Red Cell Distribution Width: an Unacknowledged Predictor of Mortality and Length of Stay following Revision Arthroplasty

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INTRODUCTION

In this single institutional retrospective study, 2,261 patients who underwent revision hip or knee arthroplasty during 2000-2009 were included. Postoperative LOS and mortality at one, three, and twelve months were assessed. Patients with hereditary anemia and acute and chronic heart failure, peripheral artery disease, chronic pulmonary disease and acute kidney injury1. The purposes of this study were 1) to investigate possible relationship between RDW levels and mortality following revision total joint arthroplasty (TJA), and if that correlation existed, 2) to develop predictive models for LOS and mortality based on preoperative patient-related factors including RDW values.

MATERIALS AND METHODS

In this single institutional retrospective study, 2,261 patients who underwent revision hip or knee arthroplasty during 2000-2009 were included. Postoperative LOS and mortality at one, three, and twelve months were assessed. Patients with hereditary anemia were excluded because of their effect on RDW values. Multivariate analysis was built based on preoperative patient-related factors.

RESULTS

Strong correlation existed between preoperative and postoperative RDW values (Figure 1 and Table 1). Therefore, only preoperative RDW values were analyzed in this study to eliminate the potential confounding influence of surgical and postoperative care. There was statistically significant yet weak correlation between RDW values and Charlson comorbidity index (CCI) (Spearman’s ρ : 0.16, p=0.005). RDW values were higher in patients who died at one (15.4 versus 14.1, p=0.031), three (15.6 versus 14.1, p=0.002), and twelve (15.4 versus 14.1, p=0.001) months. In multivariate analysis, age, male gender, CCI, and preoperative RDW values were independently correlated with mortality at all time points (Tables 2 and 3). Prediction models for LOS and mortality were developed (Figures 2 and 3).

DISCUSSION

RDW is an inexpensive parameter that can serve as an independent predictor of mortality and LOS following revision TJA. Although RDW was correlated with CCI, it was an independent predictor of LOS and mortality. RDW should be analyzed as part of the routine perioperative work-up and used to counsel patients on their postoperative risk. Higher RDW values (anisocytosis) might reflect the sum of multiple physiologic impairments that have considerable influence on erythrocyte progenitors ultimately leading to an adverse outcome2.

REFERENCES