Risk Factors for Surgical Site Infection Following Total Joint Arthroplasty

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INTRODUCTION

Surgical Site Infection (SSI) after total joint arthroplasty (TJA) is a rare but devastating complication. In spite of improvement in the prevention of SSI, these infections are still a significant cause of morbidity in surgical patients. Management of Hospital Acquired infections (HAI) including SSI poses a huge economic burden on healthcare. As part of the mission to reduce the burden of HAI, the Centers for Disease Control and Prevention (CDC) has issued guidelines for the prevention of SSI that are currently being updated. In addition, CDC requires all hospitals to report HAIs through the National Healthcare Safety Network (NHSN) surveillance program.

It is believed that identification of patient-related risk factors and their reversal in some cases can lead to a reduction in SSI. Although several studies have been performed to determine the risk factors of SSI following TJA, risk factors for SSI as defined by the CDC and required to be reported has not been fully evaluated. The objective of this case-control study was to determine the patient-related risk factors for SSI following primary and revision TJA using our institutional database on TJA and the data generated by the NHSN surveillance.

MATERIALS AND METHODS

Upon approval of the Institutional Review Board, 6,111 primary and revision TJA performed between April 2010 and June 2012 were identified. SSI cases based on the CDC definition were detected using the names of patients admitted to other facilities, as the Joint Commission and Act 52 requires institutions to share this information with each other. SSI cases with index surgery performed at another institution were excluded and all cases were followed up for one year regarding development of SSI.

Logistic regression and bootstrap resampling were used respectively to create and validate the model for predictors of SSI. The predictive power of the model was estimated by the area under the curve (AUC) in receiver operating characteristic plots.

RESULTS

During the study interval 6,111 TJA were performed in 3,414 women and 2,697 men with a mean age of 63.0 ± 11.4 (standard deviation) years. SSI developed in 80 cases (1.31%; 95% Confidence Interval: 1.12-1.52). Table 1 demonstrates the rate of SSI in different types of primary total hip arthroplasty (THA) at 1.94%. (95% CI: 0.73-3.14%).

As Figure 1 demonstrates, the rate of SSI increased in patients with a higher Charlson Comorbidity Index (CCI). The highest rate of SSI at 4.23% (95% CI: 0.92-7.53%) was found in patients with a preoperative hemoglobin level of ≤ 10 g/dL (Figure 2).

In conclusion, this study, comprising of a relatively large cohort of patients receiving TJA at a single institution, has identified various risk factors of SSI. Low preoperative hemoglobin level is one of the modifiable risk factors for SSI and preoperative correction of hemoglobin may reduce the likelihood of postoperative SSI. A study comparing impact of preoperative optimization of hemoglobin with not correcting the preoperative hemoglobin level is recommended.

REFERENCES