

The Effects of Preoperative Anemia on Surgical Outcomes of Traumatic Ankle Fractures treated with ORIF

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Introduction

Open reduction internal fixation (ORIF) is an indicated surgery for stabilization and return to normal functional status for most patients with traumatic ankle fractures. Current literature demonstrates that increased severity of anemia is associated with significantly greater odds of postoperative complications and infections following total joint replacements ^{1,2}, as well as an increased risk of myocardial infarction in patients undergoing hip or knee arthroplasty ³. Generally, increased mortality was observed following non-cardiac surgeries with associated preoperative anemia ⁴. In contrast, a higher hemoglobin level at admission is associated with shorter length of stay and lower odds of death and readmission ⁶. However, the current body of literature regarding effects of preoperative anemia on outcomes of orthopedic surgeries lacks a study dedicated to the ankle.

Objective

The aim of this study was to determine if there is a statistically significant association between preoperative anemia and surgical outcomes following ankle fracture ORIF.

Methods

183 adult patients (79 anemic, 104 nonanemic) were included in this study that underwent traumatic ankle fracture ORIF at St. Francis Hospital between January 2016 and December 2020 by 1 of 6 different surgeons. Patients were excluded in cases of polytrauma, revision procedures, autoimmune disease, and need for transfusions at baseline. Preoperative hemoglobin from within 30 days prior to date of surgery was evaluated, with anemia defined as Hb < 12.5 g/dL for women and < 13.5 g/dL for men. Comorbidity rates, hospital length of stay, postoperative wound healing complications, nonunion/delayed union, revisional surgery, postoperative thromboembolic events, and 5-year mortality were evaluated. Statistical analysis was via SPSS software, with statistical significance of p=0.05.

Results

There was a significantly higher rate of diabetes (p < 0.0001) and heart disease (p = 0.0068) noted in anemic patients, along with increased age (p = 0.007) and total number of comorbidities (p < 0.0001). Anemic patients were found to have significantly higher incidence of wound healing complications postoperatively (16.46% vs 1.92%, p < 0.0001). Additionally, anemic patients had longer hospital length of stay (2.27 vs 1.28 days, p = 0.0012). Trends were identified, though not statistically significant, of higher rates of postoperative admission (p = 0.068) and 5-year mortality (p = 0.058) in the anemic patient population. No statistically significant difference was noted between groups with respect to incidence of revisional surgery.

	Anemic	Non-Anemic	% Anemic	% Non-Anemic	P-Value
Total Patients	79	104			
Average Age	58	50			0.007
CKD	7	4	8.86%	3.85%	0.212
Heart Disease	22	12	27.85%	11.54%	0.0068
HTN	33	31	41.77%	29.81%	0.118
Diabetes	26	8	32.91%	7.69%	0.00002
Thyroid	7	7	8.86%	6.73%	0.59
Smoking	8	7	10.13%	6.73%	0.428
Pulmonary	11	9	13.92%	8.65%	0.339
Cancer	4	10	5.06%	9.62%	0.279
Total w/ Comorbidities	58	64	73.42%	61.54%	0.114
Avg # Comorbidities	1.54	0.95			<0.00001

Table 1.

Summary of demographics and total quantity within individual comorbidity categories

	Anemic	Non-Anemic	% Anemic	% Non-Anemic	P-Value
5 Year Mortality	8.00	3.00	10.13%	2.88%	0.058
Revisional Surgery	15.00	19.00	18.99%	18.27%	0.1
Healing Complications	13.00	2.00	16.46%	1.92%	0.00055
Length of Admission (Days)	2.28	1.28	-	-	0.0012
Total Admitted Post Operatively	52.00	47.00	65.82%	45.19%	0.00698

Table 2.

Outcome parameters including 5-year mortality, revisional surgery, healing complication incidence, post-operative admission length, and total # of patients admitted.

Discussion

Those in the anemic patient population included in this study were older and generally had a higher average number of comorbidities than their counterparts. They exhibited higher rates of wound healing complications, more frequent incidence of postoperative admissions, and longer durations of admission overall. While the increased anemic population 5-year mortality rate was not found to be statistically significant, there is an observed trend suggesting that this population is more likely to suffer more frequent and severe adverse outcomes. These findings demonstrate that evaluation of this parameter should be taken into account during surgical planning and patient optimization in the interest of achieving the best possible outcomes.

Conclusions

Anemia should be regarded as a risk factor for more frequent and severe adverse postoperative outcomes based on the presented data and should be taken into consideration in the perioperative period in the interest of attempting to improve patient outcomes, decrease hospital length of stay, and decrease incidence of postoperative morbidity and mortality.

References

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