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ROLE OF ULTRASONOGRAPHY IN EVALUATION OF ROTATOR CUFF INJURY

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ABSTRACT

Objective: To determine the role of ultrasonography in the evaluation of rotator cuff injury in patients with chronic shoulder pain.

Methodology: All the patients aged 30 to 80 years, suspected of rotator cuff injury were consecutively enrolled. These were then assessed by using ultrasound. Different patterns of injuries in subscapularis, supra- and infraspinatus, teres minor and bicep tendons were noted and labelled as partial or full thickness rotator cuff tears accordingly.

Results: The average age of the 96 patients was 54.72 ± 7.46 years and average duration of pain recorded was 5.21 ± 1.83 months. The majority of the patients were males (55-57.3%) and (41-42.3%) females. Right sided shoulder pain was observed in 64 (66.7%) cases. The most common finding was tendonitis seen in 43 (44.8%) of the cases with Subscapularis, partial thickness tear in supraspinatus involving 54 (56.3%) of the cases.

Conclusion: The study findings have shown that ultrasound can detect various shoulder injuries and the most common finding in Subscapularis injury was tendonitis and partial thickness tear in supraspinatus injury.

Keywords: Partial Thickness Tear; Full Thickness Tear; Tendonitis

INTRODUCTION

Chronic shoulder pain is one of the commonest symptoms seen among sports injuries, road traffic accidents and old age joint pains and rotator cuff injury is the major underlying cause. It adds to a great degree of morbidity, physical, social and mental stress to one's life.¹ Clinical examination can help but has a limited guidance towards the particular diagnosis and hence always there is a need for the aiding tool to reach the definitive diagnosis leading to management of the unwanted complications.^{2,3}

There are number of diagnostic facilities with different degree of diagnostic accuracy, availability, cost and feasibility. The choice is made based on all these entities but not at the compromise of the diagnostic delay.⁴ Ultrasonography (USG) and magnetic resonance imaging (MRI) are the most widely deployed ones where the latter has the highest degree of accuracy but it is expensive and not readily available.

Ultrasonography, with over 90% sensitivity and specificity, can help confirm the diagnosis in clinically or radiographically equivocal cases. It can be used as a focused examination providing rapid, real-time

diagnosis, and treatment in desired clinical situations. The most commonly affected tendon is supraspinatus and investigations can help in diagnosing partial or full thickness tear and tendonitis.^{5,6}

Since this is a very common finding in our set up in patients presenting with chronic shoulder pain, this study was conducted to find out the role of ultrasonography in evaluation of rotator cuff injury.

METHODOLOGY

This cross-sectional study was conducted at Radiology Department of Pakistan Institute of Medical Sciences (PIMS), Islamabad-Pakistan from 1st July 2017 to 31st December 2017. A total of 96 cases were enrolled in this study, in which the calculated sample size was 86. The sample size was calculated using 95% confidence level with 6% error margin. The samples were collected by using non-probability sampling technique.

All the patients between 30 to 80 years of age presenting to the radiology department with chronic shoulder pain of at least 1 month or more were evaluated. The cases were included that had shoulder pain of 3 or more assessed on visual analogue scale (VAS). The

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cases that had any previous surgical intervention for repair or those with any prosthetic implant were excluded from this study.

The included cases underwent USG by using Toshiba Model Xario machine where they were looked for injuries in subscapularis, supra and infraspinatus, teres minor and biceps. Ultrasound of the opposite shoulder was also done to compare.

Statistical package for social sciences (SPSS) version 23.0 was used for data analysis. Mean and standard deviation were computed for quantitative variables like age, duration of symptoms and severity of pain. Frequency and percentages were computed for qualitative variables like gender and side of shoulder.

RESULTS

The mean age of the participants was 54.72 ± 7.46 years and mean duration of pain was 5.21 ± 1.83 months as shown in table 1. There were 55 (57.3%) males and 41 (42.3%) females and 64 (66.7%) cases had right sided shoulder pain as in table 2. Table 3 reveals the types of lesions detected in various tendons of shoulder and most common findings was tendonitis seen in 43 (44.8%) of the cases with Subscapularis, partial thickness tear in supraspinatus involving 54 (56.3%) of the cases. The most common finding in Infraspinatus was also partial thickness tear seen in 7 (7.3%) of the cases and there was 1 case each with tendonitis in Teres minor and biceps.

DISCUSSION

The role of ultrasound in evaluation of the pattern of different findings in patients with chronic shoulder pain is significant. Shoulder pain is one of the occurring presentations to the orthopedic clinics and rheumatologist and is especially associated with disuse or sports injuries and are commonly referred to

Table 1: Details of Ages, Duration and Severity of Pain (n=96)

Variables	Mean \pm SD	Range
Age	54.72 ± 7.46	40-74
Duration of Pain	5.21 ± 1.83	3-12
Severity of Pain	4.0 ± 0.82	3-6

Table 2: Gender and Site of Severity of Pain (n=96)

Variables	Number	Percentage
Gender	Male	55
	Female	41
Severity of Pain	Right	64
	Left	32

Table 3: Pattern of Lesions Detected on USG (n=96)

Type of Tendon	Partial Thickness Tear	Full Thickness Tear	Tendonitis	No lesion
Subscapularis	9 (9.4%)	5 (5.2%)	43 (44.8%)	39 (40.6%)
Supraspinatus	54 (56.3%)	9 (9.4%)	17 (17.7%)	16 (16.7%)
Infraspinatus	7 (7.3%)	2 (2.1%)	5 (5.2%)	82 (85.4%)
Teres minor	0 (0%)	0 (0%)	1 (1%)	95 (99%)
Biceps	0 (0%)	0 (0%)	1 (1%)	95 (99%)

radiologists to look for the type and extent of the injuries. There is diversity of the injuries and its extent and can guide for further management. MRI is frequently advised for this, but limited facility at certain centers, increased cost and the long wait for appointments are the major concern to look for the other alternative with good results.^{7,8}

In the present study, there was male dominance in terms of shoulder pain where there were 55 (57.3%) males and 41 (42.3%) females. This was similar to the study done by Singh AP et al where they also found male dominance and was seen in 21 vs 16 cases.⁹

Most number of lesions were observed in supraspinatus where around 83% of the cases were found to suffer from anyone and the most common one was partial thickness tear. These results were comparable to the result of the previous studies.¹⁰⁻¹¹ According to a study done by Zlarkin et al, supraspinatus tendon was affected in 80% of their cases.¹¹

Singh et al also found this in highest number of cases and they also assessed the diagnostic accuracy of USG in rotator cuff in-

juries and they found that sensitivity of this was 78.72%, specificity was 84.6% and accuracy was 70% with a significant difference of 0.001.⁹

In the present study, the most common finding was tendonitis in 43 (44.8%) of the cases with Subscapularis which was the 2nd most tendon group involved and partial thickness tear was seen in supraspinatus involving 54 (56.3%) of the cases.¹²⁻¹⁶ According to another study, Netam SBS et al, the most common tendon involved was supraspinatus.¹² Similar was seen by the studies of Vijayvargiya et al, Saraya et al and Khanduri et al.¹⁴⁻¹⁶ The reason of highest number of this muscle involvement is its vulnerability due to anatomical position and mechanics.

Tendinitis was the 2nd most common finding seen after the partial thickness tear and so was seen from the results of the previous studies.¹⁷⁻¹⁹

CONCLUSION

This study concluded that the ultrasound can detect various shoulder injuries and the most common finding in Subscapularis injury

was tendonitis and partial thickness tear in supraspinatus injury.

■ REFERENCES

1. Dinnes J, Loveman E, McIntyre L, Waugh N. The effectiveness of diagnostic tests for the assessment of shoulder pain due to soft tissue disorders a systematic review. *Health Technol Assess.* 2003;7(29):1-166. DOI:10.3310/hta7290.
2. Uthoff HK, Sarkar K. An algorithm for shoulder pain caused by soft-tissue disorders. *Clin Orthop Relat Res.* 1990 1;254:121-27.
3. Lambert A, Loffroy R, Guiu B, Mejean N, Lerais JM, Cercueil JP, et al. Rotator cuff tears: value of 3.0T MRI. *J Radiol.* 2009;90(5 Pt 1):583-88. DOI:10.1016/s0221-0363(09)74024-7.
4. Fischer CA, Weber MA, Neubecker C, Bruckner T, Tanner M, Zeifang F. Ultrasound vs. MRI in the assessment of rotator cuff structure prior to shoulder arthroplasty. *J Orthop.* 2015;12(1):23-3025.
5. Roy JS, Braén C, Leblond J, Desmeules F, Dionne CE, MacDermid J C, et al. Diagnostic accuracy of ultrasonography, MRI and MR arthrography in the characterisation of rotator cuff disorders: a systematic review and meta-analysis. *Br J Sports Med.* 2015;49(20):1316-28.
6. Bashir S, Firdose SR, Kamal Y, Khan HA, Arora M, Gul S, Hassan N. Correlation between high resolution ultrasonography and MRI in rotator cuff tear diagnosis. *Int J Health Sci Res.* 2014;4(8):103-12.
7. Martinoli C. Musculoskeletal ultrasound: technical guidelines. *Insights Imaging.* 2010;1(3):99-141. DOI: 10.1007/s13244-010-0032-9.
8. Chelli Bouaziz M, Jabnoun F, Chaabane S, Ladeb MF. Diagnostic accuracy of high resolution ultrasound in communicating rotator cuff tears. *Iran J Radiol.* 2010;7(3):153-60.
9. Singh AP, Rao A, Devaru S, Amithavikrama. Role of ultrasound in evaluation of shoulder injuries: a comparative study of ultrasound and MRI. *Int J Anat Radiol Surg.* 2017;6(1):R12-18.
10. White JJ, Titchener AG, Fakis A, Tambe AA, Hubbard RB, Clark DI. An epidemiological study of rotator cuff pathology using The Health Improvement Network database. *Bone Joint J.* 2014;96-B(3):350-53.
11. Zlatkin MB. Rotator Cuff Disease. In: Zlatkin MB. *MRI of the shoulder.* 2nd Ed. Philadelphia: Lippincott Williams & Wilkins; 2003.
12. Netam SBS, Kumar S, Jain V, Singh A, Singh RK, Jain V. Role of Ultrasonography in Evaluation of Rotator Cuff in Patients of Chronic Shoulder Pain in Comparison to Magnetic Resonance Imaging. *Int J Sci Stud.* 2017;5(3):291-296.
13. Bhatnagar S, Kuber R, Shah D. The role of ultrasound and MRI in evaluation of musculo-tendinous pathologies of the shoulder joint. *West Afr J Radiol.* 2014;21:68-74.
14. Vijayvargiya R, Atram AS, Daftar J. Role of MRI in rotator cuff injury & comparing its diagnostic accuracy with USG. *Natl J M Dent Res* 2014;3:38-43.
15. Saraya S, El Bakry R. Ultrasound: Can it replace MRI in the evaluation of the rotator cuff tears? *Egypt J Radiol Nucl Med.* 2016;47:193-201.
16. Khanduri S, Raja A, Meha T, Agrawal S, Bhagat S, Jaiswal G. Comparative study of the diagnostic ability of ultrasonography and magnetic resonance imaging in the evaluation of chronic shoulder pain. *Int J Sci Study* 2016;4:266-72.
17. Modi CS, Smith CD, Drew SJ. Partial-thickness articular surface rotator cuff tears in patients over the age of 35: Etiology and intra-articular associations. *Int J Shoulder Surg.* 2012;6:15-8.
18. Chen HS, Lin SH, Hsu YH, Chen SC, Kang JH. A comparison of physical examinations with musculoskeletal ultrasound in the diagnosis of biceps long head tendinitis. *Ultrasound Med Biol.* 2011;37(9):1392-98.
19. Fischer CA, Weber MA, Neubecker C, et al. Ultrasound vs. MRI in the assessment of rotator cuff structure prior to shoulder arthroplasty. *J Orthop.* 2015;12(1):23-30. DOI: 10.1016/j.jor.2015.01.003.

Author's Contribution

RN helped in data collection, study design, statistical analysis, proofreading, and manuscript writing. SFK conceived the idea and supervised the study. Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of Interest

Authors declared no conflict of interest

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None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.