Periprosthetic Joint Infection and the Trojan Horse Theory: Examining the Role of Gut Dysbiosis and Epithelial Integrity

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INTRODUCTION: Surgical site infections (SSI) are uncommon yet dreadful complications after total joint arthroplasty (TJA). Emerging evidence suggested a role for the gut microbiome in the pathogenesis of such infections as a reservoir of opportunistic pathogens.

METHODS: A secondary analysis of an ongoing trial looking at gut dysbiosis and periprosthetic joint infections (PJI) was performed on patients that had next-generation sequencing done as part of their workup. Gut permeability and dysbiosis was measured using known biomarker such as Zonulin. Statistical analysis consisted of descriptive statistics and logistic regression modeling.

RESULTS:

Among the cohort of 46 (47.8% female) patients, with a mean age of 68.47 years (range, 40 to 91) and a mean BMI 31.15 ± 6.49 kg/m2, 38 patients underwent revision for PJI (29 chronic and 9 acute infections), and 8 patients were classified as aseptic failures. Then, review of each of the bacteria retrieved was performed. Those known to be gut commensal based on available literature were noted. When regression modeling was performed, Zonulin levels were found to be associated with an increased probability of a similar finding (Estimate: 0.377, OR: 1. 458; p=0.001).

DISCUSSION AND CONCLUSION: In our study, we report the first clinical evidence of the translocation of bacteria from the gut to the joint in surgical site infections. In particular, when evaluating the microbiological profile of the NGS signal, a great number of known gut commensals were seen in patients with highly permeable dysbiosis gut. Manipulation of the guy microbiome may become part of an essential and comprehensive approach for management of patients with PJI.

Figure 1. Conditional estimates plot based on bi-variable logistic regression is provided.

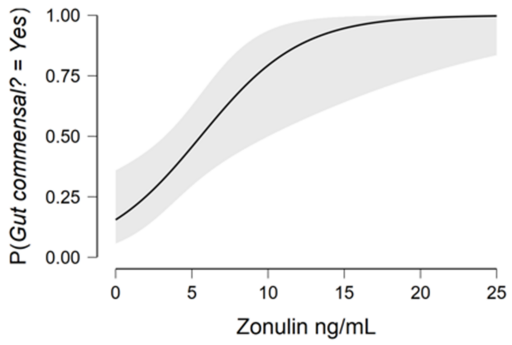

Table 1. Bi-variable logistic regression looking at "Gut commensal? = Yes" as dependent outcome.

Covariate	Estimate	Standard Error	Odds Ratio	P value
Zonulin ng/mL	0.377	0.117	1.458	0.001