Intraoperative Vasopressor Use Does Not Affect Free Flap Viability

Zachary M Huttinger MD, PhD[1], Hannah Kuhar MD[1], Hilary C McCrary MD, MPH[1,2], Janice L Farlow MD, PhD[1,3], Amit Agrawal MD[1], Catherine T Haring MD[1], Stephen Y Kang MD[1], Enver Ozer MD[1], Nolan B Seim MD[1], Kyle K VanKoevering MD[1], Ricardo Carrau MD[1], James Rocco MD, PhD[1], Matthew O Old MD[1]

1: James Cancer Hospital and Solove Research Institute, Department of Otolaryngology – Head and Neck Surgery, The Ohio State University Wexner Medical Center
2: Huntsman Cancer Institute, Department of Otolaryngology – Head and Neck Surgery, University of Utah
3. Simon Cancer Center, Department of Otolaryngology – Head and Neck Surgery, Indiana University

The James
THE OHIO STATE UNIVERSITY
COMPREHENSIVE CANCER CENTER

Introduction

Microvascular free tissue transfer procedures are often required for reconstruction after complex resection of head and neck pathologies, both benign and malignant. During these lengthy operations, vasopressors are occasionally employed to maintain mean arterial pressure and support perfusion of transplanted tissue. Theoretically, vasopressors can negatively affect free tissue transfer via vasoconstriction and reduced perfusion, although the data regarding this are mixed. The aim of this study is to evaluate outcomes of free flaps used for complex head and neck reconstruction at a single high-volume institution.

Methods

As part of an IRB approved prospective study evaluating clinical outcomes of Enhanced Recovery After Surgery (ERAS) protocols, patients undergoing free flap reconstruction at a tertiary academic medical center from January 2020 to December 2022 were reviewed. Patient demographics, operative details, intraoperative vasopressor use, and post operative complications were extracted. Primary outcome was flap failure. Secondary outcomes included reoperation within 30 days, need for flap revision, hematoma, fistula, infection, 30-day mortality, and 30-day readmission. Univariate statistical analysis with Chi-squared test and multivariate logistical regression was performed using SPSS (IBM).

Results

Patient Population

Eight-hundred and seventeen microvascular free flap operative cases performed between January 2020 and December 2022 were identified and reviewed. Patient demographics are displayed in Table 1. Mean age of patients was 63.9 years and 67.2% of patients were male. Approximately two-thirds of patients (64.0%) were either current of former smokers. Six-hundred and eight (74.4%) of flaps were soft tissue and the remaining 25.6% were osseus. Flap failure was identified in 28 cases (3.4%) and flap revision was required in 29 (3.6%). The only significant difference identified between flap failure and non-failure groups was volume of intraoperative colloid given (1000 vs 766 mL, respectively, $p < 0.001$).

Results

Effect of Vasopressin Use on Free Flap Outcomes

Out of a total of 817 microvascular free flap cases, vasopressors were used in 337 (41.2%). Of the 28 flap failures, 14 (50.0%) of free flap failures had intraoperative use of vasopressors and 8 (57.1%) of those patients had osseous free flaps. Intraoperative vasopressor use was not significantly associated with overall flap failure (p = 0.338), soft tissue flap failure (p = 0.680), nor osseous flap failure (p = 0.054). Intraoperative vasopressor use was not significantly associated (p> 0.05) with need for any reoperation, flap revision, 30-day mortality, 30-day readmission, or other complications (hematoma, fistula, infection, dehiscence) (Table 2). When correcting for intraoperative fluid resuscitation, vasopressor use was not a significant risk factor for flap failure (OR 2.09, 95% CI 0.60 - 7.28), need for flap revision (OR 3.65, 95% CI 0.71 - 18.80), 30-day reoperation (OR1.05, 95% CI 0.55 - 2.00), hematoma (OR 1.07, 95% CI 0.33 - 3.50), fistula (OR 1.51, 95% CI 0.33 - 6.88), abscess (OR 0.13, 95% CI 0.02 - 1.06), 30-day mortality (OR 1.29, 95% CI 0.08 - 20.98), nor 30-day readmission (OR 0.80, 95% CI 0.38 - 1.65) (Figure 1).

Table 1: Study Population Demographics

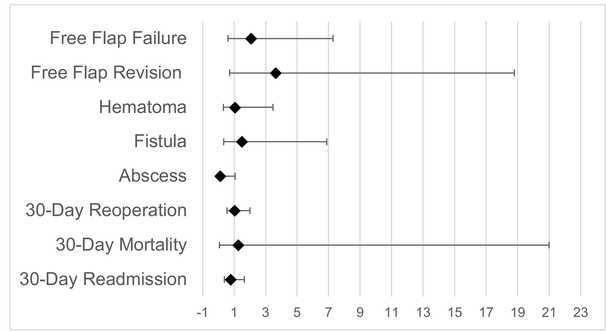
	Free Flap Failure n = 28 (3.4%)	No Free Flap Failure n = 789 (96.6%)	All Surgeries n = 817	*P*-Value
Age, mean (range)	60.3 (18.8 – 85.7)	64.1 (12.9 – 95.6)	63.9 (12.9 – 95.6)	0.145
Gender				0.940
Male	19 (67.9%)	530 (67.2%)	549 (67.2%)	
Female	9 (32.1%)	259 (32.8%)	267 (32.7%)	
Smoking Status				0.775
Never	11 (39.3%)	282 (35.7%)	293 (35.9%)	
Current	12 (42.9%)	364 (46.1%)	376 (46.0%)	
Former	5 (17.9%)	142 (18.0%)	147 (18.0%)	
Unknown	0 (0%)	1 (0.1%)	1 (0.1%)	
Flap Type				0.91
Soft Tissue	18 (64.3%)	591 (74.9%)	608 (74.4%)	
Osseus	10 (35.7%)	198 (25.1%)	209 (25.6%)	
Intraoperative Fluid				
Colloid (mL)	1000.0 (± 645.5)	766.0 (± 291.9)	774.9 (± 314.1)	< .0001
Cyrstalloid (mL)	3076.9 (± 1718.7)	3435.4 (± 1609.5)	3423.9 (± 1613.3	0.245
Any Vasopressor	14 (50.0%)	323 (40.9%)	337 (41.2%)	0.339
Epinephrine	8 (28.6%)	167 (21.2%)	175 (21.4%)	0.349
Norepinephrine	0 (0%)	15 (1.9%)	15 (1.8%)	0.462
Vasopressin	9 (32.1%)	199 (25.2%)	208 (25.5%)	0.409

Results

Table 2: Effect of Vasopressors on Free Flap Complications

	Intraoperative Vasopressor Use n = 337	No Intraoperative Vasopressor Use n = 480	All Surgeries n = 817	*P*-Value
Free Flap Failure	14 (4.2%)	14 (2.9%)	28 (3.4%)	0.338
Soft Tissue Flap Failure	6 (1.8%)	11 (2.3%)	17 (2.1%)	0.680
Osseus Flap Failure	8 (2.4%)	3 (0.6%)	11 (1.3%)	0.054
Free Flap Revision	15 (4.5%)	14 (2.9%)	29 (3.5%)	0.255
30-Day Reoperation	46 (13.6%)	63 (13.1%)	109 (13.3%)	0.835
Hematoma	14 (4.2%)	18 (3.8%)	32 (3.9%)	0.855
Fistula	7 (2.1%)	12 (2.5%)	19 (2.3%)	0.815
Abscess	7 (2.1%)	18 (3.8%)	25 (3.1%)	0.217
Flap Dehiscence	0 (0%)	4 (0.8%)	4 (0.5%)	0.147
30-Day Mortality	5 (1.5%)	4 (0.8%)	9 (1.1%)	0.500
30-Day Readmission	30 (8.9%)	47 (9.8%)	77 (9.4%)	0.716

Figure 1: Odds Ratio of Vasopressors on Free Flap Complications



Conclusions

Here we present the largest single-institution study of patients undergoing head and neck free flap reconstruction and found no association between flap failure or complications with intraoperative vasopressor use, which is in line with prior research. The association between flap failure and vasopressor use trended towards significance in osseous flaps, suggesting further studies are warranted.

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