Factors Associated with failed Conservative treatment for degenerative full thickness supraspinatus tears: a prospective cohort study

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INTRODUCTION:

Conservative treatment of degenerative full thickness supraspinatus tears offers satisfactory results in most patients. However, predicting which patients will eventually require surgical treatment remains challenging. The aims of this study were to assess the effectiveness of conservative treatment in treating degenerative full thickness supraspinatus tears and to identify possible patient related factors and tear characteristics that may negatively influence the results.

METHODS:

Prospective study of consecutive patients with complete degenerative supraspinatus tears treated conservatively with the same physical therapy protocol at the same institution. Patients older than 75 years, traumatic tears, massive tears, rotator cuff arthropathy, patients without a Magnetic Resonance Image (MRI) study and those with less than 2 years of follow-up were excluded. Clinical follow-up was carried out at 3, 6, 12 months and annually thereafter. The ASES Score, Subjective Shoulder Value (SSV) and pain according to the visual analogue scale (VAS) were analyzed. Failure of conservative treatment was defined as the need for surgical treatment. Tears were analyzed with MRI and classified according to ISAKOS Classification. The size of the tear was measured in millimeters, both in the sagittal and coronal planes. The mean follow-up was 30.5 ± 6.2 months. $P<0.05$ was considered statistically significant.

RESULTS:

In total 348 patients with a mean age of 63.4 ±7.6 years, 66.1% were female, 67% had dominant side affected and 48.9% were manual workers. Almost 50% presented a C1 tear, 38 % C2 and 13 % C3 supraspinatus tear. A total of 46.6 % had an associated partial tear of the infraspinatus and 69.8 % had a partial tear of the upper third of the subscapularis (Lafosse I-II). At the end of follow-up, 77% obtained satisfactory results with conservative treatment. After physical therapy protocol, SSV improve a mean difference of 35.6±24 points ($p<0.001$), ASES 31.3±20 points ($p<0.001$) and EVA 4.3±2.7 points ($p<0.001$). Only 23% of patients required surgery during follow-up with a mean time of 10.8±7.7 months until surgery and 56.6% of patients failed in the first 6 months after conservative treatment. No differences were found in functional outcomes between patients treated with surgery and those with conservative treatment at latest follow-up. Patients that required surgery were younger (58.7±8 vs 64.8±6.8, $p<0.001$), more frequently manual workers (62.5% vs 44.7%, $p=0.008$), with higher BMI (28.7±4.8 vs 27±4.8, $p=0.004$), they had lower preoperative SSV (SSV 31.8±2 vs 38.7±19 $p=0.004$) and ASES score (41.6±14.6 vs 47.7±16.3, $p=0.003$) and a history of contralateral shoulder surgery ($p=0.05$). When analyzing the tear features, patients requiring surgery had larger tears in the sagittal plane (14.7±5mm vs 13.5±5mm, $p=0.021$).

DISCUSSION AND CONCLUSION:

Conservative treatment of degenerative supraspinatus tears offers satisfactory results in 77% of cases in our series. Younger patients, manual workers, with more painful shoulders and lower ASES score, history of previous surgery in the contralateral shoulder and those with larger tears in the sagittal plane are at greater risk of requiring surgery.

Table 1 Patient demographics

	N = 348
Age (years) mean: SD	63.4 (7.5)
Gender, n (%)	
Male	118 (34)
Female	230 (66)
Dominant side affected, n (%)	234 (67)
Manual workers n (%)	170 (49)
Classification n(%)	
C1	171 (49)
C2	131 (38)
C3	46 (13)
Location n (%)	
Anterior	240 (70.6)
Posterior	11 (3.2)
Complete (>50mm)	92 (26.6)
Associated tear	162 (46.6)
Partial infraspinatus tear n (%)	243 (69.8)
Lafosse I	202 (58)
Lafosse II	41 (11.8)
LHB pathology n (%)	245 (69.5)
Subtotal	131 (37.6)
Absent	27 (7.8)
Partial tear	84 (24)
Luxated	14 (4.0)
Corticosteroid injection n(%)	
No	255 (73.3)
1	76 (21.8)
2	15 (4.3)
3	2 (0.6)
Smoker n (%)	74 (21.3)
Body mass Index mean (SD)	27.0 (4.8)
Tear size coronal plane in mm, mean (SD)	16.4 (7.6)
Tear size sagittal plane in mm, mean (SD)	13.8 (5.3)
Comorbilities n(%)	
Diabetes	
Hypercholesterolemia	38 (10.9)
Arterial Hypertension	
	121 (34.8)

Table 2 Functional Outcomes before and after conservative treatment

	Before conservative treatment	After conservative treatment	Gain	P Value
VAS, mean (SD)	7.3 (1.7)	3.0 (2.6)	4.4 (2.7)	<0.001
ASES score, mean (SD)	46.3 (16)	78 (15)	31.5 (20)	<0.001
SPV score, mean (SD)	37.2 (10.2)	73.4 (21)	35.6 (24)	<0.001

ASES American Shoulder and Elbow Surgeons; VAS, visual analog scale; SPV subjective shoulder value

Table 3 Comparison between patients that required surgery and patients who did not

	No surgery N=248	Surgery N=100	P Value
VAS, mean (SD)	2.9 (2.6)	3 (2.9)	0.938
ASES score, mean (SD)	78 (14)	77.7 (20)	0.832
SPV score, mean (SD)	72.7 (21)	75.4 (23)	0.671

ASES American Shoulder and Elbow Surgeons; VAS, visual analog scale; SPV subjective shoulder value

Table 4 Factors Associated with Conservative treatment failure

	No surgery N=204	Surgery N=100	P Value	OR (95% CI)
Age (years) mean: SD	64.8 (6.8)	58.7 (8)	**<0.001**	0.95 (0.88, 0.95)
Gender, n (%)				0.99 (0.58, 1.67)
Male	81 (34)	27 (35.7)	>0.999	
Female	157 (66)	49 (64.3)		
Dominant side affected, n (%)	156 (66)	58 (75.3)	0.114	1.39 (0.88, 2.43)
Manual workers n (%)	120 (44.8)	50 (62.5)	**0.008**	**2.00 (1.24, 3.46)**
BMI, mean (SD)	27 (4.8)	28.8 (4.8)	**0.004**	1.07 (1.02, 1.12)
Classification, n (%)				
C1	115 (48.6)	38 (47.5)	0.137	1.00
C2	88 (35.5)	36 (45)		1.12 (0.70, 1.99)
C3	44 (15)	6 (7.5)		0.45 (0.40, 1.42)
Location n (%)				
Anterior	154 (68.6)	61 (76.3)	0.244	
Complete (>50mm)	81 (31)	22 (27.5)	0.649	1.47 (0.84, 2.44)
Partial infraspinatus tear n (%)	150 (68.2)	52 (68)	0.226	0.71 (0.42, 1.17)
Partial subscapularis tear n (%)	151 (71.2)	32 (65)	0.331	0.73 (0.44, 1.28)
LHB pathology n (%)	185 (69)	59 (72.5)	0.649	1.18 (0.69, 2.09)
Smoker n (%)	46 (22.1)	14 (17.5)	0.434	0.74 (0.37, 1.37)
Tear size coronal plane in mm, mean (SD)	15.7 (5)	17.9 (8.4)	0.062	0.99 (0.96, 1.02)
Tear size sagittal plane in mm, mean (SD)	13.5 (2.4)	14.7 (5)	**0.021**	1.04 (1.00, 1.09)

Table 5. Summary of the multivariable model

Variable	OR	95% CI	P
Age	0.897	(0.825-0.952)	<0.001
ASES	0.976	(0.952-0.988)	0.001
BM	1.077	(1.016-1.139)	0.009
Size sagittal tear	1.086	(1.013-1.129)	0.019

ASES American Shoulder and Elbow Surgeons; BMI Body Mass Index