Persistent Subacromial Bursal Effusion Leads to Inferior Patient-Reported Outcome in Individuals with Symptomatic Isolated Supraspinatus Tendon Tears

Jumpei Inoue, M.D, Luke T. Mattar, PhD, Efstathios Konstantinou, M.D
Adam J Popchak, DPT, PhD, Volker Musahl, MD
James J. Irrgang, PT, PhD, FAPTA, Richard E. Debski, PhD

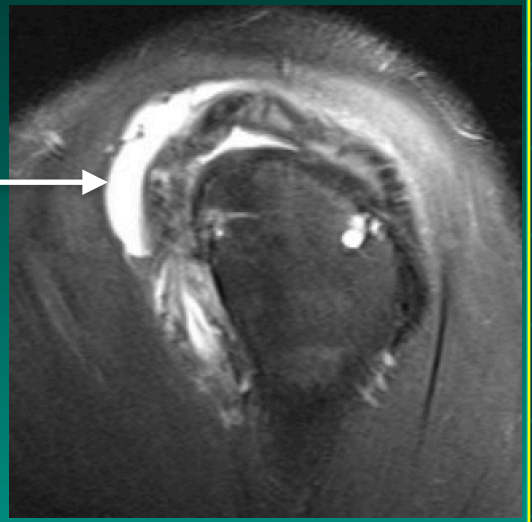
University of Pittsburgh, Pittsburgh, PA, USA

Faculty Disclosure Information

- National Institutes of Health grant 5R01AR069503

Subacromial/subdeltoid bursal effusion

- Rotator cuff tears can cause bursal effusion
- Prevalence : 20-42%
- Increased inflammatory cytokine expression
- Bursal effusion was associated with pain in patients with calcific tendinopathy, or supraspinatus tear



Associated with PRO?

Purpose

- Determine factors associated with bursal effusion and their effect on patient reported symptoms and function

Subject Recruitment

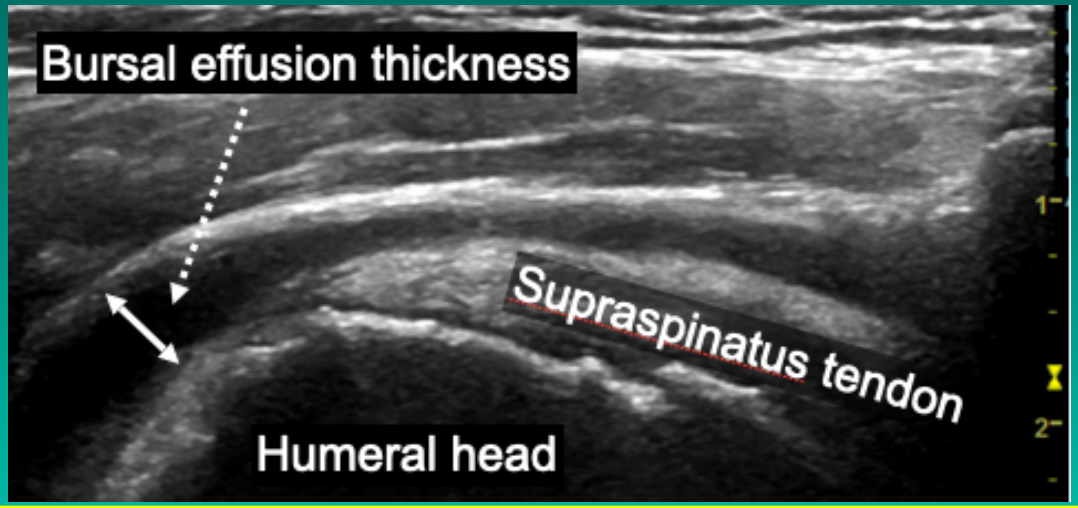
106 individuals (mean age, 60.2 ± 9.9 years)

- **Symptomatic isolated supraspinatus tendon tear (> 50% partial- or full-thickness)**
- **12-week exercise therapy**

Mattar, et al. JSES 2022
Mattar, et al. JSES 2023

Evaluation of Bursal Effusion

- Ultrasound at baseline & 1 year after initiation of exercise therapy
- >2 mm thickness of bursal effusion : positive



Outcome Parameters

- Patient & injury characteristics
  - with vs without effusion at baseline
- WORC scores at 1 year
  - with vs without effusion both at baseline & 1 year

Statistics (Significance $p < 0.05$)

- Univariable analysis: Chi-square, Independent-t, or Mann-Whitney U test
- Multivariable analysis: Variables $p < 0.10$ in univariable analysis

Patient & Injury Characteristics

Variable	Effusion at baseline (n=31)	No effusion at baseline (n=75)	P Value
Age, years	65.3 ± 8.0	58.1 ± 10.0	<.001
Males	18 (58.1%)	38 (50.7%)	0.488
Height, cm	171.3 ± 10.6	170.7 ± 10.9	0.788
BMI, kg/m^2	28.0 ± 4.5	29.0 ± 5.2	0.521
Hand dominant side	20 (64.5%)	42 (56%)	0.418
Full thickness tear	23 (74.2%)	45 (60%)	0.166
Tear size, mm (n=99)	12.8 ± 6.5 (n=30)	11.1 ± 5.2 (n=69)	0.238
Current or previous smoker	18 (58.1%)	20 (26.7%)	0.002
Current worker	15 (48.4%)	52 (69.3%)	0.042
Injury onset	16 (51.6%)	28 (37.3%)	0.175
<3 months symptom duration	17 (54.8%)	25 (33.3%)	0.039
WORC score at baseline	53.7 ± 24.9	62.5 ± 19.6	0.113

Multivariable Analysis for Bursal Effusion

Variable	B	OR	95% CI	P Value
Age, year	0.081	1.085	1.027-1.145	0.003
History of smoking	1.214	3.369	1.338-8.481	0.010

Working status and symptom duration were excluded during analysis due to $p > 0.10$

WORC Score at 1 year

	Effusion both at baseline & 1 year (n = 15)	No effusion both at baseline & 1 year (n = 58)	P Value
WORC score at 1 year	79.5 ± 24.9	91.2 ± 12.3	0.047

Persistent bursal effusion linked to inferior WORC scores at 1 year

Discussion

Bursal effusion at baseline

- Related factors: smoking history, older age
- No effect on patient reported symptoms and function at baseline

Persistent effusion

- Inferior WORC scores at 1 year

→ Persistent bursal effusion should be treated

Conclusions

- Persistent bursal effusion was associated with inferior patient-reported symptoms and function as evidenced by worse WORC scores

References

[1] Blaine, et al. JSES, 2005
[2] Voloshin, et al. Arthroscopy, 2005
[3] Arslan, et al. J Clin Ultrasound, 1999
[4] Gafoor, et al. Cureus, 2023
[5] Draghi F, et al. J Ultrasound. 2015
[6] Lee DH, et al. Arch Physics Med Rehab. 2017