

To Determine the Agreement between Ultrasound and MRI in Diagnosing Rotator Cuff Tear

MAIMOONA GULSHAN¹, MEHWISH TAHIR², SEHRISH BILAL³

^{1,2}Senior Registrar, Shalamar Institute of Health Sciences, Lahore

³Trainee Registrar, CMH, Rawalpindi

Correspondence to: Dr. Maimoona Gulshan, Senior Registrar

ABSTRACT

Aim: To see the agreement between ultrasound and MRI in diagnosing rotator cuff tear.

Study design: Cross sectional survey

Setting: Radiology department, Shaikh Zayed Hospital, Lahore.

Duration of study: Six months

Results: In 200 cases, 93(46.5%) were between 40-55 years of age while 107(53.5%) were between 56-70 years. 108(54%) were males and 92(46%) were females. Agreement between ultrasound and MRI in diagnosis of tear of rotator cuff was seen. There are 132 positive cases on MRI and only 101 cases were agreed. However, in 68 negative cases, only 30 cases were agreed with ultrasonography.

Conclusion: Significant degree of agreement between ultrasonography and MRI in diagnosing rotator cuff tears.

Keywords: Rotator cuff tear, ultrasound, MRI

INTRODUCTION

Tendinus insertion of the shoulder muscles like supraspinatus, infraspinatus, teres minor and subscapularis over humerus is called rotator cuff. Rotator cuff tear is defined as break in the continuity of rotator cuff tendon either partially or completely. In 95%, supraspinatus tendon is involved¹. Main causative agents are trauma, degenerative changes in old age, chronic stress and heavy weight lifting².

METHODOLOGY

All gender of age between 40-70 years and subjects from OPD of orthopedics with H/O trauma to shoulder, pain in shoulder and difficulty in abduction of shoulder were included in the study. While patients with known joint infection or shoulder tumor were excluded. Patients fulfilling the inclusion criteria were enrolled in the study from OPD of Shaikh Zayed Hospital Lahore. Ultrasonography of shoulder joint was done by radiologist. Different parameters were observed to see the continuity of cuff tendon, echogenicity of tendons, presence of fluid in the tendon and tendon atrophy in old patients. Then MRI of same shoulder was performed. Data was analyzed by using software SPSS version 16.

RESULTS

The detail of results is given in tables 1-4. This study was approved by the institutional Ethical Committee. Agreement between ultrasound and MRI in diagnosing rotator cuff tear was given in Table 3 i.e., 132 positive cases were seen by performing MRI and 101 cases were agreed. In 68 negative cases, 30 were agreed with ultrasonography. Frequency of agreement of ultrasound and MRI in diagnosis of rotator cuff tear was observed in 131(65.5%) cases and 69(34.5%) cases were not observed as agreed (Table 4,5).

Received on 29-08-2018

Accepted on 11-11-2018

Table 1: Age distribution

Age	n
40-55 years	93(46.5%)
56-70 years	107(53.5%)
Total	200(100%)

Table 2: Gender distribution

Gender	n
Male	108(54%)
Female	92(46%)
Total	200(100%)

Table 3: Agreement between ultrasound and MRI in rotator cuff tear diagnosis

MRI	Ultrasound	
	Yes	No
Yes	101	31
No	38	30
Total	139	61

131 (65.5% of the observations)

Number of agreements expected by chance:

112.5 (56.2% of the observations)

Kappa= 0.212, SE of kappa = 0.072

95% confidence interval: From 0.071 to 0.353.

The strength of agreement is considered to be 'fair

Table 4: Frequency of agreement between Ultrasound and MRI

Agreement	n
Yes	131(65.5%)
No	69(34.5%)
Total	200(100%)

DISCUSSION

In our study, agreement between ultrasound and MRI in diagnosis of tear of rotator cuff was observed. 132 positive cases were seen by performing MRI. In 132 cases, 101 cases were agreed. In 68 negative cases, 30 cases were agreed by ultrasonography investigation, (Kappa= 0.212,

SE of kappa= 0.072). This shows a significant agreement between the two procedures. Our findings are consistent with a study of Matthieu J et al 2010, who reported 78% agreement between ultrasonography and MRI in diagnosing tear of rotator cuff³.

Dinnes et al⁴ and Teefey et al,⁵ showed that ultrasonography and MRI have comparable results in identification of partial or full-thickness rotator cuff tears. Both studies show that MRI provides little more information as compared to ultrasonography examination. Some surgeons observed that MRI may have more information to see fatty infiltration of the rotator cuff. But it is agreed that ultrasonography can pick fatty infiltration and atrophy of the rotator cuff also.^{6,7} MRI may be used To define the exact site of rotator cuff tear, MRI may be used.

Waldt et al⁸ showed that the diagnosis of small partial-thickness tears are restricted due to problems in differentiating fibre tearing, tendinitis and synovitic changes. Kuhn et al⁹ showed that there are six classification systems of rotator cuff. These systems have demonstrated inter observer agreement in experienced surgeons of shoulder injury.

CONCLUSION

Highly significant agreement between ultrasound and MRI is seen in rotator cuff tear diagnosis.

REFERENCES

1. Sajjad M, Waheed M, Zaidi NR. Radiographic appearances of rotator cuff tear by employing MR imaging techniques to find the degree of rotator cuff tear *PJR* 2010;20(1): 08-11.
2. Yamamoto A, Takagishi K, Osawa T. Prevalence and risk factors of a rotator cuff tear in the general population. *J Shoulder Elbow Surg*, 2010 ;19(1):116-20.
3. Matthieu JC, Rutten M, Gert-Jan S et al. Detection of rotator cuff tears: the value of MRI following ultrasound. *Eur Radiol* 2010 ;20(2): 450–457.
4. Dinnes J, Loveman E, McIntyre L et al. The effectiveness of diagnostic tests for the assessment of shoulder pain due to soft tissue disorders: a systematic review. *Health Technol Assess*. 2003;7:1–166.
5. Teefey SA, Rubin DA, Middleton WD et al. Detection and quantification of rotator cuff tears. Comparison of ultrasonographic, magnetic resonance imaging, and arthroscopic findings in seventy-one consecutive cases. *J Bone Joint Surg Am*. 2004;86-A:708–16.
6. Khoury V, Cardinal E, Brassard P. Atrophy and fatty infiltration of the supraspinatus muscle: sonography versus MRI. *Am J Roentgenol*. 2008;190:1105–11.
7. Strobel K, Hodler J, Meyer DC et al. Fatty atrophy of supraspinatus and infraspinatus muscles: accuracy of US. *Radiology*. 2005;237:584–9.
8. Waldt S, Bruegel M, Mueller D. Rotator cuff tears: assessment with MR arthrography in 275 patients with arthroscopic correlation. *Eur Radiol*. 2007;17:491–8.
9. Kuhn JE, Dunn WR, Ma B. Interobserver agreement in the classification of rotator cuff tears. *Am J Sports Med*. 2007;35:437–41.