Preoperative Albumin Does Not Predict Short Term Outcomes in Patients Undergoing Head and Neck Free Flap Reconstruction

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Abstract

Objectives: To evaluate the impact of preoperative albumin on short term outcomes of patients undergoing head and neck reconstructive procedures with free tissue transfer.

Methods: The NSQUIP was queried for all cases of free autologous tissue transfer via CPT code. Each patient was allocated to normal albumin (3.5-5.0 g/dL) or abnormal albumin (<3.5 g/dL) subgroups based on preoperative laboratory tests and were then further stratified to identify baseline characteristics.

Results: A total of 232 subjects met inclusion criteria. The relative risk of flap failure and odds ratio between the two groups were not significantly different [(RR = 0.605, 95% CI: 0.198-1.841), (OR = 1.05, 95% CI: 0.3393 to 3.2296)] and no association was identified between serum albumin and flap survival (chi square value = 0.794, P=0.373). Although not statistically significant, we identified a trend toward increased wound infection and return to operating room in the abnormal albumin group (chi square value = 2.24, p = 0.13 and chi square value = 2.40, p = 0.12).

Conclusions: This analysis demonstrates that albumin may not be a significant predictor of short term free flap outcomes in head and neck reconstruction with free autologous tissue transfer.

Introduction

It is well documented that albumin serves as a marker for a patient's nutritional status. The normal range for albumin ranges from 3.5 to 5 g/dL upon serum sampling for preoperative or inpatient lab testing. Furthermore, it is also well known that patients who maintain poor nutritional status maintain poorer wound healing outcomes similar to those undergoing chronic steroid regimens, suffer from diabetes or maintain poor vascular integrity.

Besides a single study in the maxillofacial literature, the otolaryngology community is devoid of large scale analyses of nutritional markers and their ability to predict short term outcomes of free tissue transfer. As a result, in this study our group retrospectively reviewed autologous free tissue transfer cases within the National Surgical Quality Improvement Database for nutritional markers, specifically albumin, and wished to determine if there was any association or increased odds of flap failure in patients with poor nutritional status reflected by an abnormally low albumin value.

Methods and Materials

The American College of Surgeons National Surgical Quality Improvement Program was queried for all cases of autologous free tissue transfer via CPT code. These were further refined by specialty to include only those involving the head and neck.

Each patient was allocated to normal albumin (3.5-5.0 g/dL) or abnormal albumin (<3.5 g/dL) subgroups based on preoperative laboratory tests and were then further stratified based on diabetes, heart failure, body mass index, dialysis, renal failure, previous chemoradiation, smoker status, alcohol, transfusions, steroid use, DVT, previous coagulopathy, PTT/PT/INR, BUN, creatinine and hematocrit

Patient cohorts were then compared to discern an association between free flap failure and survival over a thirty day period. Secondary outcomes included wound complications and return to operating room.

	Normal Albumin	Abnormal Albumin	Chi Square
Diabetes	15	12	0.21 (-0.10, 0.96)
Heart Failure	0	0	-
Smoker Status	38	41	0.82 (-0.24, 8.51)
Steroid Use	4	7	0.55 (-2.49, 1.51)
Renal Failure	0	0	-
Hematocrit	39.30	37.62	0.08 (-0.25,4.20)

Table 1. Baseline Cohort Characteristics

Results

A total of 232 cases were identified in the National Surgical Quality Improvement Program Database. 146 cases were found to maintain normal albumin while 87 patients were abnormal. Of the 87 cases with abnormal pre-operative albumin, 20 were fascial free flaps, 23 were myocutaneous free flaps and 44 were free skin free flaps. Free flap failure occurred in a total of five percent of total cases (7 – Normal Albumin, 5 – Abnormal Albumin).

The normal albumin and abnormal albumin subgroups were found to be statistically similar according to baseline characteristics (diabetes, heart failure, body mass index, dialysis, renal failure, previous chemoradiation, smoker status, alcohol, transfusions, steroid use, DVT, previous coagulopathy, PTT/PT/INR, BUN, creatinine and hematocrit) (Table 1).

The relative risk of flap failure and odds ratio between the two groups were not significantly different [(RR = 0.605, 95% CI: 0.198-1.841), (OR = 1.05, 95% CI: 0.3393 to 3.2296)] and no association was identified between serum albumin and flap survival (chi square value = 0.794, P=0.373). Although not statistically significant, we identified a trend toward increased wound infection and return to operating room in the abnormal albumin group (chi square value = 2.24, p = 0.13 and chi square value = 2.40, p = 0.12) (Table 2).

	Normal Albumin	Abnormal Albumin
Flap Survival Past 30 Days	155	65
Flap Failure	7	5

	Value	95% Confidence Interval
Relative Risk Ratio	0.605	0.198-1.841
Odds Ratio	1.050	0.339-3.229
Chi Square Value	0.794	P=0.373

Table 2: Relative Risk, Odds Ratio and Association Between Albumin Status And Flap Status Within 30 Days.

Discussion

The surgical literature demonstrates that the current rate of free flap failure is approximately two to four percent and due to the significant operative resources involved with each procedure, it would be beneficial to identify pre-operative markers to predict failure of the free tissue transfer. As a result, our group determined that within the 30-Day post-operative period, albumin status does not reflect success or failure of an autologous free tissue transfer in head and neck surgery. This is in accordance with the aforementioned studies which determined similar findings in non-otolaryngology patients.

Albumin typically reflects several weeks of nutritional status and as a result, is utilized by clinicians, however, pre-albumin is another marker that has proven useful in the general surgery community to trend nutritional status to determine if total parenteral nutrition may be required. As a result, it would be beneficial to determine if pre-albumin values are most sensitive or specific than albumin to predict outcomes of free tissue transfer.

Conclusions

This analysis demonstrates that albumin may not be a significant predictor of short term free flap outcomes in head and neck reconstruction with free autologous tissue transfer. Further studies evaluating other elements of nutritional status, including pre-albumin, a marker of short term nutritional status, are needed to determine its prognostic value.

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