Assessing the Adequacy of Magnetic Resonance Imaging of the Shoulder

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BACKGROUND

The shoulder is a complex region consisting of two joints, supported by various surrounding structures. Though several imaging modalities are used to evaluate the internal derangement of the shoulder, MRI is found to be the preferred method. Routine MRI of the shoulder consists of multiple imaging planes to allow for thorough evaluation of the anatomy and pathological process.

The American College of Radiology (ACR) and European Society of Musculoskeletal Radiology (ESSR) have published guidelines on the image planes and coverage of shoulder MRI:

- The images must be acquired in the axial, oblique coronal and oblique sagittal planes with adequate coverage.
- The ESSR highlight the importance of the angulation of the oblique coronal axis such that the rotator cuff tendons can be visualized in continuity.

The Standards

Patients must be in supine position with arm in mid-external position.

Coverage

- Axial: From above acromioclavicular joint to below axillary pouch
- Oblique Coronal: From coracoid process and include entire humeral head
- Oblique Sagittal: From lateral deltoide to scapular body

Imaging Planes

- Oblique Coronal: Parallel to supraspinatus tendon
- Oblique Sagittal: Perpendicular to the supraspinatus tendon

AIMS

The aims of this audit were to ensure adequate coverage and use of correct imaging planes of all MRI shoulders.

The position of the affected arm was also assessed using the location of the long head of biceps tendon as reference.

A high target of 100% adequacy for above modalities was set.

METHODS

A retrospective analysis of all shoulder MRI scans following the guidelines by ESSR was conducted, using the audit template by RCR as a framework.

We collected data from a total of 31 patients over a 2-month period. All adult patients undergoing MRI for investigation of a shoulder joint pathology were included. The images were analysed on PACS. The coverage and imaging planes for each image was assessed. The data was collected and analysed using an Excel spreadsheet.

RESULTS

On assessment, we found that the coverage of the shoulder was generally suboptimal.

- Oblique coverage: 100% accurate
- Axial Coverage: 69% accurate
- Sagittal Oblique Coverage: 72% accurate
- Sagittal oblique adequate in 91%, and coronal oblique in 94% of all images
- 81% of all images were performed in the ‘mid-external’ position of the affected arm

CONCLUSION/ACTION PLAN

In conclusion, this audit illustrated poor compliance with the ESSR guidance. The audit was presented at the departmental meeting at Warrington Hospital. We disseminated the guidelines by ACR and ESSR to the radiographers and the radiologists. We also provided education on anatomy of the rotator cuff to the radiographers and highlighted the importance of aligning the localiser parallel to the supraspinatus central tendon to ensure visualisation of the rotator cuff tendons in continuity. We are currently in the process of the re-auditing and hope to observe some positive changes.

REFERENCES

5. Lee, K., 2018. [Audit of adequacy of magnetic resonance imaging of the shoulder | The Royal College of Radiologists]. [online] Available at: <https://www.rcr.ac.uk/audit/audit-audit-magnetic-resonance-imaging-shoulder>

Inadequate sagittal oblique coverage

Inadequate imaging planes

Inadequate axial coverage

Inadequate sagittal oblique coverage