Is Penicillin Allergy a Risk Factor for Surgical Site Infection After Oral and Maxillofacial Surgery?

Daniel M. Roistacher, DMD, Joshua A. Heller, BA,† Nalton F. Ferraro, DMD, MD,‡ and Meredith August, DMD, MD§,#*

Purpose: The selection of perioperative antibiotics for prevention of surgical site infection (SSI) is often limited by the presence of a reported penicillin allergy. The purpose of this study was to determine if oral and maxillofacial surgery patients who report allergy to penicillin are at an increased risk of developing SSI.

Methods: A retrospective cohort study was performed of patients who underwent oral and maxillofacial surgical procedures in the operating room setting at a single institution between 2011 and 2018. The following categories of procedures were investigated: dentoalveolar, orthognathic, orthognathic with third molar extraction, pathology and reconstruction, and temporomandibular joint. The primary predictor and outcome variables were reported penicillin allergy and surgical site infection, respectively. Bivariate and multiple logistic regression analysis were performed. $P < .05$ was considered to be significant.

Results: The cohort was composed of 2,058 patients of which 318 (15.5%) reported allergy to penicillin. Beta-lactam antibiotics were administered less frequently to penicillin allergic patients perioperatively compared with those without penicillin allergy (7.9 vs 97.1%, $P < .001$), while clindamycin was more commonly administered (76.4 vs 2.5%, $P < .001$). Clindamycin was associated with a higher SSI rate compared with beta-lactam antibiotics (5.6 vs 1.4%, $P < .001$). Penicillin allergy was significantly associated with SSI at an adjusted odds ratio of 2.61 (95% CI 1.51 to 4.49, $P = .001$). After holding perioperative antibiotic usage equal between the 2 groups, penicillin allergy per se was no longer associated with SSI ($P = .901$), suggesting that the outcome was mediated by antibiotic selection.

Conclusions: Penicillin allergy was associated with development of SSI due to receipt of non–beta-lactam antibiotics as perioperative prophylaxis. Formal allergy evaluation should be considered for patients with putative penicillin allergy.

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*Resident, Oral and Maxillofacial Surgery, Mount Sinai Health System, New York, NY.

†DMD Student, Harvard School of Dental Medicine, Boston, MA.

‡Instructor, Oral and Maxillofacial Surgery, Harvard School of Dental Medicine, Boston, MA.

§Attending Surgeon, Department of Oral and Maxillofacial Surgery, Massachusetts General Hospital, Boston, MA.

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#Present Address: Private Practice, Brockton, MA

Address correspondence and reprint requests to Dr Daniel M. Roistacher: Division of Oral and Maxillofacial Surgery, Mount Sinai Health System, 10 Union Square East, Suite 5B, New York, NY 10003; e-mail: danielroistacher@gmail.com

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Penicillin allergy is among the most common self-reported allergies. Approximately 10% of patients report penicillin hypersensitivity; however, 90% of these cases are found not to be true allergies.[1-3] Potential cross-reactivity with cephalosporins has been a concern due to the presence of similar sidechains to penicillin in some early generation agents, but the risk is estimated to be minimal.[4,5]

A patient's penicillin allergy status is an important consideration when choosing perioperative antibiotics. Diagnosis of a penicillin allergy often precludes use of penicillins and other beta-lactams, including cephalosporins, and instead results in the use of broad-spectrum antibiotics that are more associated with toxicities and the development of antimicrobial resistance.[6] The proper choice of antibiotics is also a contributing factor in the prevention of surgical site infection (SSI). Report of a penicillin allergy has been found to be associated with a significantly increased odds of SSI in patients undergoing orthopedic, gynecologic, colorectal, and cardiac surgery; this has been found to be brought about by the use of alternative perioperative antibiotics.[7]

Surgical site infection is a risk for patients undergoing oral and maxillofacial surgical procedures. The reported risk of SSI following orthognathic surgery ranges from 0.5 to 18% and has been linked to selection and duration of antibiotic prophylaxis.[8-12] For total replacement of the temporomandibular joint, the SSI rate is reported to be 1.5%.[13] Data for SSI following third molar removal is also reported with wide variability.[14,15]

The purpose of this study was to answer the following clinical question: among patients undergoing oral and maxillofacial surgical procedures, do those who report penicillin allergy when compared with those who do not report being penicillin allergic, have an increased risk of developing SSI? The authors hypothesized that patients with a reported penicillin allergy would have an increased odds of SSI after oral and maxillofacial surgical procedures when compared with similar patients without a penicillin allergy designation. The authors also hypothesized that there would be a predilection for SSI on the basis of the class of prophylactic antibiotic administered with an increased incidence associated with the use of non −beta-lactam antibiotics. The specific aims of this study were to: 1) estimate and compare the rate of SSI in patients with and without a reported penicillin allergy; and 2) assess the association between choice of antibiotic prophylaxis and development of SSI.

Methods

STUDY DESIGN

This was a retrospective cohort study of patients who underwent oral and maxillofacial surgical procedures in the operating room setting between 2011 and 2018 at Massachusetts General Hospital (Boston, MA). Institutional review board approval was sought through Partners Human Research and an exemption was granted in writing (Protocol: 2019P000357). Patients who underwent dentoalveolar, orthognathic, pathology and reconstruction, and temporomandibular joint procedures were identified through the Massachusetts General Hospital patient data registry. Inclusion criteria were complete medical record data identifying allergy history; complete medical history; operative records that included antibiotic management; and sufficient clinical follow-up documenting development or absence of SSI. Exclusion criteria were incomplete medical records; inadequate clinical follow-up; absence of receipt of perioperative antibiotics; and the presence of a preexisting infection at time of surgery. Only the first operation for patients who underwent subsequent procedures during the study period was included.

VARIABLES

A data intake form was used to record candidate variables which included demographic factors, medical history (including history of drug allergy), operative records (type of surgery, wound classification, duration of procedure) and antibiotic management (selection and duration). The primary predictor variable was reported penicillin allergy, defined as documentation of an allergic reaction to any antibiotic within the penicillin's group at the time of surgery. Both patient self-report and clinically verified allergy were considered to have met this criterion. The outcome variable was the development of SSI. The Centers for Disease Control and Prevention defines an SSI as either superficial or deep.[16,17] A superficial SSI is one that occurs no deeper than the subcutaneous tissue, occurs within 30 days after the procedure, and meets 1 of the following criteria: purulent drainage, an organism is identified aseptically, dehiscence or purposeful opening by the surgeon of the superficial incision due to infection, or a diagnosis of SSI is made by the surgeon. A deep SSI is one that occurs deeper than the subcutaneous tissue, occurs within 30 and up to 90 days postoperatively and meets 1 of the following criteria: purulent drainage, dehiscence or purposeful opening by surgeon of deep incision with aseptic identification of organisms, or development of an abscess. We adapted and simplified these criteria to include submucosal tissue in addition to subcutaneous tissue and to monitor for a uniform period of 30 days postoperatively. Development of either a superficial or deep SSI per these criteria was considered to have met our definition for SSI.

DATA ANALYSIS

Descriptive statistics were calculated for each variable. Categorical values were analyzed by χ^2 or Fisher

exact test as appropriate. Mann–Whitney *U* test was used to compare continuous variables. A multiple logistic regression model was used to obtain adjusted odds ratios. Independent variables associated with the outcome at a *P* value of <.15 in a bivariate analysis were included in the regression model. Variables were excluded if they were collinear with other variables included in the model. $P < .05$ was considered to be statistically significant for all analyses. Data analysis was performed using SPSS Version 25 (IBM Corp., Armonk, NY).

Results

A total of 2,058 patients were included in this study of which 318 (15.5%) reported an allergy to penicillin (Table 1). The penicillin allergy group was older (median age 38 vs 30, $P < .001$) and had a higher proportion of females (66.7 vs 55.5%, $P < .001$). Patients who reported a penicillin allergy were also more likely to report an allergy to cephalosporins (6.6 vs 2.6%, $P < .001$), have history of malignancy (10.7 vs 7.4%, $P = .042$) or a status of immune compromise or dysfunction (8.5 vs 3.9%, $P < .001$). The stated type of reaction to penicillin was categorized as: 1) hypersensitivity ($n = 248$); 2) side effect or intolerance ($n = 31$); or 3) unknown ($n = 39$).

The following surgical procedures were represented: dentoalveolar (219 patients), orthognathic (478 patients), combined orthognathic and third molar extraction (69 patients), pathology and reconstruction (836 patients), and temporomandibular joint (456 patients). The penicillin allergy group had a higher proportion of wound classification of clean (30.5 vs 22.9%, $P = .003$) and less of clean-contaminated (68.9 vs 76.7%, $P = .003$). Duration of surgery was shorter for the penicillin allergy group (median of 98 vs 113 minutes, $P < .001$). Additionally, chlorhexidine was used less commonly in the penicillin allergy group (65.4 vs 74.5%, $P = .001$). The prophylactic perioperative use of beta-lactam antibiotics was less common in penicillin allergic patients (7.9 vs 97.1%, $P < .001$) and clindamycin was more commonly used (76.4 vs 2.5%, $P < .001$). Other alternatives to beta-lactam antibiotics were also more common in the penicillin allergic patients (15.7 vs 0.4%, $P < .001$). The duration of postoperative antibiotics was not statistically different between the 2 groups ($P = .079$).

Table 2 shows the bivariate correlations between study variables and the development of SSI. Cephalosporin allergy ($P = .020$), wound classification ($P = .097$), chlorhexidine use ($P = .012$), and duration of procedure ($P = .026$) were associated with SSI at a *P* value of less than .15. The selection of perioperative antibiotic was also associated with the development of SSI. SSI was more likely to develop after administration of clindamycin than after receipt of beta-lactam antibiotics (5.6 vs 1.4%, $P < .001$). Ampicillin-sulbactam was associated with 13 SSIs (rate of 1.3% of recipients), penicillin G was associated with 8 (2.4%) and the combination of penicillin G and nafcillin was associated with 3 (4.0%). Cefazolin, a first-generation cephalosporin, was associated with zero infections in this cohort. No SSIs were noted for patients receiving prophylaxis with other alternative antibiotics.

Table 3 shows the bivariate relation between the primary predictor variable (reported penicillin allergy) and the development of SSI. Patients who reported a penicillin allergy were more likely to develop an SSI (4.1 vs 1.6%, $P = .004$) with a relative risk of 2.63 (95% CI 1.37 to 5.05).

A multiple logistic regression analysis was used, and variables found to be associated with development of SSI at $P < .15$ were included. Chlorhexidine use was excluded from this model due to collinearity with wound classification. Table 4 shows the results of the multiple logistic regression model. After adjusting for cephalosporin allergy, wound classification, and duration of procedure, penicillin allergy was found to be associated with SSI development with an adjusted odds ratio of 2.61 (95% CI 1.51 to 4.49, $P = .001$). Cephalosporin allergy ($P < .001$), wound classification ($P = .010$), and duration of procedure ($P = .001$) were also significantly associated with development of SSI. When adjusting for perioperative antibiotic selection, penicillin allergy per se was no longer associated with development of SSI ($P = .901$), suggesting that it was the alternative antibiotic choice that was associated with the increase in SSI.

Discussion

The purpose of this study was to determine if oral and maxillofacial surgery patients who report allergy to penicillin are at an increased risk of developing surgical site infection. The authors hypothesized that report of a penicillin allergy would present an increased odds of SSI development due to selection of non–beta lactam antibiotics as perioperative prophylaxis. The specific aims were to evaluate the risk of SSI for patients who report penicillin allergy and to determine the association between selection of antibiotic prophylaxis and development of SSI.

The results of this study confirm the hypothesis that penicillin allergy is associated with an increased odds of SSI development and that this is mediated by the use of non–beta lactam antibiotics. Compared with patients who did not report a penicillin allergy, penicillin allergic patients presented a significantly increased odds of SSI development (adjusted odds ratio 2.61, 95% CI 1.51 to 4.49, $P = .001$). After

Table 1. COHORT DESCRIPTION

Variables	All (n = 2,058)	Reported Penicillin Allergy (n = 318)	Non-Penicillin Allergic (n = 1,740)	P value
Age, median (IQR)	30 (20 to 50)	38 (21 to 55)	30 (20 to 49)	<.001
Female gender	1178 (57.2)	212 (66.7)	966 (55.5)	<.001
BMI, median (IQR)	24.4 (21.3 to 28.5)	24.8 (21.8 to 29.2)	24.3 (21.3 to 28.3)	.111
Cephalosporin Allergy	66 (3.2)	21 (6.6)	45 (2.6)	<.001
Tobacco Use (Current)*	154 (7.5)	23 (7.2)	131 (7.5)	.854
Heavy Alcohol Use†	33 (1.6)	4 (1.3)	29 (1.7)	.594
Medical Comorbidities				
Cardiovascular Disease	410 (19.9)	73 (23)	337 (19.4)	.141
Chronic Renal Impairment	28 (1.4)	3 (0.9)	25 (1.4)	.485
Liver Disease	23 (1.1)	1 (0.3)	22 (1.3)	.239
Diabetes	71 (3.4)	12 (3.8)	59 (3.4)	.731
HIV	4 (0.2)	1 (0.3)	3 (0.2)	.489
History of Malignancy	162 (7.9)	34 (10.7)	128 (7.4)	.042
Other Immune System Compromise or Dysfunction	95 (4.6)	27 (8.5)	68 (3.9)	<.001
Type of Surgery				.054
Dentoalveolar	219 (10.6)	34 (10.7)	185 (10.6)	
Orthognathic	478 (23.2)	62 (19.5)	416 (23.9)	
Orthognathic + Third Molar Removal	69 (3.4)	11 (3.5)	58 (3.3)	
Pathology and Reconstruction	836 (40.6)	121 (38.1)	715 (41.1)	
Temporomandibular Joint	456 (22.2)	90 (28.3)	366 (21.1)	
Wound Classification				.011
Clean	495 (24.1)	97 (30.5)	398 (22.9)	
Clean-Contaminated	1,554 (75.5)	219 (68.9)	1,335 (76.7)	
Contaminated	9 (0.4)	2 (0.6)	7 (0.4)	
Duration of Procedure, median minutes (IQR)	109 (56 to 236)	98 (52 to 217)	113 (56 to 240)	<.001
Chlorhexidine	1,504 (73.1)	208 (65.4)	1,296 (74.5)	.001
Perioperative Antibiotic				
Beta-Lactam‡	1,714 (83.3)	25 (7.9)	1,689 (97.1)	<.001
Clindamycin	287 (13.9)	243 (76.4)	44 (2.5)	<.001
Other Antibiotics§	57 (2.8)	50 (15.7)	7 (0.4)	<.001
Duration of Post-op Antibiotics, median days (IQR)	5 (0 to 7)	2 (0 to 7)	6 (0 to 7)	.079

Number (%) unless otherwise stated.

*Use of tobacco within the 6 months preceding surgery.

† Defined as 15 or more drinks per week for men and 8 or more drinks per week for women.

‡ The following beta-lactam antibiotics were represented: ampicillin-sulbactam (n = 1006), penicillin G (n = 328), penicillin G and nafcillin (n = 75), and cefazolin (n = 305).

§ The following antibiotics were represented in the "other" category: levofloxacin and metronidazole (n = 49), levofloxacin (n = 2), ciprofloxacin (n = 1), azithromycin (n = 1), vancomycin (n = 4).

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holding antibiotic selection equal between the 2 groups, reported penicillin allergy was not associated with increased odds of SSI (P = .901), verifying that the direct effect was due to differences in antibiotic selection rather than penicillin allergy status alone. Patients who reported a penicillin allergy were less likely to receive prophylaxis with first-line beta-lactam antibiotics (P < .001) and more likely to be

Table 2. BIVARIATE CORRELATION OF VARIABLES WITH DEVELOPMENT OF SSI

Variables	All (n = 2058)	SSI (n = 40)	No SSI (n = 2018)	P Value
Age, median (IQR)	30 (20 to 50)	25 (18 to 46)	31 (20 to 50)	.151
Female gender	1178 (57.2)	26 (65.0)	1152 (57.1)	.316
BMI, median (IQR)	24.4 (21.3 to 28.5)	24.2 (20.6 to 29.8)	24.4 (21.3 to 28.5)	.829
Cephalosporin Allergy	66 (3.2)	5 (12.5)	61 (3.0)	.020
Tobacco Use (Current)*	154 (7.5)	5 (12.5)	149 (7.4)	.236
Heavy Alcohol Use†	33 (1.6)	0 (0.0)	33 (1.6)	1.000
Medical Comorbidities				
Cardiovascular Disease	410 (19.9)	4 (10.0)	406 (20.1)	.159
Chronic Renal Impairment	28 (1.4)	0 (0.0)	28 (1.4)	1.000
Liver Disease	23 (1.1)	1 (2.5)	22 (1.1)	.365
Diabetes	71 (3.4)	2 (5.0)	69 (3.4)	.647
HIV	4 (0.2)	0 (0.0)	4 (0.2)	1.000
History of Malignancy	162 (7.9)	3 (7.5)	159 (7.9)	1.000
Other Immune System Compromise or Dysfunction	95 (4.6)	2 (5.0)	93 (4.6)	.841
Type of Surgery				.310
Dentoalveolar	219 (10.6)	5 (12.5)	214 (10.6)	
Orthognathic	478 (23.2)	8 (20.0)	470 (23.3)	
Orthognathic + Third Molar Removal	69 (3.4)	2 (5.0)	67 (3.3)	
Pathology and Reconstruction	836 (40.6)	21 (52.5)	815 (40.4)	
Temporomandibular Joint	456 (22.2)	4 (10.0)	452 (22.4)	
Wound Classification				.097
Clean	495 (24.1)	4 (10.0)	491 (24.3)	
Clean-Contaminated	1554 (75.5)	36 (90.0)	1518 (75.2)	
Contaminated	9 (0.4)	0 (0.0)	9 (0.4)	
Duration of Procedure, median minutes (IQR)	109 (56 to 236)	152.5 (68 to 325.5)	109 (55 to 235)	.026
Chlorhexidine	1504 (73.1)	36 (90.0)	1468 (72.7)	.012
Duration of Post-op Antibiotics, median days (IQR)	5 (0 to 7)	5.5 (1 to 7)	5 (0 to 7)	.699

Number (%) unless otherwise stated.

* Use of tobacco within the 6 months preceding surgery

† Defined as 15 or more drinks per week for men and 8 or more drinks per week for women

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administered clindamycin (P < .001). In this study, clindamycin was associated with a 4-fold increase in SSI rate compared with beta-lactam antibiotics (P < .001).

Other factors found to be associated with SSI development included: cephalosporin allergy, wound classification, and duration of procedure. In this cohort, a cephalosporin allergy was significantly associated with increased odds of SSI development (P < .001). Like patients who report penicillin allergy, a label of a cephalosporin allergy would similarly result in reduced usage of beta-lactam antibiotics. A wound classification of clean-contaminated or contaminated had increased odds of SSI development compared with that of a clean classification (P = .010). This association has been well established in the medical literature, highlighted by a large survey of the National Nosocomial Infection Surveillance System of SSI rates as follows: clean (2.1%), clean-contaminated (3.3%), contaminated (6.4%), dirty-infected (7.1%).[18,19] Additionally, a longer duration of surgery had a modest but statistically significant association with SSI development (odds ratio 1.003; 95% CI 1.001 to 1.004; P = .001). For every 1-minute increase in procedure duration, odds of SSI development increased by 0.3%.

Clindamycin, traditionally the drug of choice for penicillin allergic patients, has long been associated with increased SSI risk and development of antibiotic resistance. For patients receiving osteomyocutaneous free flap reconstruction of the head and neck, Murphy et al found that clindamycin use presented a 7 times increased odds of SSI development compared with those receiving ampicillin-sulbactam.[17] Langerman et al reported that prolonged use of clindamycin beyond the day of surgery has been associated with increased odds of SSI development after head and neck cancer surgery.[20] Other studies have also reported increased SSI risk in head and neck surgery patients receiving clindamycin.[21,22] Resistance to

Table 3. EFFECT OF REPORTED PENICILLIN ALLERGY ON DEVELOPMENT OF SURGICAL SITE INFECTION (UNADJUSTED)

	SSI	No SSI	Total
Reported Penicillin Allergy	13 (4.1)	305 (95.9)	318 (100.0)
Non-Penicillin Allergic	27 (1.6)	1,713 (98.4)	1,740 (100.0)

Number (%) shown. Relative Risk of 2.63 (95% CI 1.37-5.05, $P = .004$).

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Table 4. MULTIPLE LOGISTIC REGRESSION OF VARIABLES ASSOCIATED WITH DEVELOPMENT OF SSI

Adjustment	Odds Ratio (95% CI)	*P* Value
Penicillin Allergy	2.605 (1.512 to 4.491)	.001
Cephalosporin Allergy	7.566 (3.888 to 14.725)	<.001
Wound Classification (Clean-Contaminated and Contaminated)	2.616 (1.261 to 5.428)	.010
Duration of Procedure	1.003 (1.001 to 1.004)	.001

Reference groups for each variable are Penicillin Allergy (Reference: no reported allergy); Cephalosporin Allergy (Reference: no reported allergy); Wound Classification of Clean-Contaminated and Contaminated (Reference: Clean); Duration of Procedure (Change in odds for each 1-minute increase in procedure duration).

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clindamycin has been increasing in prevalence, being reported in 2016 to be a finding in 32% of *Streptococcus viridans* and 23% of *Staphylococcus spp.* isolates obtained from orofacial infections.[23,24] Additionally, mechanisms of inducible clindamycin resistance have been elucidated in staphylococci and group A, B, and G β-hemolytic streptococci, which may result in treatment failure with extended courses of clindamycin or macrolides despite initial report of susceptibility.[25,26] Although antibiotic resistance was not an outcome variable in this study, future studies should determine if it is a factor in the development of SSI.

Other studies have shown that penicillin allergy and receipt of alternative antibiotic prophylaxis are associated with increased risk of SSI in a wide range of surgical disciplines. Blumenthal et al investigated a large cohort undergoing orthopedic, gynecologic, colorectal, and cardiac surgery and reported a 50% increased odds of SSI development in penicillin allergic patients.[7] The results of that study also confirmed their hypothesis that the increased SSI risk was entirely mediated by use of non−beta lactam antibiotics. Lam et al followed up on this study and presented a similar finding among a wider range of surgical subspecialties.[27] Our work applied this concept to a broad scope of oral and maxillofacial surgery procedures and found that there was an increased SSI risk in penicillin allergic patients.

Penicillin allergy has previously been reported to be associated with adverse outcomes after oral and maxillofacial surgical procedures. French et al found that reported penicillin allergy was associated with a 6 times increased infection rate and 3 times increased odds of failure after dental implant placement.[28] Block et al presented similar results showing that penicillin allergy is associated with dental implant failure, but was unable in this study design to determine if the association was due to receipt of alternative antibiotics.[29] Receipt of non−penicillin antibiotics has also been associated with increased hospital length of stay and need for reoperation after severe odontogenic infection.[30]

Penicillin allergy de-labeling can be an important antibiotic stewardship measure. With 15.5% of patients in this cohort having reported a penicillin allergy, the selection of perioperative antibiotics is limited for a sizeable proportion of patients. Therefore, formal allergy evaluation may be warranted. Point of care clinical decision tools with high negative predictive values have been introduced.[31] However, the standard test for ruling out penicillin allergy remains a gradated oral challenge with amoxicillin, often preceded by intradermal skin testing with major, and minor determinants of penicillin.[32-34] Penicillin skin testing can serve as a useful test to exclude hypersensitivity, with a negative predictive value near 100%; however, it is less useful alone in assessing positive results due to a wide range of reported positive predictive value (40 to 100%).[35] Blood testing for penicillin specific IgE has low sensitivity and should not be used as sole means to rule out penicillin allergy; however, protocols are being developed for its utilization in conjunction with skin testing. Either a dose challenge or the combination of both blood and skin tests, have been proposed to provide the best means of determining clinically relevant penicillin allergy.[36] Skin testing or graded oral challenge should only be performed by a qualified allergy and immunology practitioner.

Preoperative penicillin allergy consultation and testing has shown promising results. In a large study of cardiac surgical patients, preoperative testing showed that up to 97% of patients who reported

penicillin hypersensitivity did not have a true allergy.[37] The same study showed that patients who underwent formal allergy testing were more likely to receive beta-lactam antibiotic prophylaxis. Preoperative testing of hip and knee replacement patients has also been shown to be a cost-effective measure in preventing postsurgical prosthetic joint infection in penicillin allergic patients.[38] Incorporating preoperative penicillin allergy testing into elective oral and maxillofacial surgery as a risk reduction method should be considered.

One area in which the results of this study differed from the established literature is the association of duration of postoperative antibiotics and development of SSI. A Cochrane review analyzed the development of SSI after orthognathic surgery comparing preoperative, short-term (up to 1 day postoperatively), and long-term antibiotics (greater than 1 day postoperatively).[39] The finding was that long-term antibiotic use for SSI prophylaxis is likely to be beneficial compared with short-term or preoperative use only. This contradicts the results of the present study which found no association between duration of postoperative antibiotics and development of SSI. However, the categories of procedures evaluated in our study was not limited to orthognathic surgery, and future investigation of this potential association is warranted.

Due to the retrospective nature of this study, data collection was limited to what was recorded in the medical record and was dependent on its accuracy. Additionally, patients were treated by different surgeons, and any variation in surgical technique was not considered. One important limitation to consider is that procedures were classified within general categories (eg, temporomandibular joint) and not as specific procedures. As a result, it may be difficult to generalize the results of this study to any given procedure. However, incorporation of procedure duration and wound classification as study variables helped mitigate this limitation. In the present study we were unable to anticipate effect size a priori as true population means were unknown. As a result, we were unable to calculate the probability of a type II error before commencing the study. On the basis of the prevalence of penicillin allergy reported in this study and effect size observed for the primary outcome, future prospective study should incorporate a sample size in excess of 2,485 subjects (Alpha = 0.05; Power = 0.8) in order to reduce the potential for statistical error; however, this value might not be sufficient when assessing other less prevalent study variables alone.[40]

To conclude, this study showed that reported penicillin allergy is a risk factor for SSI development among patients undergoing oral and maxillofacial surgery procedures. This effect was found to be directly due to the receipt of non−beta lactam antibiotics in the perioperative period. Referral for definitive allergy testing should be considered in preoperative patients with putative penicillin allergy as a risk reduction strategy. Future investigations should focus on the association between reported penicillin allergy and the development of surgical site infection in individual procedures of interest in a prospective fashion. A randomized controlled trial would be an ideal method to determine an appropriate alternative to clindamycin for SSI prophylaxis among patients with true penicillin allergy.

Press Release

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