



*ePoster: #100*

*Progression of **Fatty Infiltration** After Rotator Cuff  
Repair is **Accelerated by Statin Use***

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I have the following financial relationships to disclose.

## COI Disclosure Information

Presenter : Kotaro Yamakado

Nothing

Retear rate of the surgically repaired rotator cuff  
(→ up to 94%)

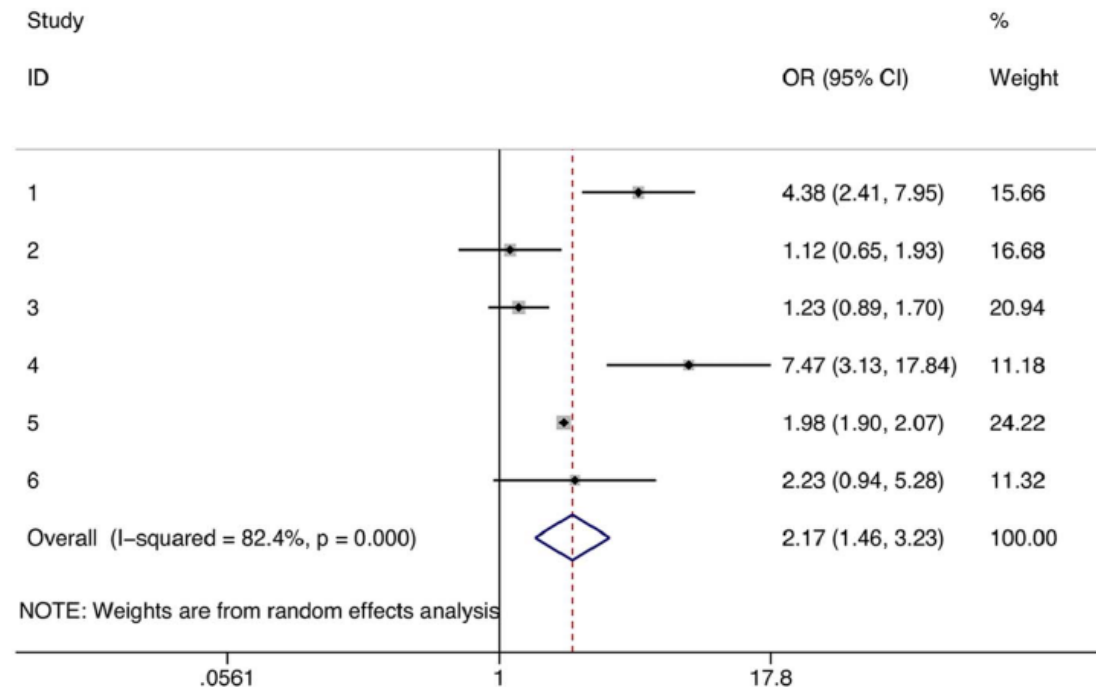
Patient comorbidities  
associated with  
increased retear risk

- Diabetes mellitus (DM)
- Smoking
- **Hyperlipidemia (HL)**
- Obesity
- Osteoporosis
- Vitamin D deficiency

# Dyslipidemia was associated with high occurrence of rotator cuff disease

- Lai J, JBJS (2018), systemic review
  - Included studies
    - Kim (2010)
    - Longo (2010)
    - Rechartd (2010)
    - Abate (2014)
    - Djerbi (2015)
    - Lin (2015)
    - Kim (2016)

- Overall OR = 2.17
  - the exposure group was compared with the unexposed group



# Statins. Protective? Detrimental?

## *Conflicting data*

- Better cuff healing in statin-treated rat model
  - Chung (2016)
- Statin use appeared to mitigate the need for revision cuff surgery
  - Cancienne JM (2017)
- Correlation of re-tear and statin use
  - Garcia GH (2017)



# Purpose

- To evaluate the influence of statin (hydroxyl-methylglutaryl-coenzyme-A reductase inhibitors) use and serum lipid level on the progression of fatty infiltration (FI) after rotator cuff repair.

# Methods

310 pts (310 shoulders)

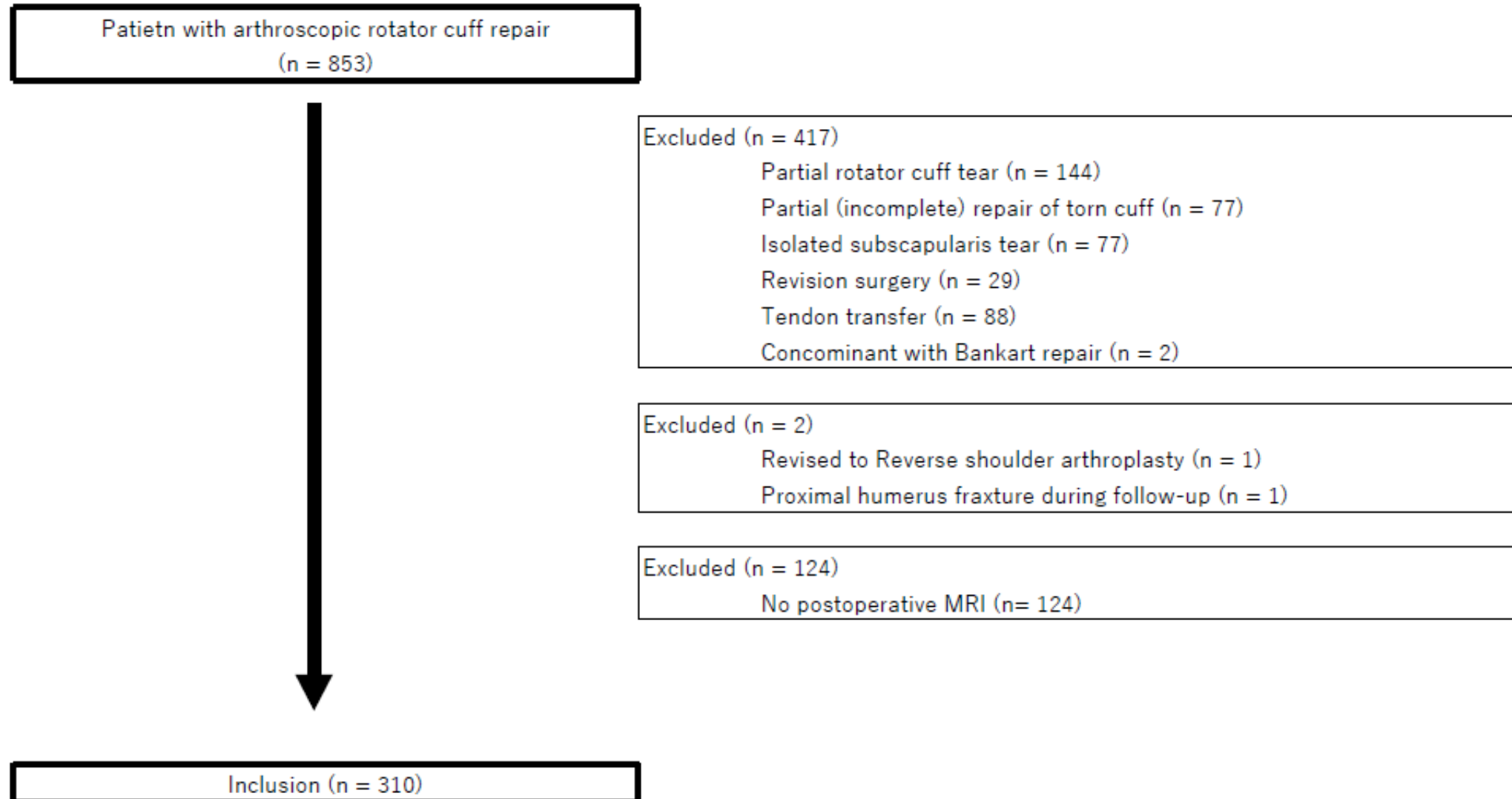
- Retrospective chart review (2015-Jan ~ 2021-Jan)
  - Laboratory data (preoperative)
    - LDL
    - Total Cholesterol (TC)
    - TG
  - Medication status
    - Statin usage

- Repair integrity and FI (MRI at one year f-up)
  - Sugaya classification
    - Healed as types 1, 2, and 3
    - Retear as types 4 and 5
  - Goutallier/Fuchs classification grade
    - As the pre- and postoperative change in the sum of the fatty infiltration grades of the supraspinatus and infraspinatus muscles as the target variable, independent variables included preoperative FI grade of supraspinatus and infraspinatus, age, sex, TC, LDL, TG, BS, cuff tear size, and statin use
- Statistical analysis
  - Student t-test or Mann–Whitney U test for continuous values
  - Multiple logistic regression
    - Significance set at  $P < .05$

# Results



# Flow chart



# Demographics

	Statin Use N = 80	No statin use N = 230	P-value
Age (yr)	68.7	65.9	0.022 *
Sex (male/female)	31/49	136/94	0.0025 **
BMI	24.6	23.4	0.014 *
Tear size			0.061
Small to medium	37	136	
Large to massive	43	94	
TC (mg/dl)	198	212	0.0029 **
LDL (mg/dl)	111	127	< .0001 ***
TG (mg/dl)	174	158	0.24
Rotator cuff healing			0.7
Healed	69	204	
Non-healed	11	26	

# Fatty infiltration of the rotator cuff

Variable	ARCR with statin use (n = 79)	ARCR without statin use (n = 229)	P value
<b>Supraspinatus</b>			
Preoperative	0.89 (0.66)	0.62 (0.61)	0.0026 **
Postoperative	1.15 (0.75)	0.85(0.70)	0.0014 **
Changes pre- and post-operative value	+0.27 (0.50)	+0.22 (0.51)	
<b>Infraspinatus</b>			
Preoperative	0.50 (0.62)	0.41 (0.68)	0.25
Postoperative	1.15 (0.72)	0.85 (0.70)	0.37
Changes pre- and post-operative value	+0.56 (0.71)	+0.26 (0.59)	
<b>GFDI</b>			
Preoperative	0.50 (0.62)	0.41 (0.68)	0.25
Postoperative	1.15 (0.72)	0.85 (0.70)	0.37
Changes pre- and post-operative value	+0.56 (0.71)	+0.26 (0.59)	

Values are expressed as mean (SD).

index

\*, < .05; \*\*, < .001; \*\*\*, < .0001

The FI of supraspinatus was significantly greater in the statin use group than in the non-use group pre- and post-operatively

# Multiple regression analysis for progression of fatty infiltration

	Coefficient	95%CI	P value
Preoperative Fuchs classification of supraspinatus	-0.079	[-0.18, 0.0056]	0.12
Preoperative Fuchs classification of infraspinatus	-0.019	[-0.12, 0.079]	0.7
Age	0.0028	[-0.0035, 0.009]	0.38
Sex (female)	0.06	[-0.058, 0.18]	0.31
Cuff tear size (Large-to-massive tear)	0.22	[0.10, 0.34]	0.0031 ***
TC	0.0015	[-0.0019, 0.0050]	0.38
LDL	-0.0023	[-0.0064, 0.0013]	0.25
TG	0.00026	[-0.00082, 0.00029]	0.35
BS	0.000027	[-0.0012, 0.0012]	0.996
Statin use	0.13	[0.0014, 0.26]	0.049 *
Retear of repaired cuff	0.19	[0.022, 0.35]	0.028 *

BS, blood sugar; CI, confidence interval; LDL, low-density lipoprotein; TC, total cholesterol; TG, triglycerides

- Statin use was a significant risk factor for the increase in the sum of the fatty infiltration grades of the supraspinatus and infraspinatus muscles
- None of the serum lipid levels were significant

# Discussion

- In multivariate regression, statin use was shown to be a significant risk factor for the increase in the FI grades of the supraspinatus and infraspinatus muscles, whereas none of the serum lipid levels were significant

This suggests that

- the normalizing effect of statins on serum lipid levels does not prevent FI
- statin use itself may be involved in the progression of FI

# Conclusions

- After arthroscopic rotator cuff repair,

Statins were a significant risk factor for the progression of postoperative fatty infiltration.