Routine Shoulder MRI for Evaluating Glenoid Labrum Pathology as Compared With Intraoperative Findings

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Introduction

Patients presenting with shoulder pain often undergo magnetic resonance imaging (MRI) to determine the type and extent of their underlying shoulder pathology. When a glenoid labrum tear is suspected clinically and there are no contraindications, the patient will receive an intra-articular injection of gadolinium contrast prior to undergoing the MRI (MR arthrogram). However, if rotator cuff pathology is suspected or the underlying pathology is unclear clinically, a routine MRI is typically performed. In cases of shoulder pain, clinical findings and presentation are often complex and patients will have multiple sites of pathology which makes choosing the correct radiologic study challenging and important.

While it is well documented that an MR arthrography is superior to routine MRI without contrast for evaluating labral pathology (routine MR imaging sensitivities range from 44% (Garneau, et al) to 95% (Legan et al) compared with MR arthrography with sensitivities of 93-96% (Beltran et al)), often a patient with unsuspected labral pathology will undergo a routine shoulder MRI. While MR arthrography is diagnostically superior with respect to labral tears, such a study adds additional cost and carries a theoretical risk of infection and adverse reaction to the contrast admixture.

The radiologist’s report will influence whether patients are treated surgically or conservatively. This in turn impacts the patient’s quality of life, health care costs and risk for future complications. As a result, diligence with ordering and performing the appropriate radiologic study plays a large role in successfully diagnosing and treating patients with shoulder pain while maintaining reasonable health care costs and risk to the patient.

This study attempts to retrospectively analyze the role of routine MRI protocol performed on a 1.5 Tesla magnet for detecting glenoid labrum pathology in patients who have subsequently undergone arthroscopic shoulder surgery.

Materials and Methods

Three hundred fifty eight patients that underwent arthroplasty shoulder surgery following routine MRI imaging of the shoulder between January 1, 2008 and December 31, 2012 were randomly selected and subjected to our inclusion and exclusion criteria. Of these, 109 patients were included our retrospective study.

Our routine shoulder MRI protocol includes axial gradient echo, axial and sagittal proton density, coronal and sagittal T2 with fat saturation and coronal T1.

Following our population selection, the MRI report and images were reviewed by a radiology resident and Board Certified/MRI-MSK fellowship trained radiologist with specific attention paid to the glenoid labrum findings. Next, the operative reports were reviewed and compared to the findings from the patient’s routine shoulder MRI.

Results

Routine MRI of the shoulder performed on a 1.5 Tesla magnet is a poor diagnostic tool for evaluating tears of the glenoid labrum. The results of the retrospective study show that out of 109 patients, 26 were prospectively diagnosed with labral tears while 45 patients were not diagnosed with labral tears prior to surgery. Fourteen patients that had MRI evidence of a labral tear had no detectable labral pathology at surgery. Our routine MRI protocol has a sensitivity of 37% and specificity of 63% for diagnosing tears of the glenoid labrum. Furthermore, the positive predictive and negative predictive values were calculated at 65% and 34%, respectively. While these results are not surprising, they serve to emphasize the need for appropriate MRI imaging with respect to glenoid labrum pathology.

Conclusion

As the results show, routine MRI shoulder protocol is not reliable for prospectively diagnosing glenoid labrum lesions. Many factors can influence our results such as differences in the quality of each exam, radiologist experience and expertise, presence or absence of a joint effusion and clinical presentation. Although many of our patients had glenoid labrum repairs performed regardless of whether or not it was diagnosed on the MRI, the primary indication for surgery in the vast majority of these cases was for another lesion (i.e. rotator cuff tear).

Therefore, it is conceivable that patients who receive a routine shoulder MRI will go undiagnosed when presenting with glenoid labrum tears as the sole site of pathology. Since it has been shown that MR arthrography has a much higher sensitivity and specificity (>90%) for diagnosing glenoid labrum tears, it is imperative that detailed clinical findings (including level of suspicion for a labral tear) are clearly communicated to the radiology department in order to ensure that the correct MRI study is performed on patients presenting with shoulder pain.

Creating a standardized shoulder MRI order form as well as educating clinicians and MRI technologists are ways in which to enhance our diagnostic capabilities and streamline this process. A follow up prospective study that compares routine MRI and MR arthrography with subsequent intraoperative findings would optimally quantify the differences between these two modalities.

References

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