

HK82: What is the recommended duration of prophylactic antibiotics for patients undergoing outpatient arthroplasty?

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Response/Recommendation: Based on limited data available, one dose of perioperative intravenous antibiotic may be sufficient for patients undergoing outpatient arthroplasty.

Level of evidence: Limited

Delegate Vote:

Rationale:

Prophylactic antibiotics are critical in arthroplasty to reduce the risk of surgical site infections (SSIs) (1), but the optimal duration of prophylactic antibiotics in the outpatient setting remains uncertain. This review analyzed current evidence on antibiotic use, identifying variations in practice across healthcare settings and administration methods. Out of 81 initially identified studies, 27 were selected after title and abstract screening, with six included in the final analysis following full-text review.

Our systematic review yielded the following key findings:

- A retrospective study of 20,682 primary TJAs performed between 2006 and 2017 compared the effectiveness of single-dose ($n = 4,523$) versus multiple-dose ($n = 16,159$) prophylactic antibiotics in preventing PJI. The PJI rates were 0.60% for the single-dose group and 0.88% for the multiple-dose group. Statistical analysis showed no significant difference between the two approaches in univariate ($OR = 0.674$, $p = 0.064$), multivariate ($OR = 0.755$, $p = 0.205$), or propensity score-matched analyses ($OR = 0.746$, $p = 0.277$). Even in high risk patients, multiple-dose regimens provided no additional benefit ($p = 0.136$) (2).
- Antibiotic timing and type: In the largest study population, only 16.5% of 73,015 outpatient total hip arthroplasty (THA) and total knee arthroplasty (TKA) patients received perioperative prophylactic antibiotics. Among these patients, 51.6% filled their prescriptions on the day of surgery, 29.7% filled them 1 to 5 days before surgery, and 20.8% filled them 1 to 3 days after surgery. The most commonly prescribed antibiotic was cephalexin 500 mg (median 2-day supply). Among non-cephalosporin options, clindamycin 300 mg was prescribed in 6.8% of cases, typically provided as a 3-day supply (3).
- Comparison of intravenous and oral antibiotics: In unicompartmental knee arthroplasty (UKA) and total shoulder arthroplasty (TSA), intravenous antibiotics administered 24 hours perioperatively showed no significant difference in outcomes compared to a single dose of oral antibiotics given within the same timeframe (4, 5).
- Variation in total number of antibiotic doses between inpatient and outpatient surgery: Outpatient THA and TKA patients received fewer antibiotic doses within the 24-hour perioperative period compared to inpatient cases (6).

The findings of our systematic review highlight considerable variability in the modality, timing, dosage, and duration of prophylactic antibiotic use in outpatient arthroplasty. While prophylactic antibiotics are effective in reducing SSIs, robust evidence to establish optimal guidelines for outpatient settings is lacking (7). Studies on perioperative antibiotic use for hip and knee arthroplasty in outpatient settings are limited. A previous meta-analysis examined

all orthopaedic procedures involving implants and found no significant difference in infection risk between single and multiple antibiotic doses. The authors, however, noted that the quality of evidence was low (8). In one series, a national antibiotic shortage prompted a change in protocol from 24 hours of perioperative antibiotics to a single preoperative dose. A comparative analysis found no significant differences in acute PJI rates, 90-day reoperations, or 90-day complications between the two groups. The authors, however, acknowledged the potential for selection bias in outpatient arthroplasty cases, and therefore excluded these patients from the study (9). Current trends suggest that oral antibiotics may be sufficient for many patients, given the lack of significant differences in outcomes between oral and intravenous administration. This approach could simplify care, reduce costs, and improve accessibility for outpatient arthroplasty patients (10). Further research is needed to determine the ideal duration and administration method, particularly for outpatient procedures, and to explore the observed differences in antibiotic prescribing practices between inpatient and outpatient settings.

Table 1. Included studies

Author, year	Study question addressed in this review	Findings																																				
Tan et al. 2019	Is Single Dose as Effective as Multiple Doses	The PJI rate was 0.60% (27/4,523) with a single antibiotic dose and 0.88% (142/16,159) with multiple doses. There was no significant difference between groups in univariate (OR = 0.674, p = 0.064), multivariate (OR = 0.755, p = 0.205), or propensity score matched analyses (OR = 0.746, p = 0.277). Multiple doses also provided no added benefit for high-risk patients (p = 0.136).																																				
Yendluri et al. 2024	Describing Current Practices on Oral Perioperative Antibiotic Prophylaxis for Outpatient Total Hip and Knee Arthroplasty	Only 16.5% of 73,015 outpatient THA and TKA patients received perioperative antibiotics. Of these, 51.6% filled prescriptions on the day of surgery, 29.7% 1 to 5 days before, and 20.8% 1 to 3 days postoperatively. Cephalexin 500 mg was most commonly prescribed with a median 2-day supply, while clindamycin 300 mg was used in 6.8% of cases, typically given for 3 days.																																				
Wyles et al. 2019	IV or Oral antibiotics in UKA?	Failure/Total: IV-24hr: (2/256), Oral-single dose: (0/40) P-value = 1.00																																				
Fryburger et al. 2021	IV or Oral antibiotics in TSA?	Failure/Total: IV-24hr: (13/896), Oral-single dose: (2/126) P-value = 0.71																																				
Keulen et al. 2024	Trends in 24-hour perioperative antibiotic therapy in TKA and THA	<table><tr><td></td><td>1 dose</td><td>2 doses</td><td>3 doses</td></tr><tr><td colspan="4">TKA</td></tr><tr><td>Outpatient (/total)</td><td>1/16</td><td>7/16</td><td>8/16</td></tr><tr><td>Inpatient (/total)</td><td>16/86</td><td>10/86</td><td>58/86</td></tr><tr><td>P-value</td><td colspan="3">.014</td></tr><tr><td colspan="4">THA</td></tr><tr><td>Outpatient (/total)</td><td>2/17</td><td>9/17</td><td>6/17</td></tr><tr><td>Inpatient (/total)</td><td>11/66</td><td>2/66</td><td>52/66</td></tr><tr><td>P-value</td><td colspan="3"><0.001</td></tr></table>		1 dose	2 doses	3 doses	TKA				Outpatient (/total)	1/16	7/16	8/16	Inpatient (/total)	16/86	10/86	58/86	P-value	.014			THA				Outpatient (/total)	2/17	9/17	6/17	Inpatient (/total)	11/66	2/66	52/66	P-value	<0.001		
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References

1. Longo UG, Candela V, Facchinetti G, Marchetti A, Dsoke S, Mazzella C, et al. Antibiotic prophylaxis in primary and revision shoulder replacement: a systematic review. *BMC Musculoskelet Disord*. 2020;21(1):292.
2. Tan TL, Shohat N, Rondon AJ, Foltz C, Goswami K, Ryan SP, et al. Perioperative Antibiotic Prophylaxis in Total Joint Arthroplasty: A Single Dose Is as Effective as Multiple Doses. *J Bone Joint Surg Am*. 2019;101(5):429-37.
3. Yendluri A, Park J, Singh P, Rako K, Stern BZ, Poeran J, et al. Oral Postoperative Antibiotic Prophylaxis for Outpatient Total Hip and Knee Arthroplasty: Describing Current Practices. *The Journal of Arthroplasty*. 2024;39(8):1911-6.e1.
4. Fryberger C, Throckmorton T, Oh S, Wan J, Azar F, Bernholt D, et al. Single-Dose Antibiotic Regimens in Total Shoulder Arthroplasty are Safe in an Outpatient Surgery Setting. *Seminars in Arthroplasty: JSES*. 2021;31.
5. Wyles CC, Vargas-Hernandez JS, Carlson SW, Carlson BC, Sierra RJ. Single-Dose Perioperative Antibiotics Do Not Increase the Risk of Surgical Site Infection in Unicompartamental Knee Arthroplasty. *The Journal of Arthroplasty*. 2019;34(7):S327-S30.
6. Keulen MHF, Bemelmans YFL, Boonen B, Hendrickx RPM, Heyligers IC, Schotanus MGM. Perioperative Differences Between Outpatient and Inpatient Pathways Following Hip and Knee Arthroplasty. *Arthroplast Today*. 2024;26:101343.
7. Siddiqi A, Forte SA, Docter S, Bryant D, Sheth NP, Chen AF. Perioperative antibiotic prophylaxis in total joint arthroplasty: a systematic review and meta-analysis. *JBJS*. 2019;101(9):828-42.
8. Ryan SP, Kildow BJ, Tan TL, Parvizi J, Bolognesi MP, Seyler TM, et al. Is There a Difference in Infection Risk Between Single and Multiple Doses of Prophylactic Antibiotics? A Meta-analysis. *Clin Orthop Relat Res*. 2019;477(7):1577-90.
9. Christensen DD, Moschetti WE, Brown MG, Lucas AP, Jevsevar DS, Fillingham YA, et al. Perioperative Antibiotic Prophylaxis: Single and 24-Hour Antibiotic Dosages are Equally Effective at Preventing Periprosthetic Joint Infection in Total Joint Arthroplasty. *J Arthroplasty*. 2021;36(7S):S308-S13.
10. Bhagat H, Sikka MK, Sukerman ES, Makadia J, Lewis JS, Streifel AC. Evaluation of opportunities for oral antibiotic therapy in bone and joint infections. *Annals of Pharmacotherapy*. 2023;57(2):156-62.