

## **The CRP/Albumin Ratio is a Prognostic Indicator to Guide the Timing of Reimplantation in PJI**

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**INTRODUCTION:** The optimal timing for reimplantation following a two-stage exchange for chronic periprosthetic joint infection (PJI) remains elusive and subjective. In response to infection, the liver produces more C-reactive protein (CRP) while inflammation related vascular permeability increases leading to decreased serum albumin. With resolution of infection, CRP levels decrease while albumin increases. We theorized that a ratio of these values could guide timing of reimplantation. The purpose of this study is to determine if the CRP/albumin ratio correlates with PJI recurrence.

**METHODS:** Patients undergoing a 2-stage exchange for chronic PJI at two institutions were retrospectively reviewed. Patients with an albumin and CRP level at least 8 weeks post-resection and prior to reimplantation, with a minimum 2-year follow-up were included. The primary outcome was recurrence of PJI. The CRP/albumin ratio was analyzed with receiver operating characteristic curves (ROC) for response failure.

**RESULTS:** Fifty patients met final inclusion criteria, of which 8 (16%) had recurrence of infection. The mean CRP level (normal <0.9 mg/dL) was higher in the recurrence group than in the success group ( $3.6 \pm 1.9$  mg/dL vs  $1.9 \pm 2.1$  mg/dL,  $p=.032$ ). Similarly, the mean albumin level (normal 3.9-4.9 g/dL) was lower in the failure group than in the success group ( $3.3 \pm 0.8$  g/dL vs  $4.1 \pm 0.4$  g/dL,  $p<.001$ ). The CRP/albumin ratio was higher in the recurrence group than in the success group ( $1.1 \pm 0.5$  vs  $0.5 \pm 0.6$ ,  $p=0.004$ ). ROC plot of the CRP/albumin ratio found an area under the curve of .717, which represents a 72% chance of recurrent infection for patients with a ratio  $\geq 1.0$ . Patients with a CRP/albumin ratio  $\geq 1.0$  had a higher risk of recurrence of PJI (OR 7.08,  $p=0.018$ ).

**DISCUSSION AND CONCLUSION:** A high CRP/albumin ratio prior to reimplantation correlates with an increased risk of PJI recurrence following two-stage exchange and may help surgeons determine the appropriate timing for reimplantation.