Patient perceptions of antibiotic prophylaxis for dental procedures after total joint arthroplasty

Niall H. Cochrane^a, Cole S. Pachter^b, Jonathan H. Garfinkel^a, Thomas B. Gladnick^c, Elizabeth P. Gladnick^c, David W. Romness^b, Brian P. Gladnick^{d,e,*}

^a Georgetown University School of Medicine, 3900 Reservoir Road NW, Washington, DC, 20007, USA

^b OrthoVirginia, 1635 N. George Mason Drive, Suite 310, Arlington, VA, 22205, USA

^c Gladnick Family and Cosmetic Dentistry, 15215 Shady Grove Road, Suite 103, Rockville, MD, 20850, USA

^d W.B. Carrell Memorial Clinic, Adult Hip and Knee Reconstruction, 9301 N. Central Expressway, Suite 500, Dallas, TX, 75231, USA

^e Texas Health Presbyterian Hospital Dallas, Department of Orthopaedic Surgery, 8200 Walnut Hill Lane, Dallas, TX, 75231, USA

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ABSTRACT

Objective: Investigating patients' perceptions regarding need for antibiotic prophylaxis during dental procedures after undergoing joint arthroplasty.

Methods: Questionnaire was administered to patients presenting at: 1) an orthopaedic office; 2) a dental office; regarding perceptions of antibiotic prophylaxis.

Results: 36 orthopaedic patients responded "Yes" to always taking prophylaxis; 36 patients responded "No" (36/72, 50.0% compliance). Five dental patients responded "Yes" to always taking prophylaxis; 19 patients responded "No" (5/24, 20.8% compliance) ($p = 0.017$). 67/135 orthopaedic patients (49.6%) endorsed some form of dental prophylaxis, versus 34/58 dental patients (58.6%) ($p = 0.27$).

Conclusion: Patient perceptions of the need for dental prophylaxis vary within orthopaedic and dental practices.

1. Introduction

Total joint arthroplasty (TJA) is one of the most successful interventions in modern medicine, and by 2030 it is estimated that as many as four million primary hip and knee arthroplasty procedures will be performed annually.¹ While outcomes are generally excellent, infection is still one of the most feared complications, with annual deep infection rates of 1–2% per year.¹ The cost of management of periprosthetic joint infections (PJI) usually exceeds \$50,000 dollars per patient, placing a great financial burden on both the patient and the health care system.² Given the increasing number of surgeries performed each year, it can be estimated that the annual cost of infection treatment in the United States could reach as high as two to four billion dollars by year 2030.¹

PJI can be secondary to either acute inoculation at the time of surgery, versus later hematogenous seeding from a remote source.¹ Hematogenous seeding that occurs after bacteremia induced by dental procedures has been suggested to be a potential cause of late PJI.^{1,2} While no direct causation between dental procedures and PJI has been definitively demonstrated, there are multiple studies that link oral

procedures to bacteremia, suggestive of a potential risk for PJI.^{1–3} However, prescribing practices vary substantially between providers, with some authors recommending for the use of prophylactic antibiotics, while others recommend against the use of prophylactic antibiotics prior to dental procedures.^{4,5} These differing prescribing practices have the potential for creating confusion amongst patients and providers alike. Knowledge of patients' perceptions regarding the need for antibiotic prophylaxis would be an important prerequisite for properly educating patients on the risks associated with dental procedures. However, we are not familiar with a study that assesses patient perceptions regarding antibiotic prophylaxis prior to dental procedures, nor whether these perceptions may differ in the dental practice setting versus the orthopaedic practice setting.

Thus we designed the present study to answer the following research questions: 1) what is the patient-reported compliance with antibiotic prophylaxis after TJA?; and 2) what are patients' perceptions of the need for antibiotic prophylaxis prior to dental procedures after total joint replacement?

* Corresponding author. W.B. Carrell Memorial Clinic, Adult Hip and Knee Reconstruction, 9301 N. Central Expressway, Suite 500, Dallas, TX, 75231, USA.

E-mail addresses: nhc8@georgetown.edu (N.H. Cochrane), cole.pachter@orthovirginia.com (C.S. Pachter), jhg71@georgetown.edu (J.H. Garfinkel), drtommy@gladnickdentistry.com (T.B. Gladnick), drliz@gladnickdentistry.com (E.P. Gladnick), david.romness@orthovirginia.com (D.W. Romness), bgladnick@carrellclinic.com (B.P. Gladnick).

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2. Materials and methods

2.1. Study design

This was a prospective study of patient perspectives regarding the need for antibiotic prophylaxis prior to dental procedures after undergoing TJA. Approval for the study was obtained by the Internal Review Board at our institution prior to its commencement. A patient questionnaire was concurrently administered to consecutive patients presenting between May 2018 and August 2018 at two separate clinical locations 1) the office of a fellowship-trained arthroplasty specialist at a large referral center; and 2) an outpatient dental office. We included all adult patients aged 18–99 with the ability to complete the survey. No patients were excluded from the study. Application of these inclusion and exclusion criteria returned a total of 263 patients who had completed the survey, 143 at the orthopaedic center and 120 at the dental center.

The primary outcome of the study was the percentage of patients who have taken prophylactic antibiotics prior to undergoing dental procedures. As a secondary outcome, we determined whether patients believed these antibiotics should be taken indefinitely, versus for a shorter arbitrary duration. Of note, it is the general practice of both the orthopaedic and dental offices in this study to always recommend antibiotic prophylaxis prior to undergoing a dental procedure in a TJA patient.

2.2. Patient questionnaire

For all patients at both office locations, we administered a patient questionnaire and focused on the following questions:

1. If you have a total hip or total knee replacement, have you always taken antibiotics prior to undergoing a dental procedure?
2. Which of the following best describes your opinion about taking antibiotics prior to having dental work?

For question 1, patients could respond “Yes”, “No” or “Not Applicable.” For the purposes of our analysis, we assumed that patients who answered “not applicable” have not had a joint replacement. For question 2, patients could respond “Unnecessary”, “Absolutely necessary at every dental visit”, “Necessary for the first 2–4 years post-surgery” and “Other” (meaning some other schedule of antibiotic usage).

2.3. Statistical analysis

All patient questionnaire data was collected and analyzed using Microsoft Excel (Microsoft Corporation, Redmond, Washington) and GraphPad QuickCalcs (GraphPad Software, San Diego, CA, USA). Categorical variables were analyzed using Fisher's Exact test. In all cases, statistical significance was set at $p = 0.05$.

3. Results

In the orthopaedic setting, 36 patients responded “Yes” that they have always taken an antibiotic for dental procedures, while an additional 36 patients responded “No” (36/72, 50.0% compliance with antibiotic prophylaxis). Comparatively, in the dental setting, five patients responded “Yes” that they have always taken an antibiotic for dental procedures, while 19 patients responded “No” (5/24, 20.8% compliance with antibiotic prophylaxis) ($p = 0.017$). In the orthopaedic group, 69 patients declared “Not Applicable,” and two did not respond to the question. In the dental group, 75 patients declared “Not Applicable,” and 21 patients did not respond to the question.

Regarding the perceived necessity of prophylactic antibiotics after TJA, 68 orthopaedic patients responded “Unnecessary,” while 44 patients responded “Absolutely Necessary,” six patients responded

“Necessary for the first 2–4 years post surgery,” and 17 patients responded “Other.” Thus, 67/135 orthopaedic patients (49.6%) endorsed prophylactic antibiotics in some form after TJA. In comparison, 24 dental patients responded “Unnecessary,” while 12 patients responded “Absolutely Necessary,” five patients responded “Necessary for the first 2–4 years post surgery,” and 17 patients responded “Other.” Thus, 34/58 dental patients (58.6%) endorsed prophylactic antibiotics in some form after TJA, however this was not statistically different than the orthopaedic office patients ($p = 0.27$). Ten orthopaedic patients and 62 dental patients did not respond to the question.

4. Discussion

The present study demonstrates that even in the setting of consistent instruction from providers to take prophylactic antibiotics after TJA prior to dental procedures, actual patient compliance appears to be relatively low. Our data suggest that only 50.0% of patients surveyed in the orthopaedic office and 20.8% of patients surveyed in the dental office have always taken an antibiotic prior to dental work being performed. When asked about their perception of the need for antibiotic prophylaxis, almost half of orthopaedic patients agreed that some form of antibiotic prophylaxis should be used; while 58.6% of dental patients similarly agreed.

There are multiple limitations inherent to our study. First, as with any direct patient survey our study is limited by the patients themselves; indeed not all patients responded to each question, which could potentially bias our data analysis. We attempted to mitigate this bias by asking clear, concise questions with limited multiple choice responses. Second, given the data was only obtained from one dental and one orthopaedic office, it could be argued that our patient population is relatively homogenous; assessing multiple different practice locations may have returned a wider range of responses. However, by limiting our survey sites to only these two locations where the prescribing habits of the clinical providers are known, we were able to maximize the likelihood that all patients are receiving the same information from their clinicians, which we feel is a strength of the study. A third limitation is that a significant proportion of patients responded “not applicable,” to Question 1, which was assumed by the authors to mean the patient had not undergone a joint replacement. It is possible that this question may not have fully captured the incidence of patients undergoing joint replacement in our patient population, which could potentially influence the survey results. However, we feel the data nonetheless achieves the purpose of answering the study question as to what are the general perspectives of patients in both orthopaedic and dental offices on the need for antibiotics after joint replacement, and speaks to the need for clear communication between patient and surgeon on this issue.

Recommendations for antibiotic prophylaxis after dental procedures vary, and there is no single accepted protocol. In 2003, an expert panel including the American Academy of Orthopaedic Surgeons (AAOS) and the American Dental Association (ADA) issued a statement that the risk/benefit and cost effectiveness ratios failed to justify the routine administration of antibiotic prophylaxis for dental patients with TJA.⁶ However, a 2010 AAOS clinical practice guideline suggests that given the potential adverse outcomes and cost of treating a PJI, antibiotic prophylaxis should be considered for all total joint patients prior to procedures that may result in bacteremia.⁷ An updated clinical practice guideline released in 2012 by the AAOS and ADA helped address these differences, giving a limited recommendation to not routinely prescribe antibiotics for patients undergoing dental procedures.⁸ The authors recommended a shared decision-making tool in prescribing antibiotics prior to these procedures, using clinician experience, scientific evidence, and patient values in the decision-making process. In 2014, the ADA council on scientific affairs published its Clinical Practice Guideline, judging with moderate certainty that there is no association between dental procedures and the occurrence of PJI.⁵ Since that time, the

AAOS has published the Appropriate Use Criteria in 2016, which provides 64 clinical patient scenarios derived from indications of patients with orthopaedic implants presenting for dental procedures, and commenting on the appropriateness of antibiotic prophylaxis in the given situation. These scenarios are to be used as an education tool to guide qualified physician through decisions on antibiotic prophylaxis.³ The present investigation is a useful adjunct to the aforementioned studies, in that we are reporting the patients' perspectives, rather than clinicians' perspectives, on the need for dental antibiotic prophylaxis after TJA. Interestingly, while the providers in both clinical settings in the present study uniformly recommend continued use of dental prophylaxis for TJA patients, only approximately half of orthopaedic office patients and one-fifth of dental office patients affirmed that they had used such prophylaxis. Furthermore, only 49.6% of orthopaedic patients and 58.6% of dental patients endorse the use of antibiotic prophylaxis in some form. These data suggest either that patients are getting conflicting information from multiple sources, or that clinicians may not be as effective in communicating their instructions to TJA patients. We believe the present study will help providers to better understand their patients' perceptions regarding dental prophylaxis and instruct them accordingly.

In conclusion, we find that patient perceptions of the need for antibiotic prophylaxis prior to dental procedures after TJA continues to vary within both orthopaedic and dental practices. We recommend a full discussion of the risks and benefits of such prophylaxis with all TJA

patients, in order to adequately educate patients and set appropriate expectations.

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