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Treatment Outcomes in Gram Negative Periprosthetic Joint Infection

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**Title**: Treatment Outcomes in Gram Negative Periprosthetic Joint Infection

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**Introduction**: Outcomes associated with periprosthetic joint infection (PJI) involving Gram negative (GN) organisms are poorly understood. While prevailing beliefs indicate that GN PJI cases have poorer prognoses than Gram positive (GP) cases, the current literature is sparse and inconsistent.

**Objective**: The purpose of this study is to systematically compare the treatment outcomes for GN PJI versus GP PJI.

**Methods**: A retrospective review of 1189 PJI cases between 2007 and 2017 was performed using an institutional PJI database. Treatment failure defined by the Delphi criteria was compared between cases with only GN organisms ($n=45$) and only GP organisms ($n=663$). Cox multivariate regression was used to predict time to failure.

**Results**: GN status did not have significantly higher rates of treatment failure compared to GP PJI ($OR=1.021$, $p=.375$) in the multivariate analysis. After sub-analysis of only two-stage exchange procedures, GN cases were significantly less likely to reach reimplantation than GP cases ($OR=.182$, $p<.0001$). Patients with GN infections were older ($p=.041$) and had more comorbidities ($p<.0001$) than GP patients.

**Conclusions**: While there was no observed difference in the overall Delphi failure rates between GN and GP PJI cases, GN patients were significantly less likely to reach reimplantation. We hypothesize this is largely a result of the GN patients being older and more comorbid hosts. This data increases insight into the risk factors and outcomes of GN PJI. Further research is needed to investigate the utility of alternate procedures to the two-stage exchange in older or immunocompromised patients.