size between MR arthrogram and non-arthrogram MRI when compared to surgical findings

Methods

Inclusion Criteria

- Acute first-time anterior shoulder instability event from 2012-2021
- MR arthrogram or non-arthrogram MRI obtained after injury
- Arthroscopic shoulder stabilization surgery performed after MR

Exclusion Criteria

- Chronic, recurrent anterior instability
- Multidirectional instability

Methods

Data Collection and Analysis

- MSK radiologists determined size of labral tear from MRI based on a clock face for every “half-hour” (Figure 2)

- Labrum tear size difference calculated by comparing labrum tear size on MRI to intraoperative labrum tear size

- Time from injury to MRI was categorized as acute (0-7 days) or delayed (>7 days)

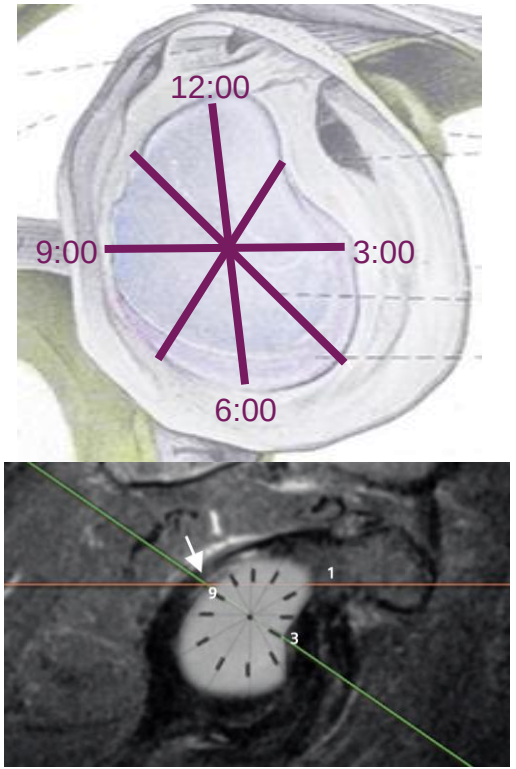

Figure 2. Illustration of the glenoid labrum clockface positions[4].

Results

- 39 patients included
  - Mean age: 24.5 years

- Median time from injury to MR imaging: 9 days

- Median time from injury to surgery: 45 days

Table 1. Time to Imaging Classification for Included Patients

Imaging Window	Non-arthrogram MRI (n=16)	Arthrogram MR (n=23)
Acute (0-7 days)	8	6
Delayed (>7 days)	8	17

Results

- Mean labrum tear size difference between MRI and surgical findings: 4.7 half-hours on clock face (Figure 3)
- No difference in labrum tear size difference between arthrogram and non-arthrogram MRI (p=0.83)
- No association in labrum tear size difference with number of days from injury to MRI

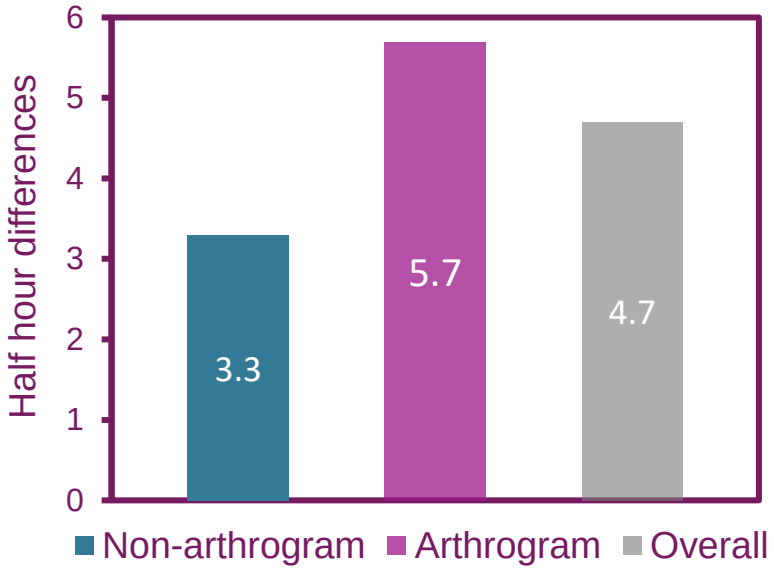

Figure 3. Tear size differences between magnetic resonance imaging modalities and intraoperative findings during arthroscopic stabilization (p=0.83).

Conclusion

- The extent of labral tear detected by MRI differed from that identified intraoperatively after acute shoulder instability

- There were no statistically significant differences in accuracy of labral tear detection based on time of imaging or the addition of intra-articular contrast

Clinical Significance

The additional cost, time, and morbidity of MR arthrogram should be weighed in the setting of anterior shoulder instability.

References

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