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Preoperative injection increases infection rates after open knee cartilage procedures

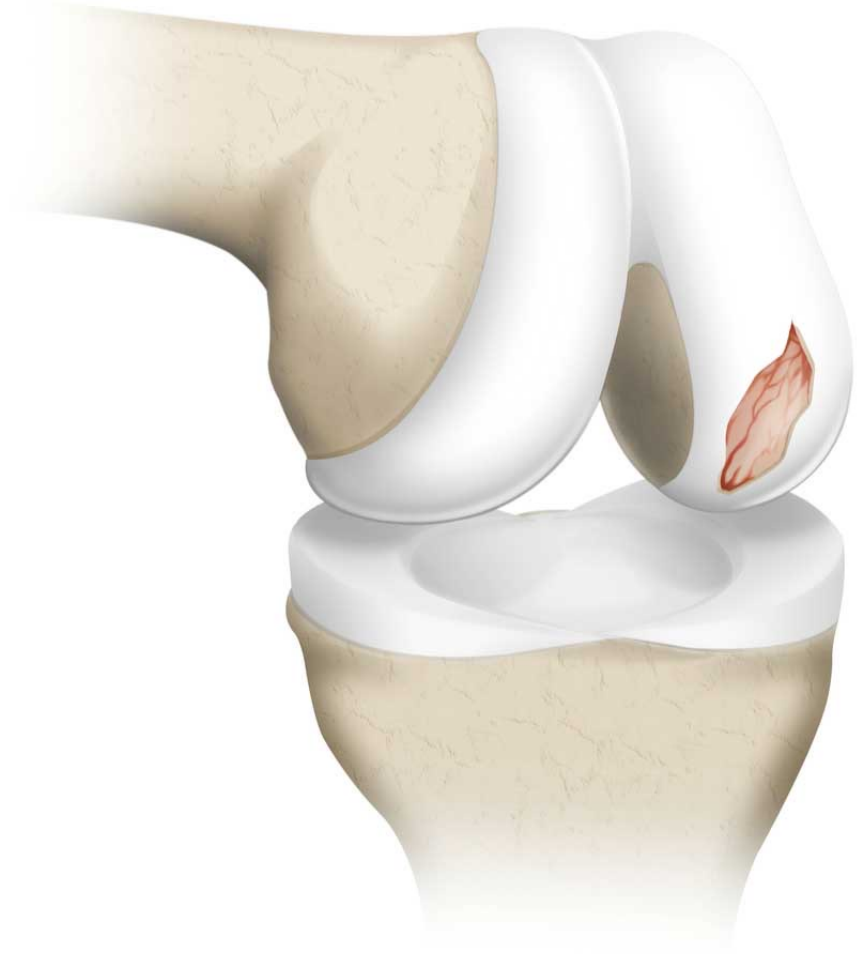
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Disclosures

- Dr. Austin V Stone
 - Institutional – Fellowship Support: Smith & Nephew, LLC, Arthrex, Inc.
 - AOSSM – Board or Committee
 - AANA – Board or Committee
 - Smith and Nephew – Consultant
 - Bioventus – Consultant
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- The other authors have nothing to disclose

Background

- Focal articular cartilage defects are a common cause of knee pain
- Definitive management is often surgical
- Symptom relief can often be achieved using intra-articular injection
- Preoperative intra-articular injection has been shown to increase infection rates following other types of orthopaedic procedures



Purpose

- Examine the effect of preoperative injection or arthroscopy on infection rates following open knee cartilage procedures
- Hypotheses:
 1. Prior injection increases postoperative infection rates
 2. Prior arthroscopy has no effect on postoperative infection rates



Methods

- Study Design
 - Data obtained from PearlDiver M151Ortho database
 - Medicare claims database
 - Contains records from over 151 million patients from 2010 - 2020
 - All information is deidentified
- Population
 - All patients who had an open knee cartilage procedure
 - Autologous chondrocyte implantation (ACI): CPT-27412
 - Osteochondral allograft (OCA): CPT-27415
 - Osteochondral autograft transplantation (OAT): CPT-27416

Methods

- Injection cohort
 - Patients who received an injection within 2 years prior to their procedure
 - CPT-20610 and CPT-20611 with diagnosis of knee pain or effusion (**Appendix A**) on the same day
 - Divided based on the number (single vs. multiple) and timing (0-3 months vs. 3-24 months) of injections
- Arthroscopy cohort
 - Patients who underwent arthroscopy (**Appendix B**) within 2 years prior to their cartilage procedure

Methods

- Outcome
 - Diagnosis of knee joint infection or lower-extremity soft tissue infection after cartilage procedure (**Appendix C**)
- Statistics
 - Odds ratios calculated to compare postoperative infection rates between groups
 - Significance set at $p < .05$

Results

Table 1. Results for all groups

Variable	Group	# with infection	# without infection	OR (95% CI)	p value
Injection	Injection	39	1549	1.48 (1.04-2.10)	0.03
	No injection	166	9740		
Arthroscopy	Arthroscopy	81	4560	0.96 (0.73-1.28)	0.80
	No arthroscopy	124	6729		
Number of injections	Multiple	27	751	2.39 (1.20-4.75)	0.01
	Single	12	798		
Timing of injection	0-3 months	11	485	0.86 (0.43-1.75)	0.68
	3-24 months	28	1064		
Injection + arthroscopy	Injection then arthroscopy	20	861	0.84 (0.45-1.59)	0.59
	Injection alone	19	688		

OR = odds ratio, CI = confidence interval

Results

- Patients with a prior injection had higher infection rates than those without ($p=0.03$)
- Prior arthroscopy did not affect infection rates ($p=0.80$)
- Injection followed by arthroscopy prior to the procedure produced no difference in infection rates compared to injection alone ($p=0.59$)
- Multiple injections led to higher infection rates than a single injection ($p=0.01$)
- Timing of injection did not affect infection rates ($p=0.68$)

Limitations

- All large data studies are subject to inconsistent or inaccurate coding by providers
- No specific surgical data, i.e., length of procedure, size and number of grafts used, severity of the defect
 - Among these, only length of procedure has been shown to affect postoperative infection rates
- Unable to determine laterality of the injection and procedure due to lack of modifier codes in our database
 - No guarantee that injection, procedure, and infection all occurred on the same side
- Did not analyze the effects of comorbid conditions, though this population is typically young and healthy

Conclusion

- The results support our hypotheses
 - Preoperative injection increases infection rates following open knee cartilage procedures
 - Prior arthroscopy has no effect on postoperative infection rates following open knee cartilage procedures
- Injections prior to open knee cartilage procedures should be used with caution

Appendices

Appendix A Codes for diagnosis of knee pain or effusion

ICD-9-D-71946	ICD-10-D-M25569
ICD-9-D-71906	ICD-10-D-M25461
ICD-10-D-M25561	ICD-10-D-M25462
ICD-10-D-M25562	ICD-10-D-M25469

Appendix B Codes for knee arthroscopy

CPT-29850	CPT-29877
CPT-29851	CPT-29879
CPT-29855	CPT-29880
CPT-29856	CPT-29881
CPT-29866	CPT-29882
CPT-29867	CPT-29883
CPT-29868	CPT-29884
CPT-29870	CPT-29885
CPT-29871	CPT-29886
CPT-29873	CPT-29887
CPT-29874	CPT-29888
CPT-29875	CPT-29889
CPT-29876	

Appendix C Codes for diagnosis of knee infection

ICD-9-D-71180	ICD-10-D-M00261
ICD-9-D-71186	ICD-10-D-M00262
ICD-9-D-71188	ICD-10-D-M00269
ICD-9-D-71100	ICD-10-D-M00861
ICD-9-D-71106	ICD-10-D-M00862
ICD-9-D-99859	ICD-10-D-M00869
ICD-10-D-M0000	ICD-10-D-M009
ICD-10-D-M0006	ICD-10-D-M01X61
ICD-10-D-M00061	ICD-10-D-M01X62
ICD-10-D-M00062	ICD-10-D-M01X69
ICD-10-D-M00069	ICD-10-D-T847
ICD-10-D-M00161	ICD-10-D-T847XXA
ICD-10-D-M00162	ICD-10-D-T847XXD
ICD-10-D-M00169	ICD-10-D-T847XXS



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