Risk Factors for Surgical Site Infection Following Total Joint Arthroplasty

Mohammad Rasouli, MD  
*Rothman Institute of Orthopaedics at the Thomas Jefferson University Hospital*

Camilo Restrepo, MD  
*Rothman Institute of Orthopaedics at the Thomas Jefferson University Hospital*

Mitchell Maltenfort, PhD  
*Rothman Institute of Orthopaedics at the Thomas Jefferson University Hospital*

James J. Purtill, MD  
*Rothman Institute of Orthopaedics at the Thomas Jefferson University Hospital*

Javad Parvizi, MD  
*Rothman Institute, Thomas Jefferson University*

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Risk Factors for Surgical Site Infection Following Total Joint Arthroplasty

Mohammad Rasouli MD, Camilo Restrepo MD, Mitchell Malenfort BS, PhD, James J. Pursill MD, Javad Parviz MD, FRCs.

Investigation performed at the Rothman Institute of Orthopaedics at the Thomas Jefferson University Hospital, Philadelphia, PA.

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 HI 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 reduces the likelihood of postoperative SSI. A study comparing impact of preoperative optimization of hemoglobin and preoperative correction of hemoglobin may reduce the rate of SSI.

MATERIALS AND METHODS

Upon approval of the Institutional Review Board, 6111 primary and revision TJAs performed between April 2010 and June 2012 were identified. SSI cases based on the CDC definition were identified. SSI cases following revision TJA using our institutional database on TJA and the data generated by the NHSN surveillance.

RESULTS

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).

Table 1 lists various risk factors associated with SSI. In our model, male gender, revision TKA, and lower preoperative hemoglobin level are independent predictors of SSI (Table 1). The AUC of the model was found to be 0.709 without correction and 0.678 after bootstrap correction for model optimism (200 bootstrap samples). These values indicate that the model has fair predictive power.

Figure 2. Relationship between the preoperative Hemoglobin level and the rate of SSI.

DISCUSSION

The study has some limitations. Despite the availability of a comprehensive database, this retrospective study may suffer from the shortcomings of the design such as non-uniformity of data collection and bias. Despite all efforts to capture data on every SSI that occurred following TJA in this cohort, it is possible that some cases of SSI that were seen and treated at an outpatient basis may have been missed. However, we feel the latter is unlikely, as ordering of any cultures would have led to the notification of the infection surveillance center. We included only variables with the highest probability of affecting SSI in the model to avoid the potential negative effect that entering too many variables in the presence of a small number of events could have on the model. This might be considered as one of the limitations of this study. However, we used various statistical tests to make sure that output is accurate.

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