Increasing Numbers of Pre-operative Shoulder Injections are Associated with a Higher Rate of Subsequent Revision Rotator Cuff Surgery

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Objectives: Subacromial steroid injections are frequently used in the initial conservative management of rotator cuff (RC) tears, however, the long-term effect of this treatment in patients who eventually undergo rotator cuff repair (RCR) is not well defined in the literature. The objective of this study is to identify any dose-dependent association between injections prior to rotator cuff repair (RCR) and subsequent revision surgery.

Methods: Two large databases were queried for patients undergoing arthroscopic RCR. Patients with one year of pre-operative database exposure and a minimum of two years post-operative follow-up were included. In each database, three study groups were formed, stratified by the number of ipsilateral injections given within the year prior to RCR: one, two and three or more injections. A control group without any prior injection was identified and matched to the single injection group in each database. The outcome of interest was ipsilateral revision arthroscopic or open rotator cuff repair, or arthroscopic debridement for a diagnosis of rotator cuff tear within 2 years of the index surgery. Revision surgery rates were compared between groups using a multivariate logistic regression analysis controlling for demographic and comorbidity confounders. This allowed for identification of the independent association between the number of injections and the need for subsequent revision surgery.

Results: 108,516 patients from the Medicare database and 11,360 patients from the private database were included (Table 1A-B). There was no association between a single injection within the year prior to RCR and revision surgery in either database. In the Medicare database, two or more injections was associated with a substantial increase in the risk of requiring revision surgery (OR 2.40-2.62, $P < 0.0001$). A similar association was noted in the private insurance database for patients with two or more injections (OR 2.09-2.42, $P < 0.0001$) (Table 1A-B).

Conclusion: A single shoulder injection within a year prior to arthroscopic RCR is not associated with any increased risk of revision surgery. Two or more injections within a year prior to RCR appears to be associated with a substantially increased risk of revision surgery. While causality cannot be established on the basis of this database review, caution is recommended when considering more than one shoulder injection in patients with potentially repairable RC tears.

Table 1A. Risk of Revision Rotator Cuff Surgery Stratified by Number of Preoperative Injections (Medicare Patients)

Study Group	Ipsilateral Revision Surgery				
	Total N	N of Revisions	% Revisions	Adjusted O.R. [95% CI]	P Value
Control	103,514	3,691	3.6%	-	-
1 Injection	2,738	103	3.8%	1.09 [0.96 - 1.25]	0.194
2 Injections	1,137	96	8.4%	2.40 [2.08 - 2.76]	< 0.0001
3+ Injections	1,127	99	8.8%	2.62 [2.29 - 3.01]	< 0.0001

Table 1B. Risk of Revision Rotator Cuff Surgery Stratified by Number of Preoperative Injections (Humana Patients)

Study Group	Ipsilateral Revision Surgery				
	Total N	N of Revisions	% Revisions	Adjusted O.R. [95% CI]	P Value
Control	7,462	215	2.9%	-	-
1 Injection	2,250	67	3.0%	0.95 [0.78 - 1.16]	0.333
2 Injections	890	53	6.0%	2.09 [1.69 - 2.58]	< 0.0001
3+ Injections	758	57	7.5%	2.42 [1.96 - 2.99]	< 0.0001

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