

A Comparative analysis of DAIR and Repeat Two-Stage Exchange in Recurrent Periprosthetic Joint Infections following Complex Revision Total Knee Arthroplasty

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Introduction

- Periprosthetic joint infection (PJI) is the most common cause of failure in both primary and revision total knee arthroplasty (rTKA)[1], and is a significant source of mortality, morbidity, and healthcare expense [2]
- Debridement, Antibiotics, and implant retention (DAIR) and two-stage exchange are common treatments for PJIs [3,4]
- Two-stage exchange remains a common treatment strategy for chronic PJI [5]; however, this approach may be suboptimal when implant removal complicates reconstruction or limits future reconstructive options

Methods

- Retrospective study of patients treated for recurrent TKA PJI from 2011-2022
- Data collected through electronic medical records (EMR)
- Complex revision defined as use of metaphyseal sleeve, trabecular metal cone, or structural allograft
- Patients stratified into two groups:
 - Two-stage exchange with complex revision components
 - DAIR with long-term antibiotic suppression
- Primary outcome: failure, defined as reoperation for PJI within 3 years (MSIS ORT Tier 3 or 4)
- Kaplan-Meier analysis used to evaluate failure rates

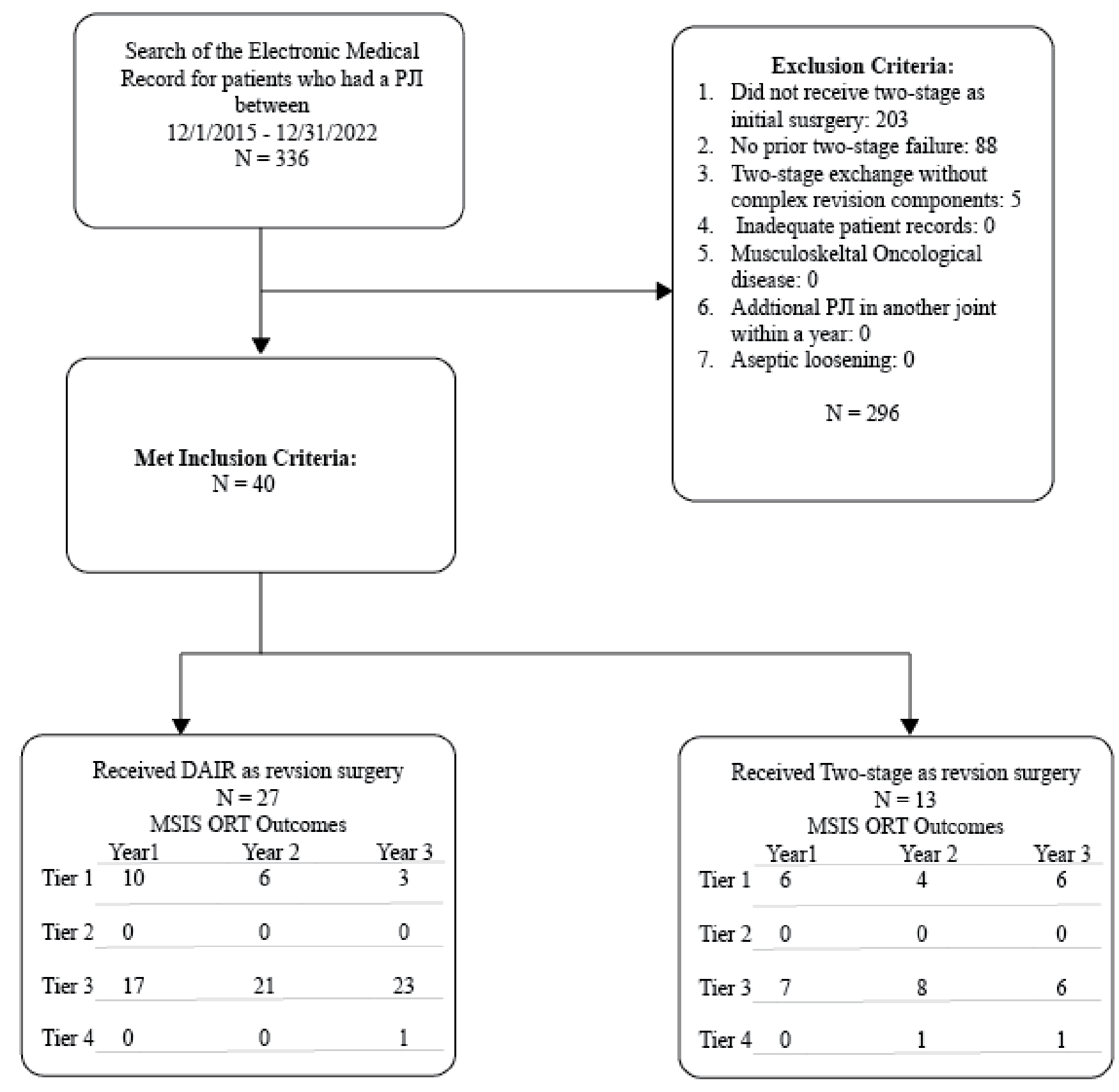


Figure 1: Consort diagram illustrating patient selection and distribution. PJI= Periprosthetic Joint Infection, DAIR= Debridement, Antibiotics, and implant retention, MSIS ORT= Musculoskeletal Infection Society Outcome Reporting Tool

Conclusion

- DAIR demonstrated a higher cumulative failure rate at 2 years, despite no significant difference in overall failure-free survival
- Group size disparity likely reflects surgeon preference for managing complex cases
- Larger studies needed to determine optimal treatment approach for recurrent PJI

Results

- Cohort: 40 patients included; 27 DAIR, 13 repeat two-stage exchange, mean follow-up 25.2 ± 14.2 for DAIR and 34.8 ± 31.0 months for two-stage exchange
- Survival analysis revealed no significant difference in overall failure between DAIR and two-stage exchange (80.0% vs 64.1%, respectively, $P = 0.23$)

KM Survival Curve for Revision TKA Patients: Complex vs. DAIR

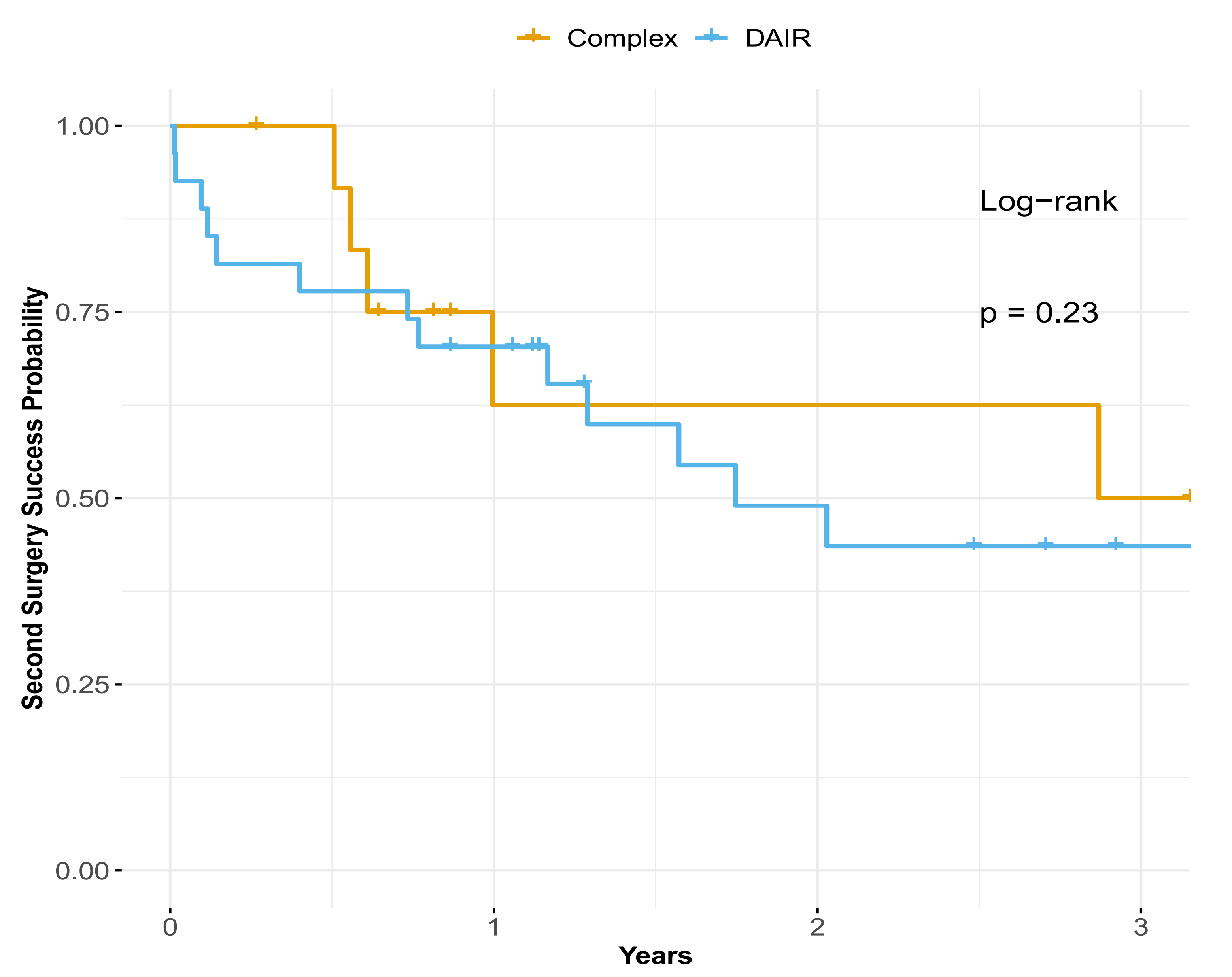


Figure 2: Kaplan-Meier survival curve showing estimated probability of revision free from infection in years postoperatively. Blue solid line= DAIR with long-term antibiotics. Yellow sold line= two-stage exchange

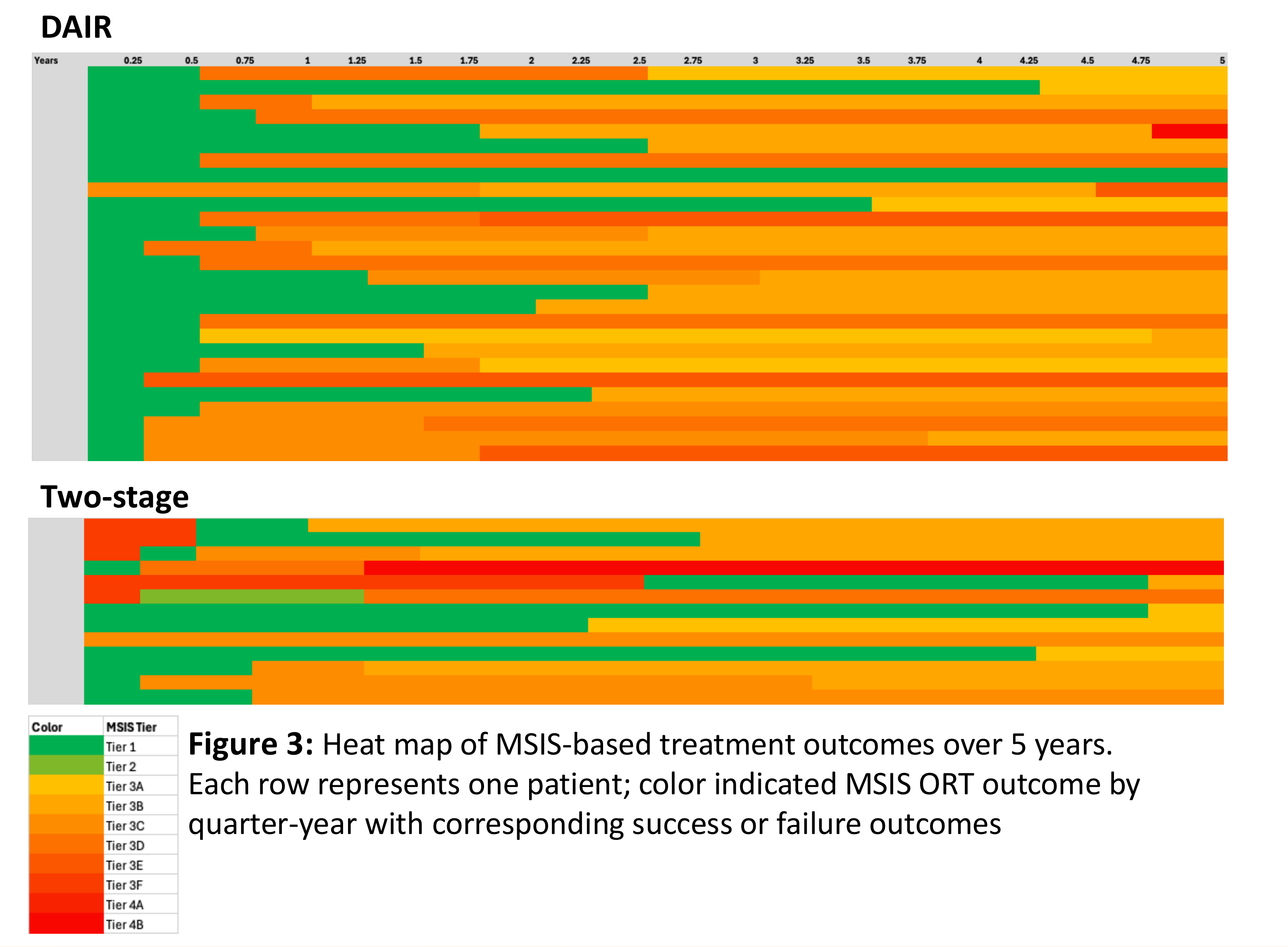


Figure 3: Heat map of MSIS-based treatment outcomes over 5 years. Each row represents one patient; color indicated MSIS ORT outcome by quarter-year with corresponding success or failure outcomes

References: [1] Geary, Michael B et al., [2] Premkumar, Ajay et al., [3] Clemente, Antonio et al., [4] Bedair, Hany S et al., [5] Pangaud, Corentin et al.