THE EFFICACY OF CEFAZOLIN VS NON-CEPHALOSPORIN ALTERNATIVES IN PERIPROSTHETIC JOINT INFFECTION PREVENTION AFTER HIP AND KNEE ARTHROPLASTY

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INTRODUCTION: Periprosthetic joint infection (PJI) remains a challenging complication of total hip and knee arthroplasty (THA and TKA, respectively). Current guidelines recommend the use of first generation cephalosporins for prophylactic antibiotic coverage. Recent literature suggests that non-cephalosporin alternatives increase the likelihood of PJI compared to cefazolin. However, there are currently no meta-analyses comparing the two. The purpose of this meta-analysis was to compare PJI rates in patients who received cefazolin or non-cephalosporin prophylaxis following total joint arthroplasty.

METHODS: Multiple databases were queried for literature comparing the clinical outcomes between patients treated with cefazolin prophylaxis and those treated with non-cephalosporin prophylaxis. The primary outcome was PJI rates. A random effects model was used to compare the relative risk of PJI in the two pooled cohorts.

RESULTS: Twelve studies with a total of 2,300,059 patients were included, with 2,121,706 (92.3%) treated with cefazolin antibiotics and 178,353 (7.7%) treated with non-cephalosporin antibiotics. Patients treated with cefazolin were 45% less likely to develop a PJI (rate = 0.24%) relative to vancomycin (with/without clindamycin) treated patients (rate = 0.42%, p = 0.004) among all TJA cases. The cefazolin group was also 34% less likely to develop a PJI (rate = 0.26%) relative to patients treated with all non-cephalosporin antibiotics (rate = 0.40%, p = 0.004). When comparing cefazolin to clindamycin alone there was no significant risk reduction of PJI. Further studies are needed to assess variability due to high heterogeneity in effect sizes across the meta-analysis ($I^2 = 88\%$, Tau 0.20), likely from differences within this large study population.

DISCUSSION AND CONCLUSION: Cefazolin is associated with a significantly lower rate of PJI following total joint arthroplasty when compared to all non-cephalosporin antibiotics and specifically vancomycin with/without clindamycin. The heterogeneity suggests that randomized clinical trials are needed to further evaluate this question.

	Cerazolin		Non-Cephalosporin			RISK Fatio	RISK ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	M-H, Random, 95% Cl
1.4.1 Cefazolin Versus Vand	comycin						
Buchalter 2022	48	104840	11	1066	6.5%	0.04 [0.02 , 0.09	1
Kheir 2017	62	5810	32	1828	8.2%	0.61 [0.40 , 0.93	1 -
Norvell 2023	7	809	12	319	4.8%	0.23 [0.09 , 0.58	1
Ponce 2014 (Vancomycin)	200	15422	35	1500	8.6%	0.56 [0.39 , 0.79	a 🔸
Smith 2012	23	2221	14	2815	6.4%	2.08 [1.07 , 4.04	i 🔔
Tan 2015	152	7734	48	2657	8.9%	1.09 [0.79 , 1.50	i 🖵
Tan 2017	62	5810	36	2765	8.3%	0.82 [0.54 , 1.23	i 🚽
Wyles 2019	521	28174	46	1521	9.0%	0.61 [0.45, 0.82	i _
Zastrow 2020 (Vancomycin)	1853	938588	311	114860	9.9%	0.73 [0.65 , 0.82	á .
Subtotal (95% CI)		1109408		129331	70.6%	0.55 [0.37 , 0.83	i 🔺
Total events:	2928		545				•
Heterogeneity: Tau ² = 0.33; C	hi² = 96.67	. df = 8 (P	< 0.00001); I	² = 92%			
Test for overall effect: Z = 2.8	6 (P = 0.00	4)					
1.4.2 Cefazolin Versus Cline	damycin						
Pawloy 2003	713	57760	30	2655	8.6%	1.09 [0.76 , 1.57	1 1
Ponce 2014 (Clindamycin)	200	15422	9	846	6.4%	1.22 [0.63 , 2.37	i 🔟
Zastrow 2020 (Clindamycin)	1853	938588	138	45033	9.7%	0.64 [0.54 , 0.77	i .
Subtotal (95% CI)		1011770		48534	24.7%	0.90 [0.57 , 1.40	i 🔺
Total events:	2766		177				· •
Heterogeneity: Tau ² = 0.12; C	;hi² = 9.14,	df = 2 (P =	0.01); l ² = 7	3%			
Test for overall effect: Z = 0.4	8 (P = 0.63)					
1.4.3 Cefazolin Versus Othe	r Antibioti	cs					
Laredo 1989	1	64	0	66	0.7%	3.09 [0.13 , 74.54	1
Periti 1999	7	464	6	422	4.0%	1.06 [0.36 , 3.13	a
Subtotal (95% CI)		528		488	4.7%	1.19 [0.43 , 3.30	i 📥
Total events:	8		6				T
Heterogeneity: Tau ² = 0.00; C	hi² = 0.39,	df = 1 (P =	0.53); I ² = 0	%			
Test for overall effect: Z = 0.3	3 (P = 0.74)					
Total (95% CI)		2121706		178353	100.0%	0.66 [0.50 , 0.88	1
Total events:	5702		728				•
Heterogeneity: Tau ² = 0.20; C	hi² = 107.5	2, df = 13	(P < 0.00001	; I² = 88%			0.01 0.1 1 10 100
Test for overall effect: Z = 2.8	9 (P = 0.00	4)					Favors Cefazolin Favors Other Antibiotic
Test for subgroup differences	: Chi ² = 3.4	3. df = 2 (F	P = 0.18), l ² =	41.7%			