



Double DAIR for Acute-PJI: Positive Culture at Second Stage Increases the Risk of Subsequent Failure

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BACKGROUND

- Debridement, antibiotics, and implant retention (DAIR) is commonly used in the management of acute periprosthetic joint infection (PJI) when implant retention is considered feasible. More recently, the double-DAIR technique has gained increasing attention as a strategy for acute PJI.
- An unknown is how frequently cultures remain positive at the second stage and whether persistent culture positivity represents clinically meaningful residual infection or predicts subsequent treatment failure. Understanding the prognostic significance of second-stage cultures could help identify patients at increased risk for recurrent infection and potentially guide postoperative management
- Purpose:** To determine the rate of culture positivity at the second debridement and evaluate whether ≥ 1 positive intraoperative culture at the second stage is associated with worse clinical outcomes following double DAIR.

METHODS

- Retrospective review of all patients who underwent a double-DAIR protocol for acute PJI at a single institution.
- Acute PJI was defined as infection occurring <28 days from the index arthroplasty or symptom onset. PJI was defined according to the 2013 MSIS criteria
- All patients had a minimum of 1 year of follow-up.
- Treatment failure was defined as:
 - Any reoperation for infection at latest follow-up, or
 - Mortality within 1 year following surgery.
- Multivariable logistic regression controlled for: Patient demographics, history of failed surgical treatment for PJI, and organism virulence
- The primary exposure was ≥ 1 positive intraoperative culture at the second debridement.

RESULTS

- A total of 131 patients were included:
 - 71 knees
 - 60 hips
- Of these, 15 patients (11.5%) had ≥ 1 positive culture at the second debridement.

Outcome	Negative Second-Stage Culture	Positive Second-Stage Culture	P-value
Treatment Failure	18.1%	40.0%	0.048

- Patients with a positive culture at the second stage demonstrated more than double the observed rate of treatment failure compared with those whose cultures were negative.
- On multivariable regression analysis, ≥ 1 positive culture at second debridement was an independent risk factor for subsequent reoperation:
 - Adjusted OR 4.9
 - 95% CI: 1.3–18.4; $p=0.015$

CONCLUSION

- Persistent culture positivity at the second debridement was relatively uncommon, occurring in approximately 1 in 9 patients undergoing double DAIR; however, when present, it was strongly associated with worse clinical outcomes.
- Patients with ≥ 1 positive second-stage culture experienced a 40.0% treatment-failure rate compared with 18.1% among those with negative cultures. After adjustment for relevant clinical factors, second-stage culture positivity remained an independent predictor of reoperation, with nearly five-fold greater odds of subsequent reoperation.
- These findings suggest that microbiologic results from the second debridement provide important prognostic information following double DAIR. Patients with persistent positive cultures may represent a higher-risk subgroup in whom standard postoperative management may be insufficient.