

CLINICAL DIAGNOSIS OF ROTATOR CUFF TEAR

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The author examined 1926 shoulders in 16 years between April 1984 and March 2000. All patients were over 40 years of age and complained of pain and restriction of range of motion. The author will explain how useful clinical symptoms and findings are for the diagnosis of rotator cuff tear.

I. Materials

1926 shoulder problems consist of 451 rotator cuff tear (23%), 1159 periarthrititis (60%), 147 calcifying tendinitis (7.6%). 56 impingement syndrome (2.9%), 26 Paralytic shoulder(1.3%) , 22 degenerative arthritis of AC joint (1.1%), 21 degenerative arthritis of glenohumeral joint (1.1%) and 45 other disorders (5.2%).

1926 shoulders were divided into two groups. 451 rotator cuff tear group (23%) and 1475 remainder group (77%) (Table 1).

The sensitivity, plus predictive value, specificity, minus predictive value, and accuracy of clinical symptoms and findings of each group were studied (Table 2).

Sensitivity is the rate of occurrence of respective symptoms and findings in each condition, which contributes little for the clinical diagnosis. Plus predictive value is the probability of each symptoms and findings of the group to lead to the correct diagnosis, which is considered more reliable than specificity.

Minus predictive value is probability to deny the diagnosis, if symptoms and findings are not present.

Diagnosis of rotator cuff tear is made by arthrogram (393 shoulders) and MRI (531 shoulders) of shoulder. Total of both procedures are 924 shoulders (48% of shoulder problems).

As to peak age distribution of two groups, rotator cuff tear was occurred in 6th decade (145 shoulders) and remainders in 5th decade (587 shoulders) (Table 3).

In sex ratio rotator cuff tear was more prevalent in male and occurred in 284 shoulders(63%). This was proven statistically significant (χ square

test, $p < 0.001$) (Table 4).

As to sides rotator cuff tear was more prevalent on the right which occurred in 298 shoulders (66%), and this was statistically significant (χ square test, $p < 0.001$) (Table 5).

II. Result

1. Sensitivity

1. Impingement sign: 76.8%
2. Night pain: 71.6%
3. Crepitus: 66.5%

Crepitus is felt in the anterior portion of the acromion when arm is abducted.

4. Painful arc sign: 54.3%
5. History of trauma: 49.2%
6. Atrophy of infraspinatus muscle: 49.2%
7. Weakness of abductor muscle: 45.2%
8. Subacromial effusion sign: 40%

Effusion is checked by aspirating subacromial bursa.

2. Plus predictive value

1. Subacromial effusion sign: 180/208 (86.5%)
2. AHI less than 6 mm: 63/75 (84%)
AHI is the distance between acromion and humeral head on X- rays
3. Crepitus: 300/480 (62.5%)
4. Trauma: 230/400 (57.4%)
5. Atrophy of infraspinatus muscle: 222/448 (49.6%)
6. Drop arm sign: 74/177 (41.8%)
7. Tenderness of greater tuberosity: 208/509 (40.9%)
8. Painful arc sign: 245/605 (40.5%)

3. Minus predictive value

1. Crepitus: 1295/1446 (89.6%)
2. Impingement sign: 538/610 (88.2%)
3. Trauma: 1305/1527 (85.5%)
4. Infraspinatus muscle atrophy: 1249/1470 (85%)
5. Painful arc sign: 1115/1321 (84.4%)
6. Subacromial effusion sign: 1447/1718 (84.2%)
7. Tenderness of greater tuberosity: 1174/1417 (82.9%)
8. Weakness of abductor muscle: 1090/1337 (81.5%)

4. Specificity

1. AHI less than 6 mm: 1463/1475 (99.2%)
2. Subacromial effusion sign: 1447/1475 (98%)
3. Drop arm sign: 1305/1475 (93%)
4. Trauma: 1305/1475 (87.8%)
5. Crepitus: 1295/1475 (87.5%)
6. Weakness of external muscles: 1074/1475 (86.4%)
7. Reduction of endurance: 1259/1475 (85.4%)
8. Atrophy of infraspinatus muscle: 1249/1474 (84.7%)
9. Tenderness of greater tuberosity: 1174/1475 (79.6%)
10. Painful arc sign: 1115/1475 (75.6%)

5. Accuracy

1. Subacromial effusion sign: 1627/1926 (84.5%)
2. Crepitus: 1447/1926 (82.8%)
3. Trauma: 1534/1926 (79.6%)
4. AHI less than 6mm: 1526/1926 (79.3%)
5. Atrophy of infraspinatus muscle: 1471/1926 (76.4%)
6. Reduction of endurance: 1400/1926 (72.2%)
7. Tenderness of greater tuberosity: 1382/1926 (71.8%)
8. Weakness of external muscles: 1382/1926 (71.8%)

III. Clinical diagnosis of rotator cuff tear

1. Positive clinical findings

a. Useful clinical findings

Subacromial effusion sign, AHI less than 6mm, crepitus on shoulder abduction, history of trauma, atrophy of infraspinatus muscle and drop arm sign.

b. Male, right shoulder and no presence of contracture.

Rotator cuff tear is predominantly seen among male patients and right shoulder. Contracture of shoulder joint is seldom present. When these factors are combined, plus predictive value is 47% and they are useful for diagnosis of rotator cuff tear.

2. Negative clinical findings

a. Rotator cuff tear is ruled out by minus predictive value when crepitus, impingement sign, trauma, atrophy of infrasupinatus muscle, painful arc sign or subacomial effusion sign are absent.

b. Rotator cuff tear can be also ruled out by low plus predictive value when contracture of shoulder (plus predictive value: 8.9%) and tenderness of

coracoid process (plus predictive value: 10.6%) are present.

Reference

1. Mikasa M: Clinical diagnosis of a rotator cuff tear (Japanese, English abstract). *The Shoulder Joint*, 25(2): 297-300, 2001.

Table 1. Materials

Rotator cuff tear	451 (23%)
Periarthritis	1159 (60%)
Calcifying tendinitis	147 (7.6%)
Impingement syndrome	56 (2.9%)
Paralytic shoulder	26 (1.3%)
Degenerated arthritis of AC joint	22 (1.1%)
Degenerated arthritis of glenohumeral joint	21 (1.1%)
Other disorders	45 (5.2%)
Total	1926

Rotator cuff tear group	451 (23%)
Remainders group	1475 (77%)

Table 2. Method of the examination

		Crepitus			
		Positive	Negative		
Rotator cuff tear	Positive	300	151	451	300/451=66.5%
	Negative	180	1295	1475	1295/1475=87.5% (Specificity)
		480	1446	1926	
		300/480=66.5%		300+1295/1926=82.8%	
		(Predictive value)		(Accuracy)	
		1295/1446=89.6%			

(—Predictive value)

Table 3. Age

Age	Cuff tear group	Remainders group
40-49	56	332
50-59	124	587
60-69	146	423
70-79	103	113
80-89	22	20

Table 4. Sex

Sex	Cuff tear group	Remainders group
Male	286 (63%)	762 (52%)
Female	165 (37%)	713 (48%)

Table 5. Sides

Sides	Cuff tear group	Remainders group
Right	298 (66%)	744 (50%)
Left	153 (34%)	731 (50%)