

Bacteriophage Therapy for the Management of Multidrug-Resistant Prosthesis-Associated Infections

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INTRODUCTION

BACKGROUND

Prosthetic joint infection (PJI) remains one of the most devastating complications following joint arthroplasty. Treatment is particularly challenging when infections involve multidrug-resistant (MDR) bacteria capable of forming biofilms on implant surfaces, substantially reducing antibiotic efficacy.

The heterogeneity of MDR organisms and the limited penetration of conventional antimicrobials into the biofilm matrix often necessitate implant removal — a major surgical burden.

A targeted, adjunctive bacteriophage-based strategy may offer a viable, less invasive approach to this clinical challenge.

AIM

To evaluate the in vitro efficacy of bacteriophage therapy as a potential alternative or adjunctive approach for the management of antibiotic-resistant prosthetic joint infections.

Key Clinical Challenge

MDR biofilm formation blocks antibiotic penetration into the joint space.

Proposed Approach

Local phage cocktail — targeted, biofilm-penetrating antibacterial activity

TAKE HOME MESSAGE

Bacteriophage therapy, combined with standard antibiotics and DAIR surgery, offers a promising adjunctive approach for managing multidrug-resistant prosthetic joint infections where conventional treatment alone fails.

FIGURE 3 Treatment Protocol & Timeline

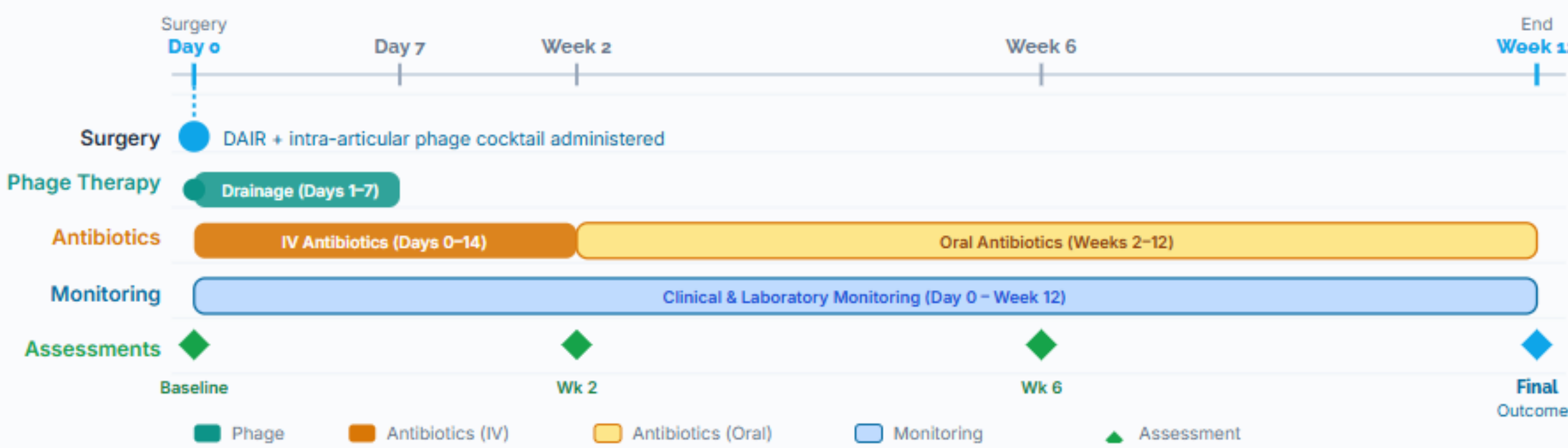


FIGURE 2 Mechanism of Action: Phage–Antibiotic Combination Therapy

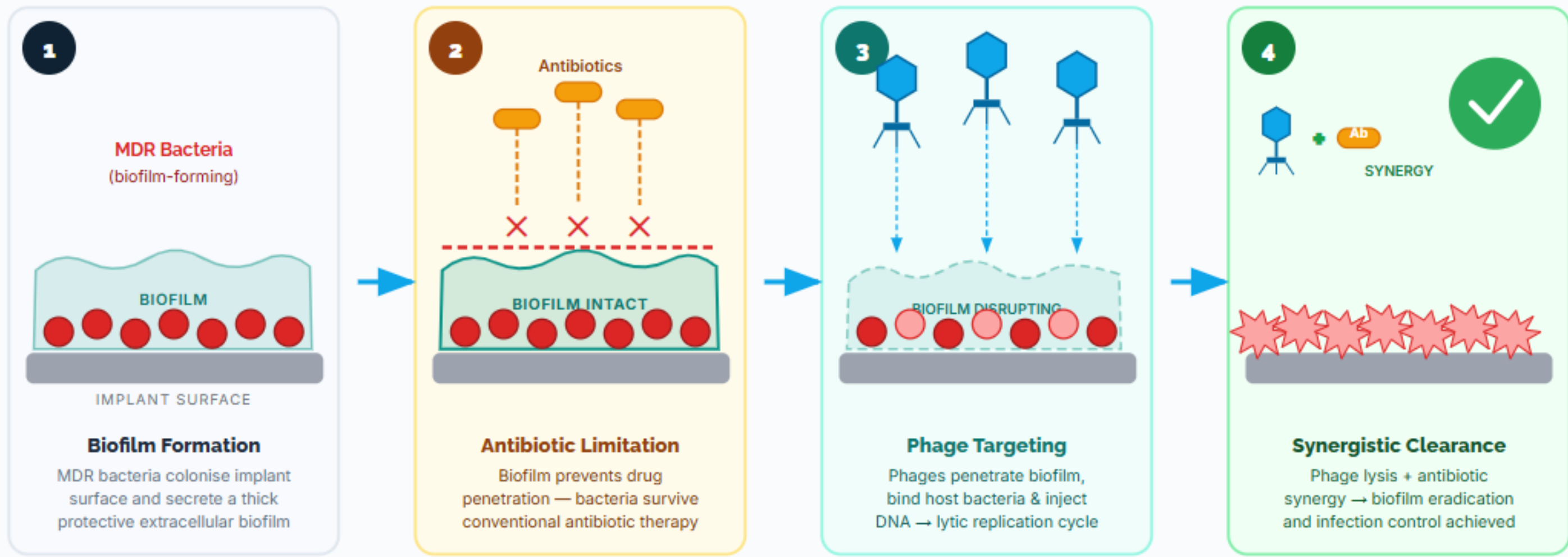
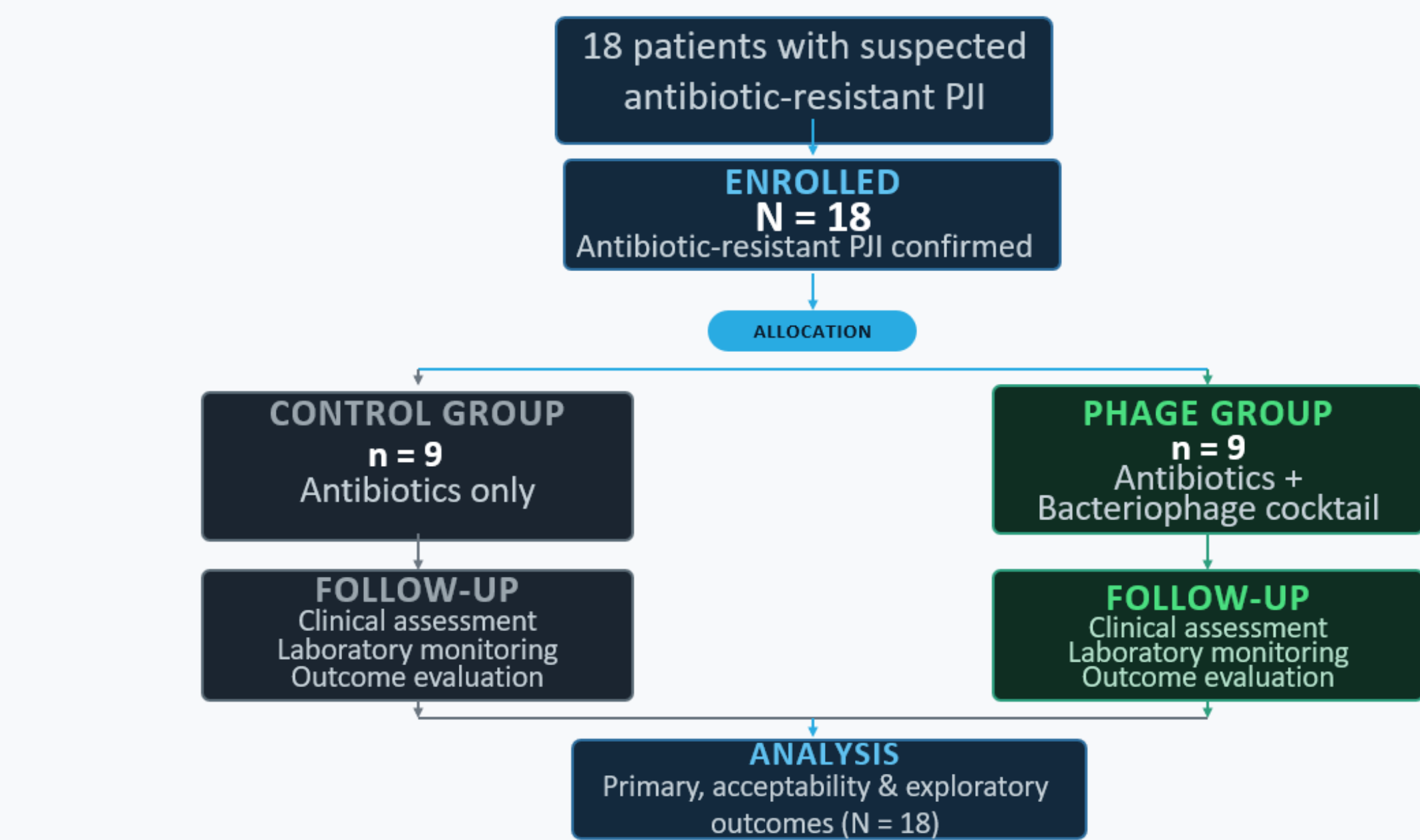


FIGURE 1 Study Design & Patient Flow



Key Findings

- ✓ Clinical improvement observed in both treatment groups
- ✓ Faster normalization of infection markers with phage-antibiotic combination
- ✓ Implant preservation achieved in several comparison-group cases
- ✓ No bacteriophage-related adverse events recorded
- ✓ No infection recurrence reported during follow-up

RESULTS

Summary of Outcomes

Outcome	Antibiotics Only (n = 9)	Antibiotics + Phages (n = 9)
Clinical improvement	7/9	9/9
Implant retention	7/9	9/9
Serious adverse events	2/9	0/9
Infection recurrence	2	None

Conclusion

Local bacteriophage therapy, combined with standard antibiotics and DAIR surgery, appears to be a safe and effective adjunct for managing prosthetic joint infections caused by antibiotic-resistant bacteria.

Clinical recovery and reduction of infection markers occurred more rapidly with the combination of phages and antibiotics than with antibiotics alone. Some cases achieved implant retention, and no recurrences have been reported to date.

These findings support further evaluation of bacteriophage therapy as an adjunctive treatment for difficult-to-treat prosthetic joint infections.

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