

Kidney Function and Mortality Following Two-Stage Revision Total Joint Arthroplasty for Periprosthetic Joint Infection

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Principal Disclosures:
 Buller - Enovis/DJO, OsteoRemedies, Link Biomedical, Smith and Nephew
 Meneghini - Enovis/DJO, OsteoRemedies, Kinamed, Innomed, EMOVI, PeekMed



Introduction

Periprosthetic joint infection (PJI) after primary total hip and knee arthroplasty (THA, TKA) is reported in up to 2% of patients and is a catastrophic and devastating complication.

The current 'gold standard' of treatment for chronic PJI remains a two-stage surgery involving intravenous antibiotic therapy between stages of implant resection and reimplantation (Fig. 1). Studies on the effect of antibiotics (Abx) on kidney function and mortality during contemporary two-stage treatment for PJI with modern perioperative protocols and medical optimization are limited.

Study Purpose

To evaluate kidney function and mortality before, during, and after two-stage revision THA or TKA for PJI

Methods

Retrospective review of 160 patients treated with a two-stage revision for THA or TKA; 22 cases were excluded due to native joint resections, joints that were never reimplanted, and resections involving hardware related to fractures; 138 cases (66 hips; 72 knees) were available for analysis

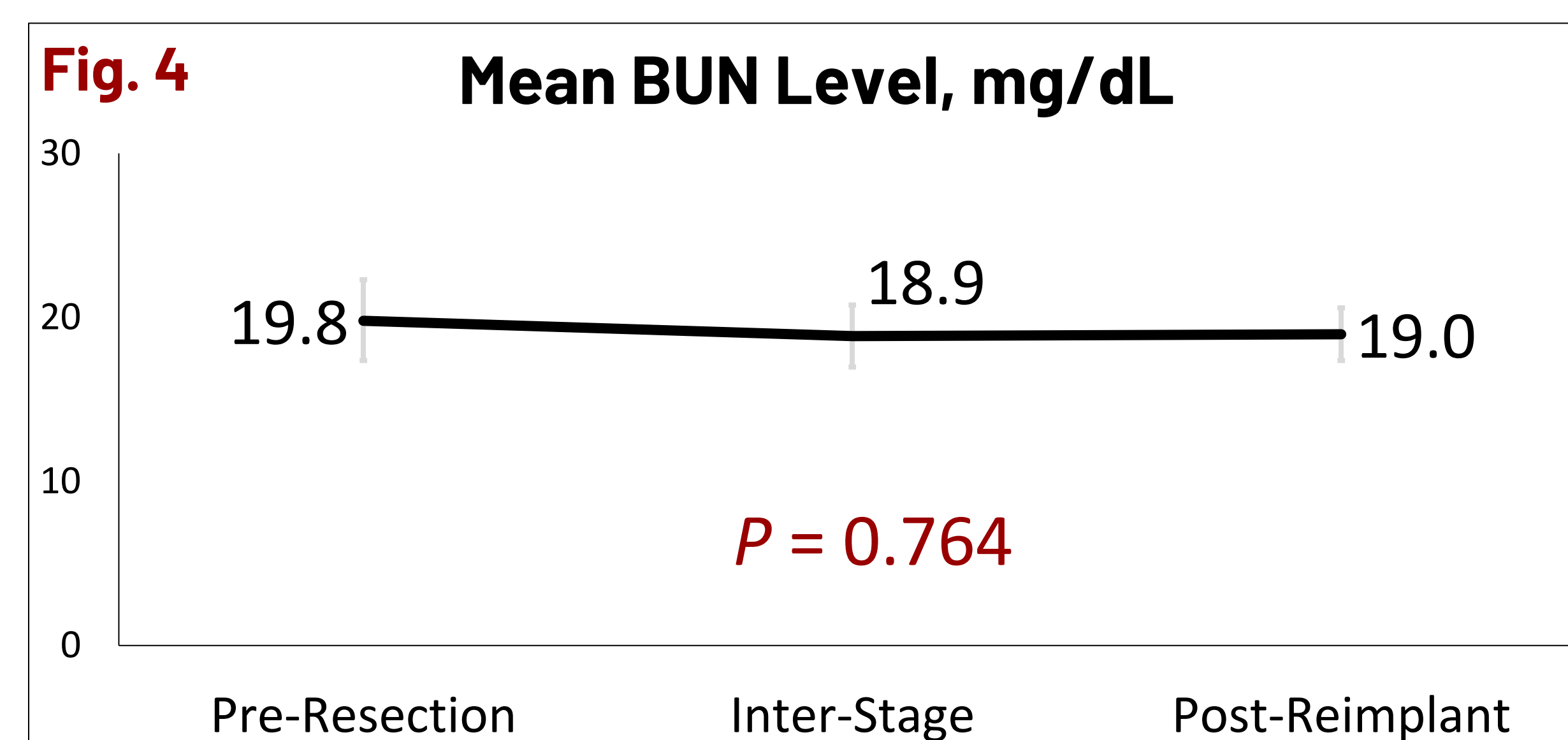
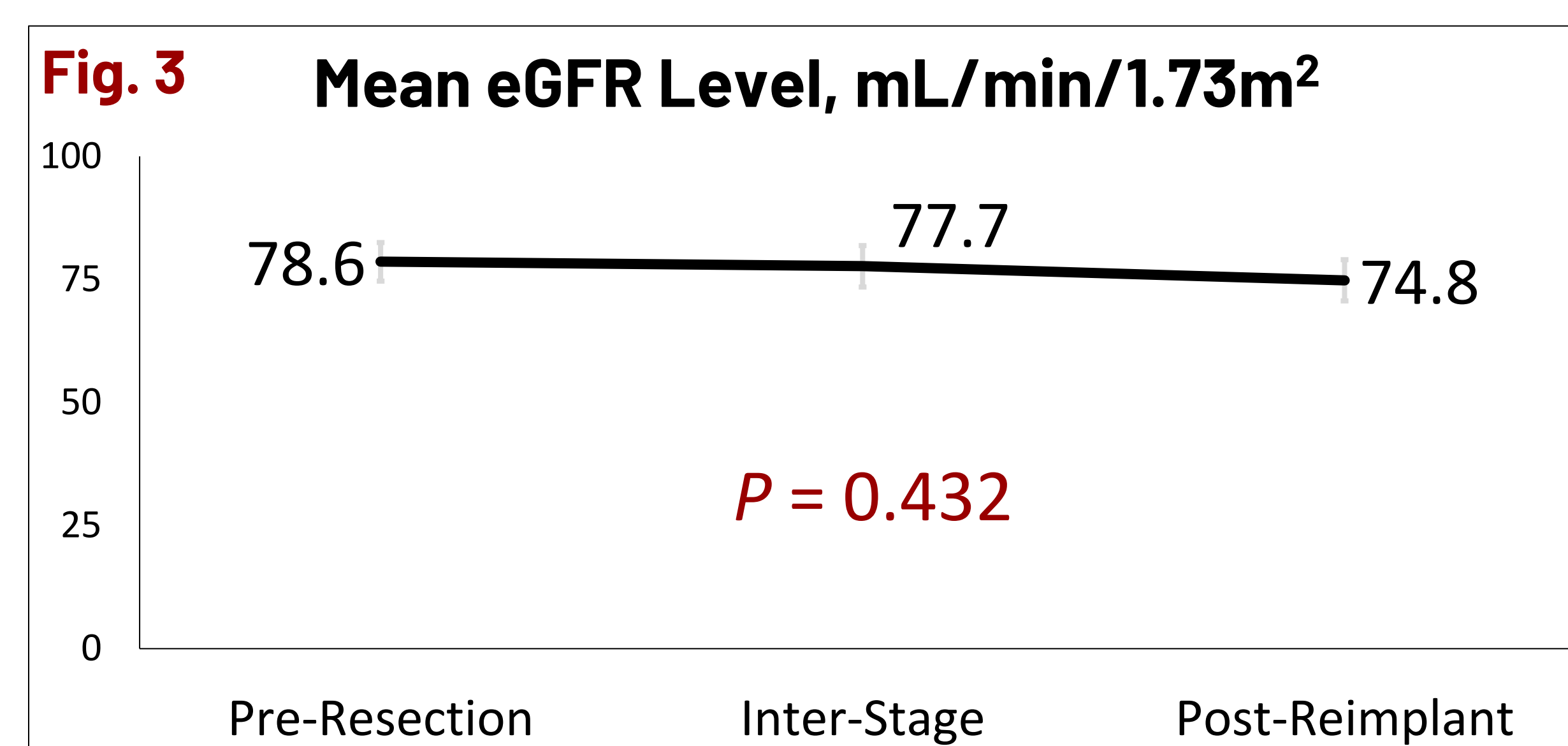
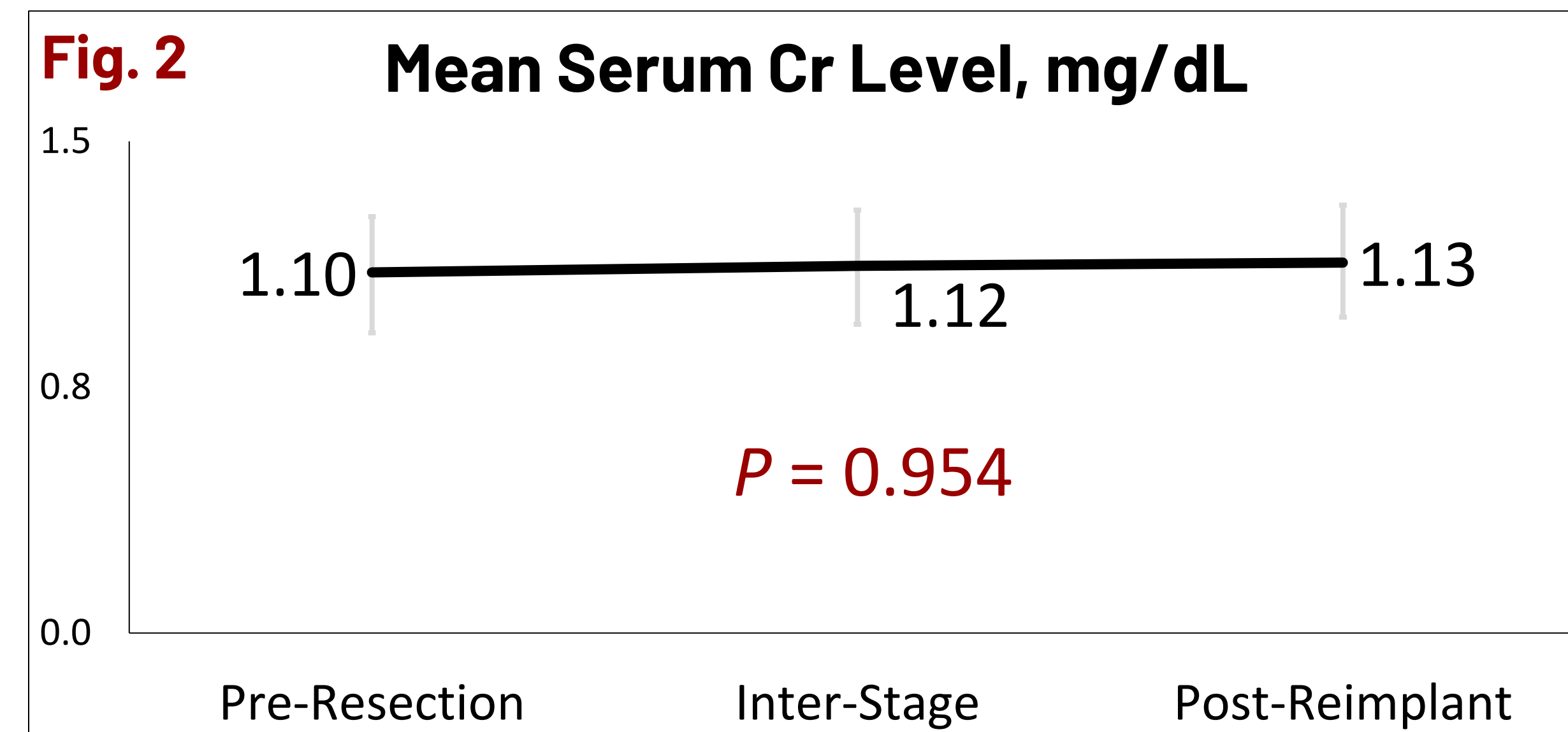
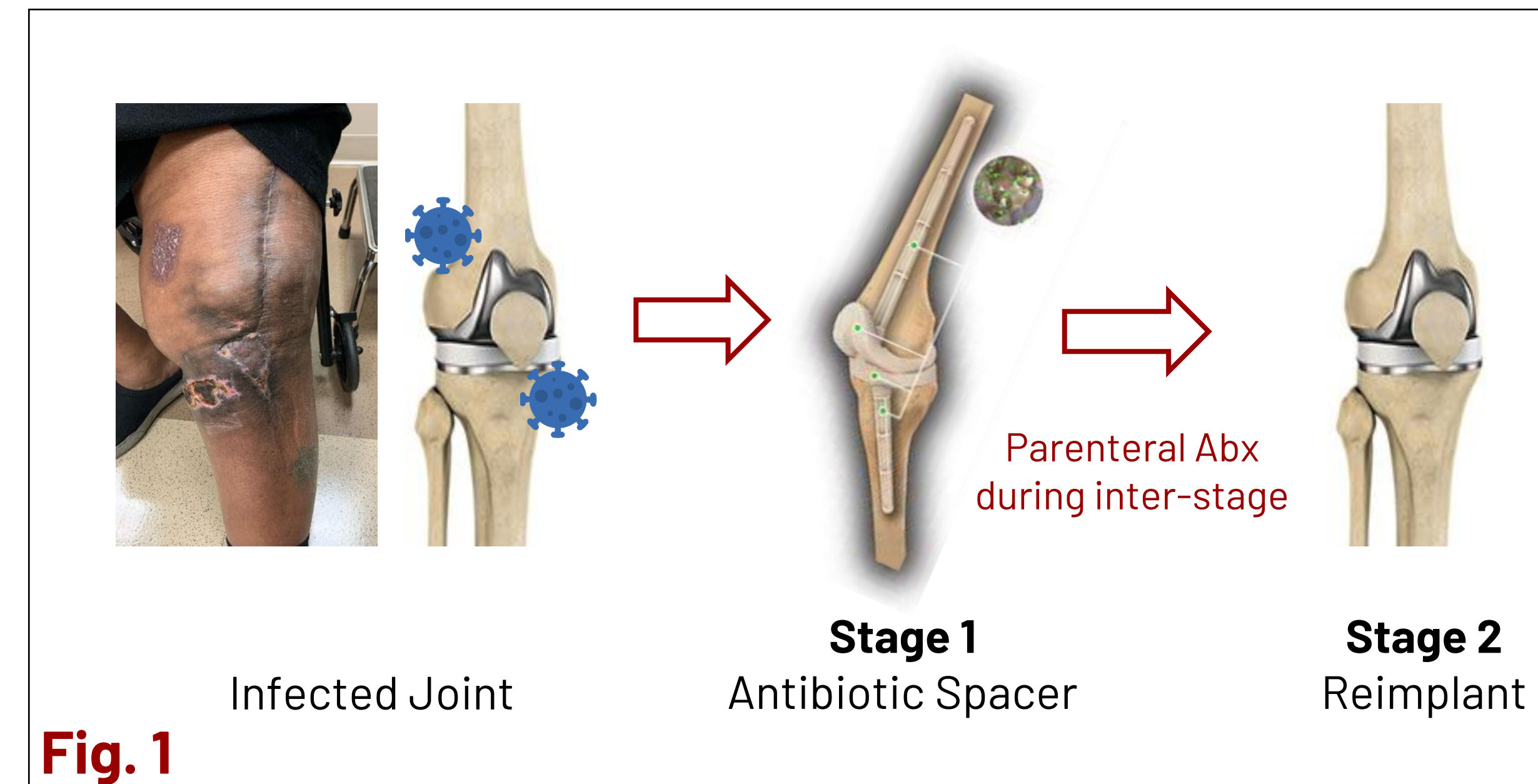
Single institution; resections performed August 2010 to June 2022

Standardized protocols were used for all cases consisting of robust medical optimization by a dedicated perioperative medicine specialist and 6 weeks of IV antibiotics prior to reimplantation.

Manual chart review from the electronic medical record was performed for all cases.

Outcomes: (1) Kidney function metrics of serum creatinine (Cr), estimated glomerular filtration rate (eGFR, CKD-EPI 2021), and blood urea nitrogen (BUN) were collected from routine labs pre-resection, during the inter-stage period, and post-reimplantation. The statistical mean was used for all metrics collected during the inter-stage period. **(2)** Mortality data were collected from a state-wide health care system including date of death and cause of death.

Data analyses were performed in Minitab 22. Analysis of Variance (ANOVA) and individual paired t-tests were used to compare kidney function metrics pre-resection, during the inter-stage period, and post-reimplantation. Survivorship free from mortality was calculated using right-censored non-parametric Kaplan-Meier methodology. A P-value of 0.05 was considered statistically significant.



Results

The cohort was 51% female and 83% ASA-PS class of 3 or 4 with a mean age and BMI of 66.9 years (range, 44-88) and 32 kg/m² (range, 17-60), respectively. 81% of cases were categorized III-A-1 or worse according to the McPherson Classification of PJI.

No significant differences were observed in serum Cr (Fig. 2), eGFR (Fig. 3), or BUN levels (Fig. 4) between pre-resection, during the inter-stage period, or post-reimplant ($P \geq 0.432$; Power $\geq 85.3\%$). NSAIDs were used in the majority of cases at all time intervals (61-83% usage), however did not have a significant effect on kidney function metrics at any time point ($P \geq 0.127$).

Mortality was 0% within 90-days of resection, and 1.4% (N=2/138) within 1-year of resection (both unrelated to kidney function; cardiac events).

Mortality regardless of timing after resection was 18.8% (N=26/138). 3 of the 26 total deaths (11.5%) were related to kidney function at a mean of 6.3 years (range, 5-9) after resection. 8 of the 26 total deaths occurred without a known cause identified in the EMR at a mean of 6.8 years (range, 4-10) after resection.

Survivorship free from mortality was 98% at 2-years and 86% at 5-years post-resection (Fig. 5).



Conclusions

Kidney function via Cr levels, eGFR, and BUN was not adversely impacted by the antibiotics associated with the two-stage revision procedure for PJI.

In addition, survivorship following two-stage treatment for PJI was high (98%) out to 2 years after resection.

With proper medical management, the two-stage revision for PJI remains the preeminent treatment for PJI following TJA.