Extended Antibiotic Prophylaxis in Aseptic Revision Hip and Knee Arthroplasty: A Systematic Review

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Introduction

- Extended antibiotics shown to reduce periprosthetic joint infection (PJI) in high-risk patients undergoing primary hip and knee arthroplasty
- Limited information available on effectiveness of antibiotic prophylaxis in preventing PJI in aseptic revision hip and knee arthroplasty
- Purpose of systematic review
  - Determine if antibiotics > 24 hours postop significantly reduces PJI rates compared to standard antibiotic care

Method

- Systematic review adhering to Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines
- Inclusion criteria
  - Antibiotic administration > 24 hours
  - Aseptic revision hip or knee arthroplasty
  - Patients 18 years or older.
- Exclusion criteria
  - Primary surgeries
  - Non-hip or knee arthroplasty.
- Screening of demographics, antibiotic regimen, PJI rates, and follow-up.

Author	Number of Patients (Study/Control)	Procedure	Mean Age (SD)	Follow-Up
Kuo (2022)[1]	2467/333	Aseptic Revision THA & TKA	Study: 63.6 (13) Control: 63.7 (13.3)	30 days, 90 days, 1 year
Bukowski[2]	267/637	Aseptic Revision TKA	65.9 (9.8)	90 days, 1 year, 5 years
Kuo (2019)[3]	209/209	Aseptic Revision Hip Arthroplasty	Study: 68.3 (11.9) Control: 67.5 (12)	1 year
Bukowski[4]	370/737	Aseptic Revision THA	65 (no SD given)	90 days, 1 year, 5 years
Villa[5]	93/85	Aseptic Revision THA & TKA	Study: 68 (10.8) Control: 69 (9.1)	Mean for both groups: 849 days Range: 15-1671
Claret[6]	138/203	Aseptic Revision TKA	72.1 (8.4)	3 months
Zingg[7]	176/0	Aseptic Revision TKA	63.9 (9.9)	No standardized timeframe
Kuo (2020)[8]	176/76	Aseptic Revision TKA	Study: 70.1 (10.2) Control: 71.4 (11.3)	Mean: 5.2 +/- 2.5 years
Mauerhan[9]	45/49	Primary and Revision TKA/THA	65 (range 17-95)	1 year

Table 1: Study Demographics[1-9]

Results & Discussion

- 9 articles published from 1994 to 2023 included for final analysis.
- Assessed Rates of PJI after revision hip or knee arthroplasty
  - Compared standard treatment and antibiotic prophylaxis
  - 7 showed no statistically significant differences in PJI rates
  - Decrease in PJI rates for the study group in Claret study
    - Rate of PJI in control group = 6.9%, study group = 2.2% (p = 0.049)
  - Zingg et al noted decrease in PJI rates compared to other published rates, but p-values not listed.[1-9]

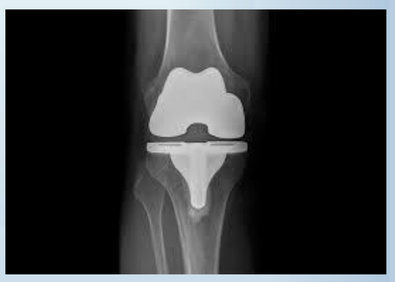

Image 1: Total Knee Arthroplasty[10]

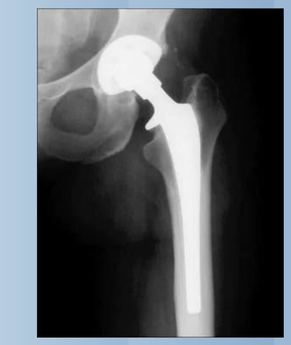

Image 2: Total Hip Arthroplasty[11]

Author	Antibiotics Used	Control Dosage and Frequency	Study Dosage and Frequency	Duration	Deep Infection Rate (Study vs Control)
Kuo (2022)[1]	Control & Study: 1st Gen Cephalosporin (clindamycin or Vancomycin for allergy)	1 g for 24 hr	1 g for > 24 hr	Study: mean of 3.9 (1.8) days Control: 1 day	0.6% vs 0.3% (at 30 days) 1.7% vs 2.1% (at 90 days) 3.7% vs 6.0% (at 1 year)
Bukowski[2]	Control: cefazolin or vancomycin Study: (same as control for 1st 24 hr) amoxicillin, amoxicillin-clavulanate, cefadroxil, cefdinir, cephalexin, clindamycin, doxycycline, minocycline	25 mg/kg Q8H (cefazolin) 15 mg/kg Q12H (vancomycin for allergy) 7.5 mg/kg Q8H (clindamycin for allergy)	Most prescribed: Cefadroxil 500mg PO BID Cephalexin 500mg PO QID	Study: mean of 11 days (range 3-90 days) Control: 1 day	0% vs 1.1% (at 90 days) 2.4% vs 2.2% (at 1 year) 7.4% vs 6.4% (at 5 years)
Kuo (2019)[3]	Control & Study: cefazolin or vancomycin	Dose unspecified; Q8H for cefazolin Q12H for vancomycin	Dose unspecified; Q8H for cefazolin Q12H for vancomycin	Study: mean of 2.9 (1.5) days Control: 0.3 (0.2) days	4.8% vs 2.4% (P= 0.293)
Bukowski[4]	Control: cefazolin or vancomycin Study (same as control to start): Amoxicillin-clavulanate, Trimethoprim/Sulfamethoxazole, cefadroxil, cephalexin, clindamycin, doxycycline, minocycline	25 mg/kg Q8H (cefazolin) 15 mg/kg Q12H (vancomycin for allergy) 7.5 mg/kg Q8H (clindamycin for allergy)	Most prescribed: Cefadroxil 500mg PO BID Cephalexin 500mg PO QID	Study: mean of 10 days (range 3-28 days) Control: 1 day	2.3% (at 90 days) 2.7% (at 1 year) 3.5% (at 5 years)
Villa[5]	Control: cefazolin and vancomycin Study: Control regimen and doxycycline sulfamethoxazole/trimethoprim, clindamycin, or ciprofloxacin	1 dose Vancomycin and 2 doses cefazolin (weight adjusted)	Control regimen and doxycycline 100 mg BID (7-14 days) or sulfa/trim 800/160 mg BID (14 days) or clindamycin 300 mg TID (14 days) or Ciprofloxacin 500 mg BID (7 days)	7-14 days	2.2% vs 3.5% (P= 0.671)
Claret[6]	Control: teicoplanin and ceftazidime Study: teicoplanin, ceftazidime, vancomycin	Teicoplanin 800 mg and ceftazidime 2 g (during induction); Ceftazidime 1 g (2 hr after 1st dose)	Control regimen and vancomycin 1 g Q12H and ceftazidime 2 g Q8H	Study: 5 days Control: 1 day	2.2% vs 6.9% (P= 0.047)
Zingg[7]	Control: cefazolin (clindamycin or vancomycin for contraindications) Study: cefadroxil or cephalexin, (amoxicillin-clavulanate, ciproxine, clindamycin, cotrimoxazole, or doxycycline for contraindications)	Cefazolin 2 g TID if under 120kg, 3 g TID if over 120kg Clindamycin 600 mg BID Vancomycin 1 g BID	Cefadroxil 500 mg BID or Cephalexin 500 mg QID	Study: 7 days Control: 1 day	0% (at 90 days) 1.8% (at 1 year) 2.2% (at 3 years or latest follow up)
Kuo (2020)[8]	Control & Study: first generation cephalosporins	Weight dependent dose Q8H	Weight dependent dose Q8H	Study: 8.9 (15.3) days Control: 1 day	1.1% vs 3.9% (P= 0.14)
Mauerhan[9]	Control: cefuroxime Study: cefazolin	1.5 g preoperatively + 750mg at 8 and 16 hours, saline Q6H for placebo	1 g Q8H	Study: 3 days Control: 1 day	rTHA: 1/33 (3.03%) vs 1/29 (3.4%) -rTKA 0/16 vs 0/16

Table 2: Antibiotic Regimen and Outcomes[1-9]

Conclusion

- Not significant data indicating extended antibiotic use for prevention of PJI in aseptic revision arthroplasty
- May be beneficial in reduction of PJI rates for high-risk patients
- Further prospective studies needed conducted to assess their utility

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