

Independent Association Between Type of Intra-Operative Blood Transfusion and Post-Operative Delirium After Complex Spinal Fusion (≥ 5 Levels) for Adult Deformity Correction

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Introduction

Intraoperative allogenic RBC transfusions are associated a greater complication risks, length of hospital stay and 30-day readmissions. However, whether intraoperative allogenic, autologous or both RBC transfusions increase the risk for post-operative delirium after complex spinal fusions (≥ 5 levels) remains relatively unknown.

Methods

The medical records of 131 adult (≥ 18 years-old) spine deformity patients undergoing elective, primary complex spinal fusion (≥ 5 levels) for deformity correction a major academic institution from 2005 to 2015 were reviewed. We identified 105(80.2%) who underwent an intraoperative blood transfusion and 26(19.8%) who did not. Of the 105, 15(14.2%) had Allogenic only, 23(21.9%) had Autologous only, and 67(63.8%) had Both. Patient demographics, comorbidities, intra- and post-operative complication rates were collected for each patient. The primary outcome investigated in this study was the rate of post-operative delirium.

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Describe the importance of intraoperative RBC transfusions,
- 2) Discuss, in small groups the impact that transfusions have on post-operative delirium,
- 3) Identify an effective interventions to reduce post-operative delirium in patients receiving intraoperative blood transfusions.

Results

Patient demographics and comorbidities were mostly similar between both cohorts, except for age ($p=0.019$) and BMI ($p=0.038$), Table 1. There were no significant differences in preoperative hemoglobin ($p=0.115$) and hematocrit ($p=0.163$), Table 1. The median number of fusion levels operated and length of surgery were similar between both cohorts, with significant differences in estimated blood loss (Both: 2191.1 ± 1907.9 mL vs. Autologous: 1396.5 ± 790.0 mL vs. Allogenic: 1071.3 ± 577.8 mL vs. None: 506.9 ± 427.3 mL, $p < 0.0001$) and amount transfused (Both: 1777.9 ± 1161.9 mL vs. Autologous 465.7 ± 289.7 mL vs. Allogenic: 986.9 ± 512.9 mL, $p < 0.0001$), Table 2. Postoperative complication profile was similar between the cohorts, except for the PRBC cohort having a significantly higher proportion of patients experiencing delirium (Both: 7.6% vs. Cell-Saver: 17.4% vs. PRBC: 46.7% vs. None: 11.5%, $p=0.002$), Table 3. In a multivariate nominal-logistic regression analysis, Allogenic [OR:24.81, 95% CI(3.930,156.702), $p=0.0006$] and Autologous [OR:6.43, 95%CI(1.156,35.771), $p=0.0335$] transfusions were independently associated with post-operative delirium, Table 4.

Conclusions

Our study suggests that there may be an independent association between intraoperative autologous and allogenic blood transfusions and post-operative delirium after complex spinal fusion.