

Carbapenem-resistant Gram-negative Bacilli in Post-TKR Infection

Treatment Challenges and Outcomes: Indian High-Volume Centre Experience

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INTRODUCTION & AIM

Gram-negative prosthetic joint infection (GN-PJI) remains one of the most difficult complications after total knee arthroplasty. The increasing prevalence of extensively drug-resistant organisms such as carbapenem-resistant Gram-negative bacilli (CR-GNB) has made treatment challenging, often requiring repetitive surgery and prolonged antibiotic therapy. This study aimed to review the microbiological profile, resistance patterns, treatment strategies and clinical outcomes of CR-GNB PJI managed at our institution.

METHODS

A retrospective review of 28 patients with culture-confirmed CR-GNB PJI treated at our institute was performed. Patient demographics, infecting organisms, resistance mechanisms, antibiotic regimens, initial surgical procedure and subsequent outcomes were analysed. Initial treatment was categorised as debridement, antibiotics and implant retention (DAIR), Stage-1 revision within a planned two-stage protocol, or primary salvage arthrodesis.

RESULTS

The cohort included 28 patients with a mean age of 64.3 years: 18 women and 10 men. Enterobacter cloacae complex was the predominant pathogen (50%), followed by Klebsiella pneumoniae (21.4%), Pseudomonas aeruginosa (17.9%), Acinetobacter baumannii (7.1%) and Escherichia coli (3.6%). NDM was the most commonly identified resistance pattern, followed by OXA-48 and VIM. Tigecycline was used in 12 patients (42.9%); five received ceftazidime-avibactam plus aztreonam. DAIR was used initially in 8 patients, with only 2 remaining infection-free. Nineteen patients underwent Stage-1 revision; overall infection control after this strategy was achieved in 14/19 patients (73.7%).

KEY FINDINGS

28
Patients

64.3
Mean age

50%
E. cloacae
complex

25%
DAIR infection-
free

73.7%
Stage-1
infection control

MICROBIOLOGICAL PROFILE

Enterobacter cloacae complex
50% (14)

Klebsiella pneumoniae
21.4% (6)

Pseudomonas aeruginosa
17.9% (5)

Acinetobacter baumannii 7.1% (2)
E. coli 3.6% (1)

RESISTANCE & ANTIBIOTICS

Resistance pattern
NDM most common
followed by OXA-48 and VIM

Tigecycline
12 patients (42.9%)

Ceftazidime-avibactam + aztreonam
5 patients

CLINICAL OUTCOMES

DAIR: 8 patients
2 infection-free
3 septicemia deaths
3 recurrence

Stage-1 revision: 19
6 reimplanted
2 arthrodesis after Stage-1
9 remain on spacer

Primary arthrodesis: 1

TREATMENT STRATEGY / OUTCOME PATHWAY

CR-GNB PJI → Culture + resistance mechanism identification → Targeted antimicrobial therapy → DAIR in selected cases / Stage-1 revision → Reimplantation, spacer retention or arthrodesis according to infection control

CONCLUSION

CR-GNB PJI is associated with considerable morbidity and mortality. In this series, DAIR produced poor results, whereas Stage-1 revision offered a greater likelihood of infection control. Retention of an antibiotic spacer may serve as an effective interim solution in selected patients. Arthrodesis provided dependable infection control and should be considered a reasonable definitive option in selected CR-GNB PJI cases.