



The SPIRIT of Combination Therapy: Does Adjunctive Rifamycin Improve Outcomes in Spinal Implant Infections?

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Conclusion

- Adjunctive rifampin was not significantly associated with a lower hazard of treatment failure in patients with staphylococcal postoperative spinal implant infection (PSII)
- Our cohort was predominantly treated with a non-quinolone based regimen, and further studies are needed to compare the effectiveness of rifampin and quinolone combination therapy to a non-quinolone based regimen

Background

- Rifamycin antibiotics (e.g. rifampin) are commonly used as adjunctive therapy for staphylococcal postoperative spinal implant infection (PSII), but their evidence base is limited
- We aimed to evaluate the effect of adjunctive rifampin on treatment failure for patients with PSII

Results

Table 1: Demographics. No significant differences in baseline characteristics between rifampin vs no rifampin groups

	Total (N=222)	No rifampin (N=132)	Rifampin (N=90)
Age (years), mean (SD)	63.1 (12.6)	63.5 (12.4)	62.5 (12.9)
Male Sex, n (%)	128 (57.7%)	72 (54.5%)	56 (62.2%)
Spinal section involvement, n (%)			
Cervical	64 (28.8%)	36 (27.3%)	28 (31.1%)
Thoracic	106 (47.7%)	63 (47.7%)	43 (47.8%)
Lumbar	144 (64.9%)	88 (66.7%)	56 (62.2%)
Sacral	70 (31.5%)	44 (33.3%)	26 (28.9%)
ASA score, n (%)			
I	3 (1.4%)	2 (1.5%)	1 (1.1%)
II	42 (18.9%)	22 (16.7%)	20 (22.2%)
III	159 (71.6%)	100 (75.8%)	59 (65.6%)
IV	14 (6.3%)	8 (6.1%)	6 (6.7%)
Organism, n (%)			
<i>Staphylococcus aureus</i>	191 (86.0%)	117 (88.6%)	74 (82.2%)
Methicillin-resistant <i>Staphylococcus aureus</i>	57 (25.7%)	34 (25.8%)	23 (25.6%)
<i>Staphylococcus lugdunensis</i>	3 (1.4%)	1 (0.8%)	2 (2.2%)
Other coagulase-negative Staphylococci	33 (14.9%)	17 (12.9%)	16 (17.8%)

Table 2: Antibiotics used. Cefazolin and vancomycin were most commonly used while quinolone use was uncommon

	Total (N=222)	No rifampin (N=132)	Rifampin (N=90)
Duration of IV antibiotic therapy (days), median (IQR)	43.0 (42.0, 47.0)	43.0 (42.0, 46.0)	43.0 (42.0, 49.5)
Duration of antibiotic therapy (days), median (IQR)	171.0 (64.0, 377.0)	134.0 (45.0, 365.0)	271.0 (104.0, 443.0)
Antibiotics during first 6 weeks, n (%)			
Cefazolin	95 (42.8%)	59 (44.7%)	36 (40.0%)
Vancomycin	74 (33.3%)	45 (34.1%)	29 (32.2%)
Daptomycin	26 (11.7%)	15 (11.4%)	11 (12.2%)
Nafcillin/Oxacillin	19 (8.6%)	12 (9.1%)	7 (7.8%)
Ceftriaxone	15 (6.8%)	7 (5.3%)	8 (8.9%)
Doxycycline	9 (4.1%)	9 (6.8%)	0 (0.0%)
Trimethoprim-sulfamethoxazole	7 (3.2%)	4 (3.0%)	3 (3.3%)
Levofloxacin	1 (0.5%)	0 (0.0%)	1 (1.1%)
Ciprofloxacin	1 (0.5%)	1 (0.8%)	0 (0.0%)
Rifampin	94 (42.3%)	4 (3.0%)	90 (100.0%)

*Other uncommonly used antibiotics include: ceftaroline (n=3), cefadroxil (n=2), metronidazole (n=2), cefepime (n=1), cephalexin (n=1), penicillin G (n=1)

Methods

- Design
 - Retrospective cohort study of patients diagnosed with acute staphylococcal PSII between January 1, 2017 to December 31, 2022 from ten institutions
- Inclusion criteria
 - Underwent surgical debridement with hardware retention and received at least 2 weeks of systemic antibiotics
 - Positive culture with staphylococcal species
- Exclusion criteria
 - Positive culture with a non-staphylococcal species
 - Lost to follow-up or meeting primary outcome within 6 weeks of debridement
- Primary outcome
 - Treatment failure defined as unplanned reoperation, clinical recurrence of infection, or death due to infection
- Statistical analysis
 - Fine-Gray regression model
 - Primary exposure: rifamycin exposure of ≥14 days within 6 weeks from debridement
 - Covariates: days from index fusion to debridement, age, BMI, number of spinal regions involved, infection with *Staphylococcus aureus*, antibiotic exposure (time-dependent variable)
 - Secondary analysis: rifamycin exposure within the first 6 weeks of treatment as a continuous variable

Results

Figure 1: Cumulative incidence of treatment failure. No difference in incidence of treatment failure between rifampin vs no rifampin groups after covariate adjustment (sHR: 0.70; 95% CI: 0.41-1.19; p = 0.18)

No rifampin or rifampin < 14 days	132	105	92	79	69	60	50	34	27	21	16	9	6
Rifampin >= 14 days	90	71	65	58	52	42	31	26	22	18	14	7	5

*No association between rifampin duration within 6 weeks and treatment failure (sHR: 1.00; 95% CI: 1.00-1.00; p = 0.66)