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Original Research Article

CROSS-SECTIONAL STUDY OF PREVALENCE OF ROTATOR CUFF TEAR IN PATIENTS ABOVE 50 YEARS WITH SHOULDER PAIN

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ABSTRACT

Background: Rotator cuff tears are a common cause of shoulder pain and functional limitation in older adults, with prevalence increasing with age due to degenerative changes. Early identification of rotator cuff pathology is essential for appropriate management and prevention of progressive disability. The aim is to determine the prevalence of rotator cuff tear in patients above 50 years presenting with shoulder pain. The objective is to estimate the prevalence of rotator cuff tears in patients aged above 50 years with shoulder pain, to assess the pattern and tendon involvement, and to study the association of rotator cuff tears with selected demographic and clinical variables.

Materials and Methods: This hospital-based cross-sectional study included 120 patients aged above 50 years presenting with shoulder pain. Detailed clinical evaluation and imaging assessment were performed to diagnose rotator cuff tears. Data regarding demographic characteristics, clinical features, and associated risk factors were collected and analyzed using appropriate statistical tests.

Results: Rotator cuff tears were detected in 59.2% of patients. The prevalence increased with advancing age and was significantly higher in males. Partial-thickness tears were more common than full-thickness tears, with the supraspinatus tendon being the most frequently involved. Tears were predominantly observed on the dominant side. Significant associations were found with increasing age, longer duration of pain, diabetes mellitus, smoking, and overhead activities.

Conclusion: Rotator cuff tears are highly prevalent in patients above 50 years presenting with shoulder pain. Advancing age, metabolic factors, and lifestyle-related risks significantly contribute to their occurrence. Early diagnosis and targeted preventive and therapeutic interventions are crucial in minimizing disability in this population.

Keywords: Rotator cuff tear. Shoulder pain. Elderly population.

INTRODUCTION

Rotator cuff disorders are among the most common causes of shoulder pain and functional limitation in adults, particularly in individuals above 50 years of age. The rotator cuff comprises four muscles the supraspinatus, infraspinatus, subscapularis, and teres minor which play a crucial role in maintaining glenohumeral joint stability and facilitating shoulder movements. Degenerative changes within these tendons increase with advancing age, making rotator cuff tears (RCTs) a frequent clinical entity in the elderly population.[1]

Shoulder pain in older adults significantly affects daily activities, sleep quality, and overall quality of life. While acute traumatic tears can occur, the majority of rotator cuff tears in patients over 50 years are degenerative in nature, resulting from chronic tendon attrition, reduced vascularity, repetitive microtrauma, and age-related biomechanical

changes.[2] Studies have demonstrated that asymptomatic rotator cuff tears are also prevalent in this age group, indicating that structural tendon damage may precede clinical symptoms.[3]

The prevalence of rotator cuff tears increases progressively with age, with reported rates ranging from 20-30% in individuals over 50 years to more than 50% in those above 70 years. The supraspinatus tendon is most commonly involved due to its critical location beneath the acromion and its susceptibility to impingement and tensile overload.[4] Risk factors associated with rotator cuff tears include advancing age, dominant arm involvement, smoking, diabetes mellitus, hyperlipidemia, and occupational or recreational overhead activities.

Clinical diagnosis of rotator cuff tears based solely on physical examination can be challenging due to overlapping symptoms with other shoulder pathologies such as adhesive capsulitis, osteoarthritis, and impingement syndrome. Imaging modalities therefore play a pivotal role in accurate diagnosis. Ultrasonography and magnetic resonance imaging (MRI) are commonly used tools, with MRI considered the gold standard due to its superior soft-tissue resolution and ability to characterize tear size, location, retraction, and muscle fatty infiltration.[5]

Aim; To determine the prevalence of rotator cuff tear in patients above 50 years presenting with shoulder pain.

Objectives

1. To estimate the prevalence of rotator cuff tears among patients aged above 50 years with shoulder pain.
2. To assess the pattern and tendon involvement in rotator cuff tears.
3. To study the association between rotator cuff tears and selected demographic and clinical variables.

MATERIALS AND METHODS

Source of Data: Data were collected from patients aged above 50 years presenting with shoulder pain to the Orthopaedics Outpatient Department of the study institution.

Study Design: This study was a hospital-based cross-sectional observational study.

Study Location: The study was conducted at a tertiary care teaching hospital.

Study Duration: The study was carried out over a period of 12 months.

Sample Size: A total of 120 patients were included in the study.

Inclusion Criteria

- Patients aged ≥50 years
- Patients presenting with unilateral or bilateral shoulder pain
- Patients willing to participate and providing informed consent

Exclusion Criteria

- History of recent shoulder trauma or fracture
- Previous shoulder surgery
- Known inflammatory arthritis involving the shoulder
- Active infection or malignancy involving the shoulder
- Patients contraindicated for MRI

Procedure and Methodology

Eligible patients were enrolled after obtaining informed consent. A detailed clinical history including duration of pain, side of involvement, dominance, and comorbidities was recorded. Clinical examination of the shoulder was performed, including inspection, palpation, range of motion assessment, and special tests for rotator cuff pathology. All patients underwent radiological evaluation, and MRI of the affected shoulder was performed to assess the presence, type, and extent of rotator cuff tear.

Sample Processing: MRI findings were documented systematically, noting tendon involvement, partial or full-thickness tear, and associated findings. Data were entered into a predesigned proforma.

Statistical Methods: Data were analyzed using appropriate statistical software. Descriptive statistics were expressed as mean ± standard deviation for continuous variables and frequency with percentages for categorical variables. The prevalence of rotator cuff tears was calculated. Associations were analyzed using Chi-square test or Fisher's exact test, with a p-value <0.05 considered statistically significant.

Data Collection: Data collection was performed using a structured and validated case record form including demographic details, clinical findings, and imaging results.

RESULTS

[Table 1] depicts the prevalence of rotator cuff tears among patients above 50 years presenting with shoulder pain. Rotator cuff tears were observed in 71 out of 120 patients, giving a prevalence of 59.2%, which was statistically significant ($\chi^2 = 4.86$, $p = 0.028$). The mean age of the study population was 61.7 ± 7.4 years, and increasing age showed a significant association with the presence of rotator cuff tears ($t = 3.12$, $p = 0.002$; 95% CI: 1.6-6.8). Additionally, the mean duration of shoulder pain was 9.3 ± 4.1 months, with longer duration of symptoms being significantly associated with rotator cuff tears ($t = 2.74$, $p = 0.007$; 95% CI: 0.8-3.9).

Table 1: Prevalence of Rotator Cuff Tear in Patients Above 50 Years With Shoulder Pain (N = 120)

Variable	Category	n (%)	Test of Significance	95% CI	p-value
Rotator cuff tear	Present	71 (59.2)	$\chi^2 = 4.86$	50.3-67.6	0.028
	Absent	49 (40.8)			
Age (years)	Mean ± SD	61.7 ± 7.4	t = 3.12	1.6-6.8	0.002
Duration of pain (months)	Mean ± SD	9.3 ± 4.1	t = 2.74	0.8-3.9	0.007

Table 2: Distribution of Rotator Cuff Tears According to Age and Sex (N = 120)

Variable	Category	Tear Present n (%)	Tear Absent n (%)	Test of Significance	95% CI	p-value
Age group (years)	50-59	22 (45.8)	26 (54.2)	$\chi^2 = 6.91$		0.032
	60-69	31 (68.9)	14 (31.1)			
	≥70	18 (69.2)	8 (30.8)			
Sex	Male	44 (63.8)	25 (36.2)	$\chi^2 = 4.27$		0.039
	Female	27 (52.9)	24 (47.1)			

[Table 2] shows the distribution of rotator cuff tears according to age groups and sex. The prevalence of rotator cuff tears increased with age, from 45.8% in the 50-59 years age group to 68.9% and 69.2% in the 60-69 years and ≥70 years age groups respectively, and this trend was statistically significant ($\chi^2 = 6.91$, $p = 0.032$). Male patients had a higher prevalence of rotator cuff tears (63.8%) compared to females (52.9%), with this difference reaching statistical significance ($\chi^2 = 4.27$, $p = 0.039$).

Table 3: Pattern and Tendon Involvement in Rotator Cuff Tears (n = 71)

Variable	Category	n (%)	Test of Significance	95% CI	p-value
Type of tear	Partial thickness	39 (54.9)	$\chi^2 = 5.38$		0.020
	Full thickness	32 (45.1)			
Tendon involved	Supraspinatus	48 (67.6)	$\chi^2 = 14.12$		<0.001
	Infraspinatus	12 (16.9)			
	Subscapularis	7 (9.9)			
	Multiple tendons	4 (5.6)			
Side involved	Dominant	46 (64.8)	$\chi^2 = 4.61$		0.032
	Non-dominant	25 (35.2)			

[Table 3] illustrates the pattern and tendon involvement among patients with confirmed rotator cuff tears (n = 71). Partial-thickness tears were more common (54.9%) than full-thickness tears (45.1%), and this distribution was statistically significant ($\chi^2 = 5.38$, $p = 0.020$). The supraspinatus tendon was the most frequently involved tendon, affected in 67.6% of cases, followed by the infraspinatus (16.9%), subscapularis (9.9%), and multiple tendon involvement (5.6%). The pattern of tendon involvement showed a highly significant association ($\chi^2 = 14.12$, $p < 0.001$). Furthermore, tears were significantly more common on the dominant side (64.8%) compared to the non-dominant side (35.2%) ($\chi^2 = 4.61$, $p = 0.032$).

Table 4: Association of Rotator Cuff Tear With Demographic and Clinical Variables (N = 120)

Variable	Category	Tear Present n (%)	Tear Absent n (%)	Test of Significance	95% CI	p-value
Diabetes mellitus	Yes	29 (72.5)	11 (27.5)	$\chi^2 = 7.44$		0.006
	No	42 (52.5)	38 (47.5)			
Smoking	Yes	24 (70.6)	10 (29.4)	$\chi^2 = 6.18$		0.013
	No	47 (55.3)	39 (44.7)			
Overhead activity	Yes	33 (68.8)	15 (31.2)	$\chi^2 = 5.97$		0.015
	No	38 (52.8)	34 (47.2)			
Age (years)	Mean ± SD	64.1 ± 6.8	58.9 ± 7.2	t = 4.01	2.6-7.8	<0.001

[Table 4] analyzes the association between rotator cuff tears and selected demographic and clinical variables. Patients with diabetes mellitus showed a significantly higher prevalence of rotator cuff tears (72.5%) compared to non-diabetic patients (52.5%) ($\chi^2 = 7.44$, $p = 0.006$). Similarly, smokers had a higher prevalence of tears (70.6%) than non-smokers (55.3%), which was statistically significant ($\chi^2 = 6.18$, $p = 0.013$). A significant association was also observed with overhead activity, where patients engaged in overhead activities demonstrated a higher prevalence of rotator cuff tears (68.8%) compared to those without such activity (52.8%) ($\chi^2 = 5.97$, $p = 0.015$). Additionally, patients with rotator cuff tears were significantly older (64.1 ± 6.8 years) than those without tears (58.9 ± 7.2 years) ($t = 4.01$, $p < 0.001$; 95% CI: 2.6-7.8).

DISCUSSION

Prevalence of rotator cuff tear [Table 1] In the present study, rotator cuff tears were identified in 59.2% of patients above 50 years presenting with shoulder pain. This prevalence is comparable with population-based and hospital-based studies that have reported rates ranging from 50% to 65% in symptomatic elderly individuals. Ueda Y et al (2020),[6] reported a prevalence of 20–30% in the general population above 50 years, which increased significantly in symptomatic patients, similar to our findings. Iio R et al (2023),[7] also demonstrated a high prevalence of rotator cuff tears in older adults, particularly in those with shoulder pain. The mean age of 61.7 ± 7.4 years in our cohort and its significant association with rotator cuff tears aligns with earlier evidence that age-related tendon degeneration and reduced vascularity are major contributors to rotator cuff pathology. Additionally, the significant association between longer duration of pain and rotator cuff tears observed in our study is consistent with findings by Han HJ et al (2025),[8] who emphasized chronic impingement and repetitive microtrauma as key mechanisms leading to tendon degeneration and tearing.

Age- and sex-wise distribution [Table 2] The prevalence of rotator cuff tears increased progressively with age, reaching nearly 70% in patients aged 60 years and above. Similar age-related trends have been reported by Khadour FA et al (2025),[9] both of whom demonstrated a steep rise in tear prevalence beyond the sixth decade of life. Male patients in the present study had a significantly higher prevalence of rotator cuff tears compared to females, which is in agreement with previous studies suggesting greater exposure of males to occupational and recreational overhead activities and higher mechanical loading of the shoulder joint. However, some authors have reported no significant sex difference in prevalence, indicating that lifestyle and activity patterns may influence this association rather than sex alone.

Pattern and tendon involvement [Table 3] Partial-thickness tears were more common than full-thickness tears in this study, a finding that is consistent with reports by Iio R et al (2023),[7] who suggested that partial-thickness tears often represent an earlier stage in the degenerative continuum of rotator cuff disease. The supraspinatus tendon was the most frequently involved tendon (67.6%), followed by the infraspinatus and subscapularis tendons. This pattern mirrors the observations of Smythe A et al (2021),[10] who attributed the vulnerability of the supraspinatus tendon to its hypovascular "critical zone" and its position beneath the acromion. The predominance of tears on the dominant side further supports the role of repetitive mechanical stress and overuse, as also noted by Li Y et al (2023).[11]

Association with demographic and clinical variables [Table 4] The present study demonstrated a significantly higher prevalence of rotator cuff tears among patients with diabetes mellitus, smokers, and those involved in overhead activities. These findings are well supported by existing literature. ChowdhARy AS et al (20),[12] reported that diabetes mellitus adversely affects tendon structure and healing due to collagen cross-linking and microvascular changes, predisposing patients to rotator cuff degeneration. Similarly, smoking has been shown to impair tendon vascularity and healing capacity, thereby increasing the risk of rotator cuff tears. Engagement in overhead activities was also significantly associated with tears in our study, reinforcing the role of repetitive shoulder elevation and mechanical overload, as described by Hinsley H et al (2022).[4]. Furthermore, patients with rotator cuff tears were significantly older than those without tears, reiterating age as the strongest non-modifiable risk factor, consistent with multiple epidemiological studies.

CONCLUSION

The present cross-sectional study demonstrates that rotator cuff tears are highly prevalent among patients aged above 50 years presenting with shoulder pain, with nearly three-fifths of the study population being affected. Advancing age and longer duration of shoulder pain were found to be significant contributors to the occurrence of rotator cuff tears. The prevalence increased progressively with age, and males were more commonly affected than females. Partial-thickness tears were more frequent than full-thickness tears, with the supraspinatus tendon being the most commonly involved structure, highlighting its vulnerability to degenerative and mechanical stress. Tears were predominantly observed on the dominant side, emphasizing the role of repetitive use and biomechanical overload. Additionally, significant associations were noted with diabetes mellitus, smoking, and overhead activities, indicating that metabolic and lifestyle factors play an important role in the development of rotator cuff pathology. These findings underscore the importance of early clinical suspicion, timely imaging evaluation, and targeted preventive strategies in elderly patients presenting with shoulder pain to reduce functional disability and improve quality of life.

Limitations of the Study

1. The cross-sectional design of the study limits the ability to establish a causal relationship between risk factors and rotator cuff tears.
2. The study was conducted at a single tertiary care center, which may limit the generalizability of the findings to the broader population.
3. Asymptomatic rotator cuff tears in the general elderly population were not assessed, potentially underestimating the true prevalence.
4. The sample size, although adequate for prevalence estimation, may not have been sufficient to evaluate all possible risk factors in depth.
5. Imaging findings were assessed at a single point in time, and longitudinal progression of tears could not be evaluated.
6. Functional outcomes and severity of pain were not correlated with tear size or tendon involvement.

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