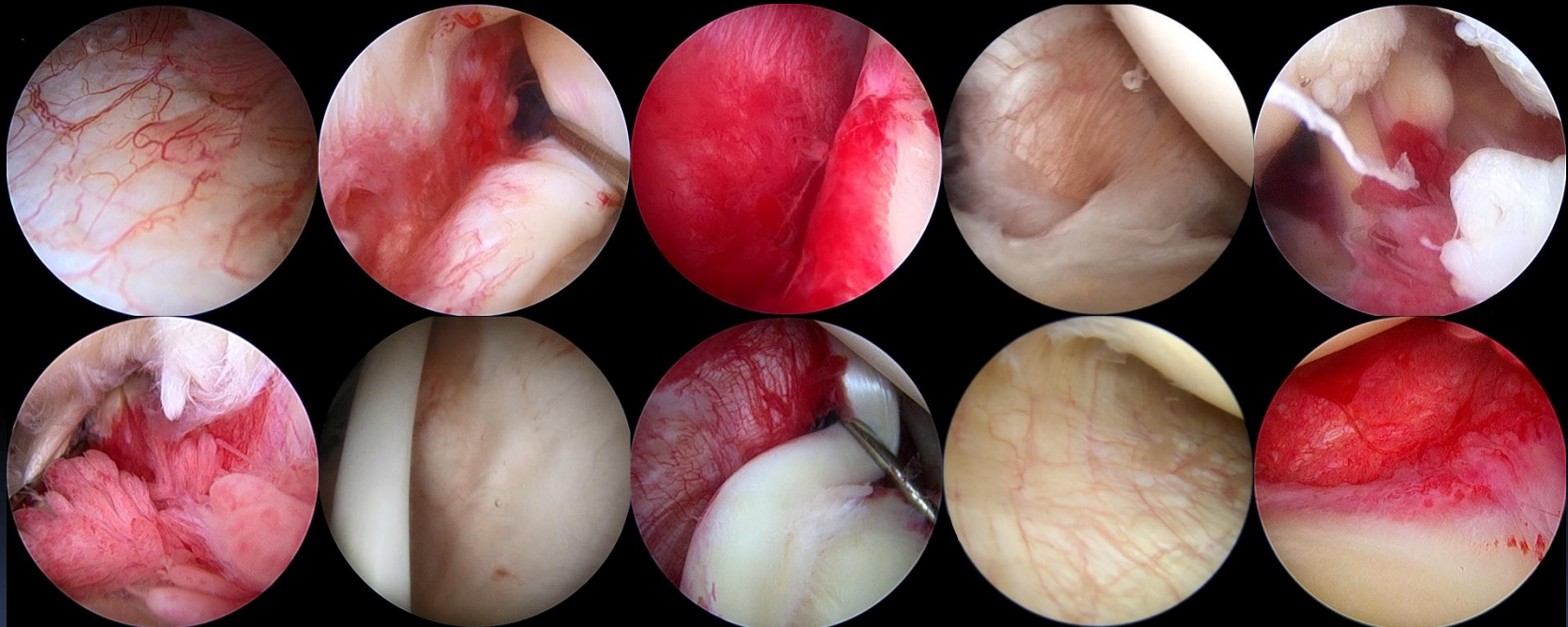


Chronicity is Associated with the Glenohumeral Synovitis in Patients with a Rotator Cuff Tear



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Disclosures

Chul-Hyun Cho, MD, PhD

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No financial disclosure

Or

Conflict of interest

Synovitis of GHJ & SAS

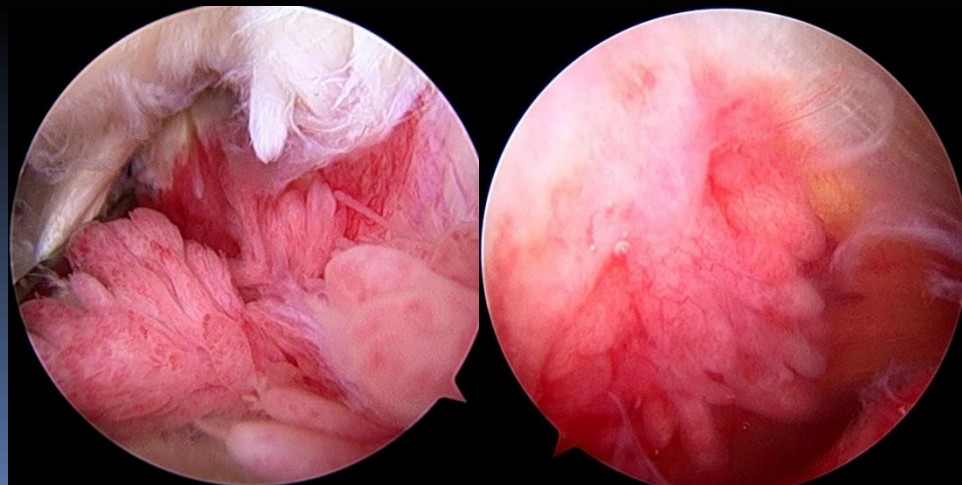
- One of the m/c findings during ARCR
- Responsible for pain and pathogenesis for RCT
- No prior studies evaluated the potential association between macroscopic synovitis and various clinical factors in patients with RCT

GHJ : glenohumeral joint

SAS : subacromial space

ARCR : arthroscopic rotator cuff repair

RCT : rotator cuff tear



PURPOSE

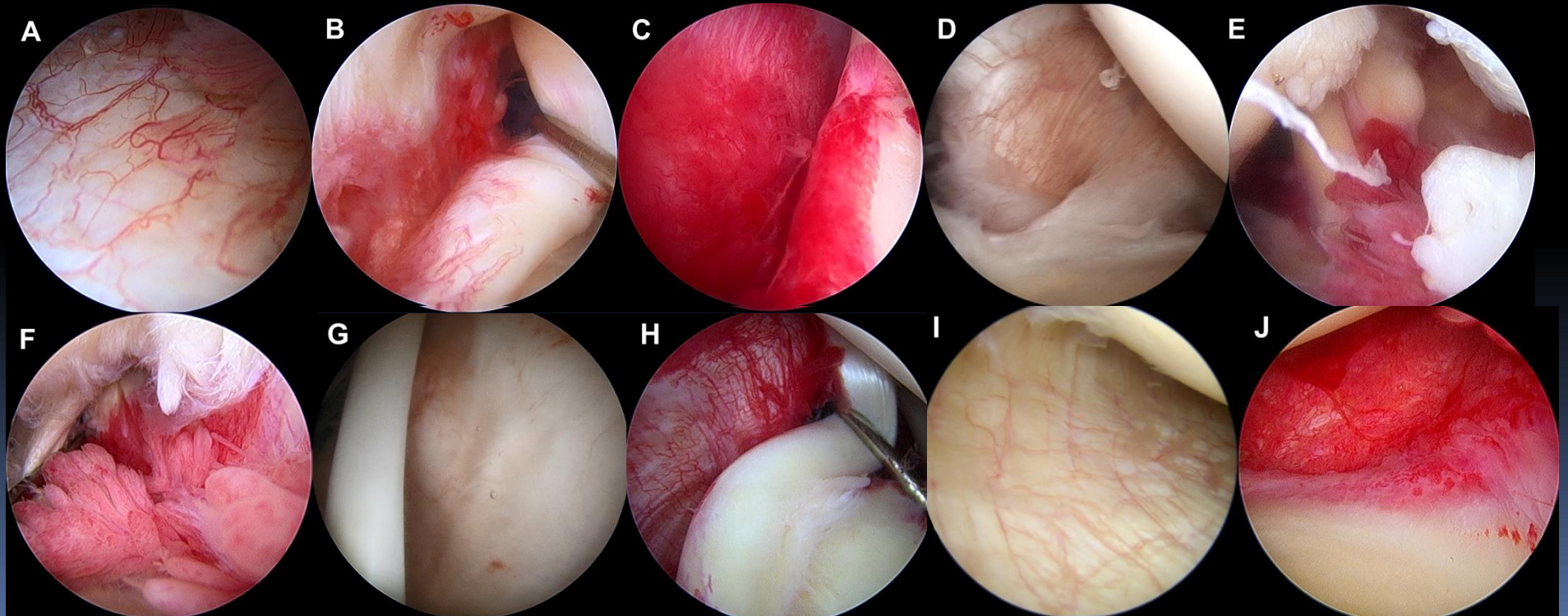
- To determine clinical factors associated with the degree of GHJ and SAS synovitis in patients with a RCT
- To determine whether macroscopic synovitis affects early clinical outcomes following ARCR
 - Clinical factors : age, sex, BMI, occupation, Sx. Duration, minor trauma Hx. preoperative stiffness, DM, muscle atrophy, fatty infiltration, Preoperative & postoperative clinical scores and ROMs

MATERIALS

- 230 patients underwent ARCR
- **Inclusion criteria**
 - Available medical records with arthroscopic video
 - Available data for serial F/U periods (PO 3, 6, 12 mo)
- **Exclusion criteria**
 - History of previous shoulder surgery or major trauma
 - History of inflammatory arthritis
 - Corticosteroid injection within 4 wks before surgery
 - Anti-inflammatory medication within 2 wks before surgery

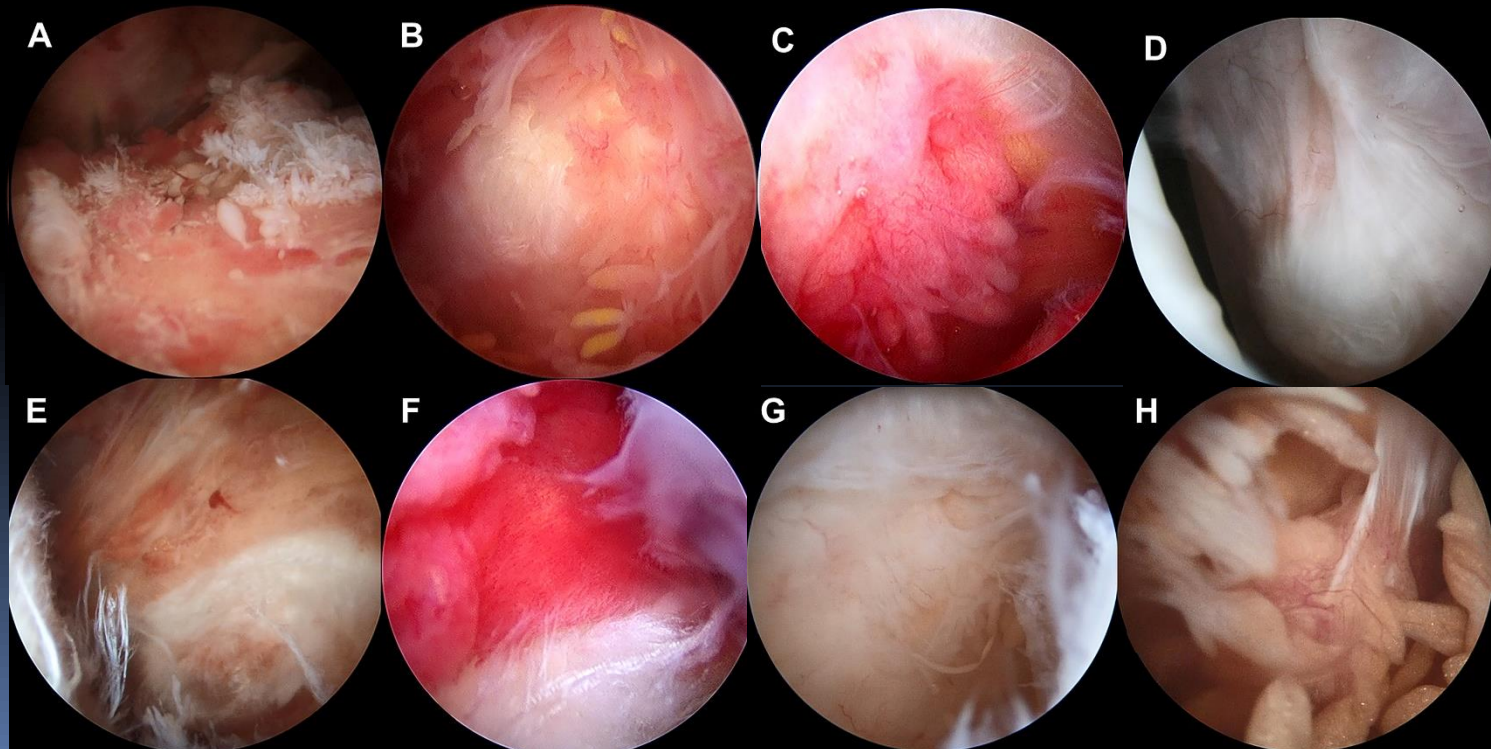
Macroscopic Assessment : GHJ Synovitis

- Randomly reviewed by two experienced shoulder surgeons
- David's grading system : total score 0-6 *David, JSES, 2017*
 - Color of capsule; pale (0), pink (1), red (2) (A,B,C)
 - Villous projections; none (0), few (1), extensive (2) (D,E,F)
 - Capillaries in capsule; scattered (0), hypertrophied (1) (G,H)
 - Axillary recess; normal (0), contracted (1) (I,J)



Macroscopic Assessment : SAS Synovitis

- Jo's grading system : total score 0-5 *Jo, BMC MS Disord, 2015*
 - Hypertrophy based on the size of the synovial villi; < 2 mm (0), 2 ~ 5 mm (1), > 5 mm (2) (A,B,C)
 - Hyperemia based on the redness of the villi; pale and transparent (0), slightly reddish (1), definitely red (2) (D,E,F)
 - Density assessed by the coverage of synovial villi; < 1/3 (0), 1/3 ≤ (1) (G,H)



RESULTS

- **Mean total GHJ synovitis score : 3.9 ± 1.5**
 - **Color of capsule : 1.2 ± 0.6**
 - **Villous projections : 1.2 ± 0.6**
 - **Capillaries in capsule : 0.9 ± 0.3**
 - **Axillary recess: 0.6 ± 0.5**
- **Mean total SAS synovitis score : 1.9 ± 1.2**
 - **Hypertrophy based on the size of the synovial villi : 0.5 ± 0.6**
 - **Hyperemia based on the redness of the villi : 1.1 ± 0.5**
 - **Density assessed by the coverage of synovial villi : 0.2 ± 0.4**

Univariate analysis

		N (%) or Mean ± SD	GHJ synovitis score		SAS synovitis score	
			Mean ± SD	P value	Mean ± SD	P value
Age		60.4 ± 7.2		.008*		.395
Sex	Man	98 (42.6%)	4.0 ± 1.5	.400	1.9 ± 1.2	.656
	Woman	132 (57.4%)	3.8 ± 1.5		1.8 ± 1.2	
Side	Dominant	172 (74.8%)	3.7 ± 1.5	.011*	1.8 ± 1.2	.360
	Non-dominant	58 (25.2%)	4.3 ± 1.2		2.0 ± 1.3	
Body mass index		25.0 ± 3.0		.019*		.105
Occupation	Heavy work	98 (42.6%)	4.0 ± 1.4	.425	1.8 ± 1.6	.675
	Light work	49 (21.3%)	4.0 ± 1.6		2.0 ± 1.2	
	Unemployed	81 (35.2%)	3.7 ± 1.5		1.8 ± 1.3	
	Others	2 (0.9%)	3.0 ± 4.2		2.5 ± 0.7	
Sx duration		30.0 ± 35.5		.027*		.473
History of trauma	No	191 (83.0%)	3.9 ± 1.4	.471	1.8 ± 1.2	.708
	Yes (minor)	39 (17.0%)	3.7 ± 1.7		1.9 ± 1.1	
Preop stiffness	No	190 (82.6%)	3.6 ± 1.5	.006*	1.8 ± 1.2	.334
	Yes	40 (17.4%)	4.5 ± 1.4		2.0 ± 1.1	
Diabetes	No	198 (86.1%)	3.7 ± 1.5	.001*	1.8 ± 1.2	.803
	Yes	32 (13.9%)	4.7 ± 1.2		1.9 ± 1.2	
Muscle atrophy	No - mild	187 (81.3%)	3.7 ± 1.5	.002*	1.8 ± 1.2	.424
	Moderate	39 (17.0%)	4.4 ± 1.4		1.9 ± 1.2	
	Severe	4 (1.7%)	4.8 ± 1.0		2.5 ± 1.9	
Fatty infiltration	No	1 (0.4%)	NA	.022*	NA	.839
	Some	87 (37.8%)	3.7 ± 1.5		1.9 ± 1.1	
	Evident	114 (49.6%)	3.9 ± 1.4		1.7 ± 1.2	
	Fat = muscle	25 (10.9%)	4.3 ± 1.6		2.0 ± 1.4	
	Fat > muscle	3 (1.3%)	5.0 ± 1.0		3.3 ± 1.2	
Tear size	Partial	33 (14.3%)	3.2 ± 1.3	< .001*	1.7 ± 1.0	.641

▪ **Age, side, BMI, Sx. duration, preop. stiffness, DM, muscle atrophy, fatty infiltration, and tear size were significantly associated with the GHJ synovitis score (all P < .05)**

Univariate analysis

	Mean ± SD	GHJ synovitis grading		SAS synovitis grading	
		r	P value	r	P value
VAS pain score					
Preoperative	6.0 ± 2.2	0.133	.044*	0.001	.983
PO 3 months	3.6 ± 1.8	-0.029	.665	-0.069	.299
PO 6 months	2.5 ± 1.8	0.028	.675	-0.066	.319
PO 12 months	1.5 ± 1.5	-0.052	.435	-0.029	.664
ASES score					
Preoperative	44.3 ± 18.7	-0.251	< .001*	0.013	.847
PO 3 months	59.4 ± 14.4	0.026	.693	0.035	.601
PO 6 months	72.8 ± 14.8	-0.006	.925	0.076	.250
PO 12 months	84.9 ± 11.8	0.113	.088	0.083	.212
Forward flexion					
Preoperative	145.9° ± 31.4°	-0.229	< .001*	-0.045	.499
PO 3 months	143.1° ± 18.6°	0.028	.667	-0.052	.433
PO 6 months	158.3° ± 13.5°	0.007	.921	0.002	.973
PO 12 months	166.5° ± 8.3°	0.012	.860	0.106	.110
External rotation					
Preoperative	53.4° ± 23.4°	-0.180	.006*	0.099	.133
PO 3 months	51.9° ± 12.6°	-0.021	.753	-0.023	.726
PO 6 months	64.0° ± 12.8°	-0.028	.670	0.026	.692
PO 12 months	70.0° ± 10.0°	0.000	.700	0.010	.907

- **Preop. VAS pain score, ASES score, FF, ER, and IR were also significantly associated with the GHJ synovitis score (all P < .05)**
- **There were no associations between the GHJ and SAS synovitis score and all clinical outcomes at 3, 6, 12 months after surgery (all P > .05)**

Multivariate Logistic Regression Analysis

	t	P value	95% Confidence Interval	
			Lower Bound	Upper Bound
Age	1.389	.166	-0.007	0.043
Side	0.936	.350	-0.214	0.600
Body mass index	0.531	.596	-0.044	0.076
Duration of symptoms	1.990	.048*	0.000	0.010
Preoperative stiffness	0.427	.670	-0.461	0.715
Diabetes	2.258	.025*	0.076	1.125
Muscle atrophy	1.833	.068	-0.039	1.064
Fatty infiltration	-1.254	.211	-0.617	0.137
Tear size	2.564	.011*	0.052	0.394
Preoperative VAS pain score	-0.668	.505	-0.245	0.121
Preoperative ASES score	-0.702	.483	-0.038	0.018
Preoperative forward flexion	-0.721	.472	-0.010	0.005
Preoperative external rotation	-0.912	.363	-0.012	0.005
Preoperative internal rotation	1.482	.140	-0.014	0.102

- **Duration of symptoms, diabetes, and tear size** were significantly associated with the GHJ synovitis score (P = .048, P = .025, P = .011)

CONCLUSION

- Longer duration of symptoms, larger tear size, and **diabetes** were independently associated with increased **GHJ synovitis** in patients with RCT
- These results suggest that **GHJ synovitis** might be more involved in the pathogenesis for pain and tear progression of rotator cuff disease compared with SAS synovitis

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