



# Impact of Preoperative Anemia on Perioperative Outcomes in Adults Undergoing Elective Posterior Cervical Fusion

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## Introduction

Anemia has been shown to be an independent risk factor of postoperative mortality and morbidity in several surgical procedures. Preoperative anemia is of particular concern in posterior cervical fusion (PCF) due to the frequent diagnosis of spinal stenosis associated with this procedure and the substantial metabolic demand of the spinal cord.

## Methods

Adult patients (>18 years) who underwent PCF (CPT code 22600) between 2005 and 2012 were identified in the NSQIP database and categorized into two groups: anemic (male Hct<39%, female Hct<36%) versus non-anemic. Univariate analysis was performed on patient demographics, preoperative comorbidities and operative variables and postoperative outcomes. Only complications with  $p<0.05$  associated with preoperative anemia in univariate analysis were evaluated in step-wise multivariate logistic regression to determine whether preoperative anemia was an adjusted predictor of postoperative complications and outcomes. Statistical significance was maintained at  $p<0.05$ .

## Results

473 patients met inclusion criteria, 106 (22.4%) of which were anemic. Anemic patients were more likely to be American Society of Anesthesiologists (ASA) Class =3 ( $p<0.0001$ ), diabetic ( $p=0.0001$ ) and have a dependent functional status prior to surgery ( $p<0.0001$ ). In regard to preoperative comorbidities, anemic patients were more likely to have a bleeding disorder ( $p=0.006$ ), previous stroke ( $p=0.013$ ) and neuromuscular injury ( $p=0.03$ ). In terms of preoperative laboratory values, anemic patients had lower baseline albumin ( $3.49\pm 0.6$  vs  $4.2\pm 0.4$ ,  $p<0.0001$ ) and hematocrit ( $34.4\pm 3.7$  vs  $42.1\pm 3.1$ ,  $p<0.0001$ ). No differences between the two groups existed in terms of operative time ( $p=0.39$ ) and fusion levels ( $p=0.97$ ). Anemic patients had a greater chance of any complication ( $p<0.0001$ ), death ( $p=0.008$ ), pulmonary complication ( $p<0.0001$ ) and perioperative blood transfusion ( $p=0.0006$ ). Anemic patients were more likely to have unplanned return to OR ( $p=0.012$ ), unplanned readmission ( $p=0.022$ ) and LOS >5 days ( $p<0.0001$ ). In multivariate regression, preoperative anemia was found to be an independent predictor of any complication (OR 3.14,  $p=0.0008$ ), pulmonary complication (OR 9.75,  $p=0.0009$ ), perioperative blood transfusion (OR 3.06,  $p=0.0021$ ), unplanned return to OR (OR 2.87,  $p=0.009$ ) and LOS >5 days (OR 2.86,  $p<0.0001$ ).

## Conclusions

Preoperative anemia in adult patients undergoing elective PCF was independently associated with an increased risk of any complication, pulmonary complication, perioperative blood transfusion, unplanned return to OR and LOS >5 days.

## Learning Objectives

To investigate the impact of preoperative anemia on outcomes in PCF.

## References