African-American race is associated with Increased blood transfusion in pediatric scoliosis surgery

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Background

Significant blood loss in pediatric scoliosis surgery

• Estimate blood loss (EBL) 3500-4000 ml, often requiring allogenic blood transfusions (ABT)

• Risk factors

  Type: Neuromuscular scoliosis

  Patient: ASA=2, female gender, low weight

  Surgical levels fused; surgical approach

• ABT is associated with increased morbidity and mortality

Goal to eliminate health care disparities in United States

• 1999: National Healthcare Disparities Report (NHRD)

Evidence suggests that African-Americans are more likely to receive ABT than Caucasians

Aims

Our study seeks to determine whether African-American race is independently associated with increased EBL and ABT in pediatric scoliosis surgery

Methods

• Retrospective chart review (74 patients) between 2013-2015 of single spine surgeon

• Patient and surgical characteristics were compared between race and scoliosis types using univariate analysis

• Multivariate generalized log-linear models to assess the independent association between race and blood loss in primary pediatric scoliosis surgery

• Adjusted for scoliosis type, gender, pre-operative hematocrit, BMI, and surgery duration

Results

Univariate analysis

• The median [01.03] EBL:Kg: African American 34.67ml/kg; Caucasian 22.05 ml/kg [14.7-73.41] Other 29.02 [12.8-47.5]

• The incidence of ABT administration: African-Americans (50%), Caucasians (19.5%), other races (27.5%)

Multivariate analysis

• African American had 1.5 times the blood loss of Caucasians (p=0.007; 95% CI=1.11-1.95)

• The odds an African-American patient received ABT was 6.3 times higher than a Caucasian patient (p=0.01; 95% CI=1.56-25.08)

• If receiving ABT, an African-American patient receives 2.5 times as much (p<0.01; 95% CI=5.44-11.95)

Conclusions

• In a multivariate model, African-American race was independently associated with both increased EBL and ABT

• Potential causes include racial bias towards undiagnosed coagulopathy and racial differences in musculoskeletal development

• Further study is indicated to investigate possible etiologies

References


Table 1: Numerical variables summarized with median [Q 1, Q 3]; categorical variables summarized with N (%) (%). P-Values from Kruskal-Wallis test for continuous variables and chi-square or Fisher exact test for categorical variables.

Table 2: Univariate outcome models for volume of EBL and ABT administration (binary notation of yes vs. no). Odds ratios indicate the relative risk for categorical variables.

Figure 1: Divox-Steel correlated pairwise comparison found EBL per Kg was greater in African-Americans than Caucasians (p=0.01), but no different than other races (p=0.51).

Figure 2: Bonferroni corrected pairwise comparison found African-American patients (received ABT) into significantly different rates than Caucasians (p=0.04), but not different from other races (p=0.83).

Figure 3: Pre and post-operative Cobb angle. 2 year follow-up.