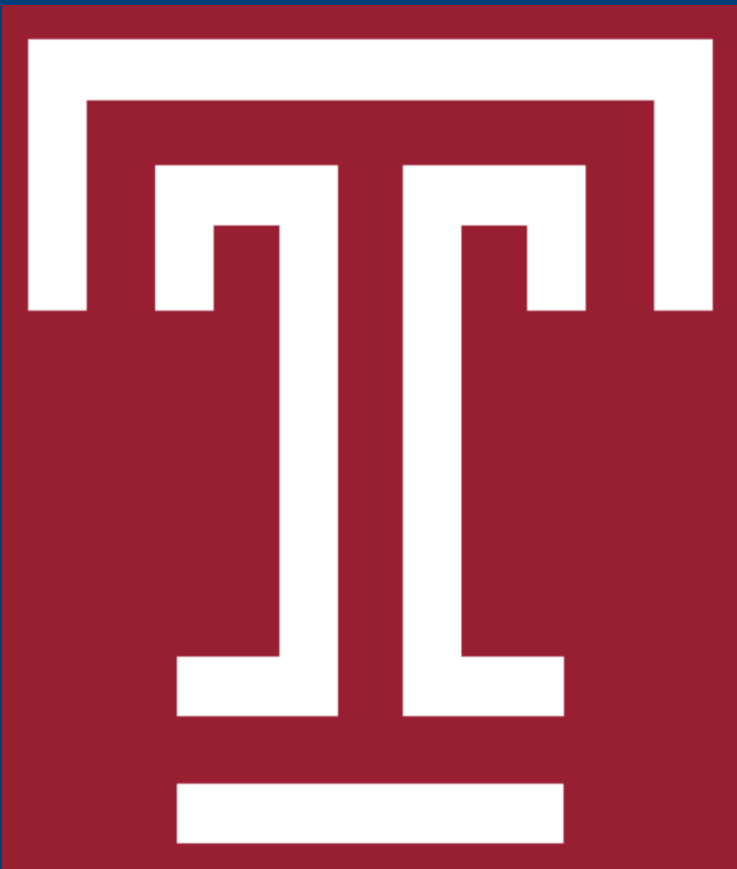




Plastic Surgeons’ Use and Safety of Cefazolin As Preoperative Prophylaxis in Patients With Antibiotic Allergies

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Introduction

Despite cefazolin's proven safety, many plastic surgeons avoid using cefazolin as preoperative prophylaxis in penicillin- and non-cefazolin cephalosporin-allergic patients. We sought to elucidate allergic reaction and surgical site infection (SSI) rates when using cefazolin versus second-line antibiotics in this population, and to understand surgeons' rationale for antibiotic choice.

Methods

Retrospective chart review was conducted on patients with penicillin and/or cephalosporin allergies who had plastic surgery at an academic hospital from 2022-2025. Allergic reaction and SSI rates were compared between patients who received preoperative cefazolin versus other antibiotics, using Chi-square and Fisher's exact tests. U.S. attending plastic surgeons with publicly available emails were surveyed on their preoperative antibiotic preferences for this population, and their rationale.

Results

Demographics (n = 406)						
Age (mean ± SD in years)	57.70 ± 16.17					
Female sex (%)	340 (83.74%)					
BMI (mean ± SD)	30.13 ± 7.41					
ASA score (mean ± SD)	2.35 ± 0.61					
Diabetes (%)	78 (19.21%)					
Active smoker (%)	38 (9.36%)					
Allergy	Antibiotic Given		Postoperative Allergic Reactions		Postoperative SSIs	
Penicillin (n = 384)	clindamycin (216)	56.25%	5 (2.3%) - none anaphylactic	p = 0.61	17 (7.9%)	p = 0.13
	cefazolin (132)	34.38%	2 (1.5%) - none anaphylactic		17 (12.9%)	
	vancomycin (28)	7.29%	0	3 (10.7%)		
	levofloxacin (5)	1.30%	0	1		
	ciprofloxacin (1)	0.26%	0	1		
	cefepime (1)	0.26%	0	0		
	doxycycline (1)	0.26%	0	1		
Cephalosporin (n = 10)	cefazolin (6)		0		0	
	clindamycin (4)		0		1	
Penicillin and Cephalosporin (n = 10)	clindamycin (8)		1 - not anaphylactic		0	
	cefazolin (1)		0		1	
	vancomycin (1)		0		0	
Cefazolin (n = 2)	clindamycin (1)		0		0	
	vancomycin (1)		0		0	

Anaphylactic Allergies	Antibiotic Given		Postoperative Allergic Reactions		Postoperative SSIs	
Pencillin (65)	clindamycin (48)	73.85%	2 - none anaphylactic	p = 0.53	4	p = 0.21
	cefazolin (9)	13.85%	0		2	
	vancomycin (5)	7.69%	0	0		
	levofloxacin (3)	4.61%	0	1		
Cephalosporin (1)	cefazolin (1)		0		0	

Of penicillin-allergic patients (n = 384), 56.25% received clindamycin, 34.38% cefazolin, and 9.37% other antibiotics. Between clindamycin and cefazolin in these patients, there was no statistically significant difference in allergic reaction (p=0.61) or SSI rates (p=0.13), even in those with anaphylactic allergies (p=0.53, p=0.21). Of 48 surveyed surgeons, 7 (15% response rate) all use cefazolin in penicillin-allergic patients, though 4 would not if anaphylactic. For cephalosporin-allergic patients, 6 of 7 use clindamycin, for cross-reactivity concerns.

Conclusion

Cefazolin is as safe as clindamycin for preoperative prophylaxis in penicillin-allergic plastic surgery patients. But most surgeons still use clindamycin, due to refuted cross-reactivity concerns.

References

1. Owens CD, Stoessel K. Surgical site infections: epidemiology, microbiology and prevention. J Hosp Infect. 2008 Nov;70 Suppl 2:3-10. doi: 10.1016/S0195-6701(08)60017-1. PMID: 19022115.
2. Bratzler DW, Dellinger EP, Olsen KM, Peri TM, Auwaerter PG, Bolon MK, Fish DN, Napolitano LM, Sawyer RG, Slain D, Steinberg JP, Weinstein RA; American Society of Health-System Pharmacists (ASHP); Infectious Diseases Society of America (IDSA); Surgical Infection Society (SIS); Society for Healthcare Epidemiology of America (SHEA). Clinical practice guidelines for antimicrobial prophylaxis in surgery. Surg Infect (Larchmt). 2013 Feb;14(1):73-156. doi: 10.1089/sur.2013.9999. Epub 2013 Mar 5. PMID: 23461895.
3. Khan DA, Banerji A, Bernstein JA, Bilgicer B, Blumenthal K, Castells M, Ein D, Lang DM, Phillips E. Cephalosporin Allergy: Current Understanding and Future Challenges. J Allergy Clin Immunol Pract. 2019 Sep-Oct;7(7):2105-2114. doi: 10.1016/j.jaip.2019.06.001. PMID: 31495420; PMCID: PMC6955146.
4. Romano A, Gaeta F, Valluzzi RL, Maggioletti M, Zaffiro A, Caruso C, Quarantino D. IgE-mediated hypersensitivity to cephalosporins: Cross-reactivity and tolerability of alternative cephalosporins. J Allergy Clin Immunol. 2015 Sep;136(3):685-691.e3. doi: 10.1016/j.jaci.2015.03.012. Epub 2015 Apr 28. PMID: 25930196.
5. LEVINE BB, OVARLY Z. Studies on the mechanism of the formation of the penicillin antigen. III. The N-(D-alpha-benzylpenicilloyl) group as an antigenic determinant responsible for hypersensitivity to penicillin G. J Exp Med. 1961 Dec 1;114(6):875-904. doi: 10.1084/jem.114.6.875. PMID: 14464604; PMCID: PMC2180410.
6. Anstey KM, Anstey JE, Doernberg SB, Chen LL, Otani IM. Perioperative use and safety of cephalosporin antibiotics in patients with documented penicillin allergy. J Allergy Clin Immunol Pract. 2021 Aug;9(8):3203-3207.e1. doi: 10.1016/j.jaip.2021.03.017. Epub 2021 Mar 23. PMID: 33766583.
7. Cooper JJ, Atturi VL, Jain R, Pottinger PS, Coleman DT. Safety of cefazolin for perioperative prophylaxis in patients with penicillin allergy labels. Ann Allergy Asthma Immunol. 2022 Jul;129(1):115-117. doi: 10.1016/j.anai.2022.03.015. Epub 2022 Mar 24. PMID: 35342019; PMCID: PMC9233131.
8. Grant JM, Song WHC, Shajari S, Mak R, Meikle AT, Partovi N, Masri BA, Lau TTY. Safety of administering cefazolin versus other antibiotics in penicillin-allergic patients for surgical prophylaxis at a major Canadian teaching hospital. Surgery. 2021 Sep;170(3):783-789. doi: 10.1016/j.surg.2021.03.022. Epub 2021 Apr 21. PMID: 33894984.
9. Shenoy ES, Macy E, Rowe T, Blumenthal KG. Evaluation and Management of Penicillin Allergy: A Review. JAMA. 2019 Jan 15;321(2):188-199. doi: 10.1001/jama.2018.19283. PMID: 30644987.
10. Bertram CM, Postelnick M, Mancini CM, Fu X, Zhang Y, Schulz LT, Bhowmick T, Lee F, Blumenthal KG. Association of β-Lactam Allergy Documentation and Prophylactic Antibiotic Use in Surgery: A National Cross-Sectional Study of Hospitalized Patients. Clin Infect Dis. 2021 Jun 1;72(11):e872-e875. doi: 10.1093/cid/ciaa1762. PMID: 33242095.
11. Pettett BJ, Eskildsen SM, Huang XX, Ostroff RF. Despite the Safety of Preoperative Cefazolin for Patients With Non-anaphylactic Penicillin Allergy, 20% of Practitioners Avoid Its Use. Orthopedics. 2019 Sep 1;42(5):e437-e442. doi: 10.3928/01477447-20190604-03. Epub 2019 Jun 13. PMID: 31185125.
12. Vorobeichik L, Weber EA, Tarshis J. Misconceptions Surrounding Penicillin Allergy: Implications for Anesthesiologists. Anesth Analg. 2018 Sep;127(3):642-649. doi: 10.1213/ANE.00000000000003419. PMID: 29757781.
13. Blumenthal KG, Ryan EE, Li Y, Lee H, Kahlen JL, Shenoy ES. The Impact of a Reported Penicillin Allergy on Surgical Site Infection Risk. Clin Infect Dis. 2018 Jan 18;66(3):329-336. doi: 10.1093/cid/cix794. PMID: 29361015; PMCID: PMC5850334.
14. Macy E, Contreras R. Health care use and serious infection prevalence associated with penicillin "allergy" in hospitalized patients: A cohort study. J Allergy Clin Immunol. 2014 Mar;133(3):790-6. doi: 10.1016/j.jaci.2013.09.021. Epub 2013 Nov 1. PMID: 24188976.
15. Dong R, Lanier K, Kraft C, Skoracki R, Lehman C, Kraft M. Safety of Cefazolin Perioperative Prophylaxis in Plastic Surgery Patients With Penicillin Allergy: A Retrospective Chart Review. Plast Surg (Oakv). 2025 Feb;33(1):159-163. doi: 10.1177/2292503231190929. Epub 2023 Aug 7. PMID: 39876855; PMCID: PMC11770715.