

Does Needle Penetration of the Shoulder Joint Prior to Arthroscopy Increase Infection Risk? The Effect of Preoperative Magnetic Resonance Arthrogram or Corticosteroid Injection

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INTRODUCTION:

Prior literature has associated preoperative corticosteroid shoulder injection (CSI) with infection following shoulder surgery, and the recommendation for delay of shoulder arthroscopy following corticosteroid injection has ranged from 2 weeks to 3 months. In joint arthroplasty literature, a recent study found an equally elevated risk of total knee arthroplasty infection with preoperative injection of either CSI or hyaluronic acid. The implication is that violation of a joint prior to surgery, even in the absence of corticosteroid, may pose an elevated risk of infection following orthopaedic surgery. The aim of the present study was to determine whether violation of the shoulder joint for magnetic resonance arthrogram (MRA) poses an elevated risk of infection following shoulder arthroscopy and to compare this risk to that introduced by preoperative corticosteroid injection.

METHODS:

A national, all-payer database was queried to identify patients undergoing shoulder arthroscopy between January 2015 and October 2020. Procedure codes were used to stratify patients into the following 5 groups based on the timing of preoperative CSI or MRA: 1) no CSI or MRA within 3 months of surgery (n = 5,000), 2) CSI within 2 weeks of surgery (n = 1,055), 3) CSI between 2 and 4 weeks prior to surgery (n = 2,575), 4) MRA within 2 weeks of surgery (n = 414), 5) MRA between 2 and 4 weeks prior to surgery (n = 1,138). Postoperative complications, including infection (septic shoulder or surgical site infection), were analyzed at 90-days, 1-year, and 2-years postoperatively. Multivariable logistic regression analysis controlled for differences among groups.

RESULTS:

MRA 2 weeks prior to shoulder surgery was associated with an increased risk of infection at 1 year (OR, 2.17; 95% CI, 1.18 to 3.68; P = 0.007), while MRA 2 to 4 weeks preceding surgery was not associated with an increased risk of infection at any timepoint. By comparison, CSI within 4 weeks of surgery was associated with an increased risk of infection at all timepoints. (**Table 1**) The rate of 90-day infection in control shoulders was 0.30% compared to 1.23% in those with CSI within 2 weeks of surgery and 0.82% in those with CSI between 2 and 4 weeks prior to surgery (P < 0.001). The rate of 1-year infection in control shoulders was 0.44% compared to 1.71% in those with CSI within 2 weeks of surgery and 1.13% in those with CSI between 2 and 4 weeks prior to surgery (P = 0.001). The rate of 2-year infection in control shoulders was 0.60% compared to 1.99% in those with CSI within 2 weeks of surgery and 1.40% in those with CSI between 2 and 4 weeks prior to surgery (P < 0.001).

DISCUSSION AND CONCLUSION:

MRA within 2 weeks and CSI within 4 weeks of shoulder arthroscopy is associated with an elevated risk of infection within the first postoperative year. This study suggests that MRA should be performed at least 2 weeks prior to shoulder arthroscopy to mitigate the risk of postoperative infection.

90-day septic shoulder/SSI	OR*	95% CI	p-value
Male sex	2.23	1.61-3.12	<0.001
Alcohol Abuse	0.88	0.48-1.48	0.656
Diabetes Mellitus	3.42	2.48-4.76	<0.001
Obesity	0.62	0.45-0.85	0.004
Tobacco Use	1.43	1.05-1.96	0.023
CSI arthroscopy within 2 weeks	1.72	1.06-2.69	0.022
CSI arthroscopy 2-4 weeks	1.83	1.30-2.56	<0.001
MRA arthroscopy within 2 weeks	1.43	0.55-3.06	0.406
MRA arthroscopy 2-4 weeks	**	**	**
1-year septic shoulder/SSI			
Male sex	1.19	0.94-1.51	0.159
Alcohol Abuse	2.00	1.43-2.73	<0.001
Diabetes Mellitus	3.00	2.34-3.87	<0.001
Obesity	1.04	0.81-1.33	0.772
Tobacco Use	1.98	1.55-2.53	<0.001
CSI arthroscopy 2 weeks	1.65	1.15-2.33	0.005
CSI arthroscopy 2-4 weeks	1.62	1.24-2.11	<0.001
MRA arthroscopy 2 weeks	2.17	1.18-3.68	0.007
MRA arthroscopy 2-4 weeks	0.31	0.12-0.64	0.005
2-year septic shoulder/SSI			
Male sex	1.15	0.93-1.42	0.194
Alcohol Abuse	1.54	1.12-2.07	0.006
Diabetes Mellitus	2.09	1.68-2.59	<0.001
Obesity	1.39	1.12-1.73	0.003
Tobacco Use	2.01	1.62-2.50	<0.001
CSI arthroscopy 2 weeks	1.63	1.18-2.21	0.002
CSI arthroscopy 2-4 weeks	1.79	1.42-2.26	<0.001
MRA arthroscopy 2 weeks	1.71	0.94-2.88	0.059
MRA arthroscopy 2-4 weeks	0.24	0.09-0.50	0.001

*Referent group: Patients without injection or MRA

**Censored in accordance with the database confidentiality agreement

MRA: magnetic resonance arthrogram; CSI: corticosteroid injection; SSI: surgical site infection

OR: odds ratio; 95% CI: 95% confidence intervals