

Risk Factors for Unplanned Readmission after Head and Neck Free Flap Reconstruction

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Background

- 30-day unplanned readmission rate is an important quality indicator and is increasingly utilized in value-based care paradigms¹
- Patients who are readmitted after surgery experience increased healthcare costs, delays in adjuvant treatment, and are at higher risk for 30-day mortality^{2,3}
- Readmission after surgery negatively impacts patient quality of life and perception of their progression⁴
- Patients undergoing free flap reconstruction of the head and neck are at high risk for an unplanned readmission⁵
- Reduction of unnecessary readmissions would result in significant improvements in both quality and cost of care in these patients
- Understanding risk factors for readmission will be critical in the development of interventions

Methods

- Retrospective review for patients who underwent vascularized free tissue transfer at a single tertiary academic center from January 2007 to June 2017
- Charts were reviewed for demographic features, intra-operative data, and post-operative course
- Planned readmissions and ED/observation visits were not included as readmissions
- Readmission risk factors were evaluated using Fisher Exact Test for categorical variables and two sample t tests for continuous variables

Results

- 892 free flap procedures were conducted on 825 patients
- 80.9% of free flaps were done for malignancy of the head and neck
- The total number of unplanned readmissions within 30 days of discharge was 92 (10.4%)
- Mean number of days between discharge and readmission: 11.7 (range 0-29)

Readmission Reason	Count (%)	Days to Unplanned Readmission (Range)
Failure/Concern for Failure	10 (10.8)	11.3 (2-22)
Fistula/Dehiscence	15 (16.1)	12.6 (2-28)
Donor Site Complication	5 (5.4)	14.4 (0-27)
Not Listed	21 (22.3)	10.46 (1-29)
Infectious	23 (24.7)	11.21 (1-25)
Medical	7 (7.5)	16.1 (7-29)
Bleeding	7 (7.5)	5.57 (1-17)
Mechanical	2 (2.2)	15 (4-26)
Other	3 (3.2)	11.6 (0-24)
Total	93	11.7 (0-29)

Table 1: Reasons for readmission

Results

Variable	Total Patients (n=892)	Not readmitted (n=799)	Readmitted (n=93)	p value
Age	62.5 (SD = 13.5)	62.7 (SD = 13.4)	61.0 (SD = 15.0)	0.259
Sex				>0.999
Male	578	518	60	
Female	314	281	33	
Indication				0.513
Malignancy	722	648	74	
Non-malignancy	106	92	14	
ORN/Osteomyelitis	63	58	5	
Defect location				0.069
Oral Cavity	402	363	39	
Larynx	115	95	20	
Midface	200	181	19	
Oropharynx	29	25	4	
Parotid/Scalp	112	104	8	
Skullbase	19	19	0	
Other	15	12	3	
T stage (n=875)				0.176
Benign	165	147	18	
T1	81	77	4	
T2	180	166	14	
T3	126	114	12	
T4	323	281	42	
Flap Donor Site				0.287
ALTFF	410	372	38	
RFFF	205	188	17	
OCRFFF	26	24	2	
Fibula	189	161	28	
Latissimus	38	32	6	
Scapula	15	14	1	
Other	9	8	1	
Osteocutaneous				0.103
Osteocutaneous	231	200	31	
Nonosteocutaneous	661	599	62	
Orbital Exenteration				0.297
No	793	707	86	
Yes	99	92	7	

Table 2: Patient Demographics

Variable	Total Patients (n=892)	Not readmitted (n=799)	Readmitted (n=93)	p value
Medical Comorbidities				
Diabetes	128	115	13	>0.999
Cardiac Disease	224	200	24	0.900
COPD	92	81	11	0.590
HTN	423	382	41	0.512
Renal Disease	53	47	6	0.816
GERD	179	160	19	0.892
Hypothyroid	111	94	17	0.095
Smoking				0.437
Never	281	256	25	
Yes Former	368	330	38	
Yes Current	243	213	30	
Alcohol Use				0.253
None	461	415	46	
1-2/week	275	250	25	
3-4/week	11	9	2	
5-6/week	21	16	5	
7-14/week	39	35	4	
>14/week	85	74	11	
Prior H&N RT or CRT				0.089
None	613	555	58	
Radiation	124	113	11	
Chemoradiation	155	131	24	

Table 3: Patient Medical and Social History

Variable	Total Patients	Not readmitted	Readmitted	p value	OR
Length of Operation, average (SD), hrs	12.17 (2.36), n=680	12.14 (2.36), n=620	12.54 (2.31), n=60	0.214	
Ischemic Time, average (SD), min	116.38 (36.5), n=865	115.70 (36.2), n=773	122.10 (38.2), n=92	0.111	
Blood Loss, average (SD), mL	361.2 (252.4), n=672	360.87 (255.3), n=612	364.92 (222.1), n=60	0.906	
Difficult Anastomosis or Dissection	195, n=886	170	25	0.184	1.393 (0.853 - 2.274)
Difficult Inset	53, n=878	46	7	0.481	1.360 (0.595 - 3.110)
Revision of Pedicle	32, n=881	28	4	0.559	1.267 (0.434 - 3.699)
Intra-op use of Vasopressors	31, n=685	25	6	0.052	2.563 (1.009 - 6.510)
Intra-op blood transfusion	238, n=688	214	24	0.486	1.216 (0.711 - 2.080)
Implantable Doppler	27, n=881	25	2	>0.999	0.696 (0.162 - 2.990)

Table 4: Intra-operative factors

Variable	Total Patients (n=892)	Not readmitted (n=799)	Readmitted (n=93)	p value	OR
LOS, average (SD), days	9.94 (SD = 7.961)	9.69 (7.728)	12.03 (9.525)	0.007*	
Return to OR	151	130	21	0.143	1.501 (0.891 - 2.528)
Postoperative Complication	254	195	59	<0.001*	5.547 (3.517 - 8.748)
Alcohol Withdrawal	41	34	7	0.184	1.831 (0.788 - 4.257)
Fistula	25	20	5	0.171	2.213 (0.811 - 6.043)
Hematoma	48	40	8	0.146	1.786 (0.809 - 3.941)
Wound Dehiscence	46	37	9	0.047*	2.207 (1.029 - 4.370)
Wound Infection	45	39	6	0.457	1.344 (0.553 - 3.265)
Free Flap Failure	35	30	5	0.400	1.456 (0.551 - 3.850)
DVT	20	18	2	>0.999	0.954 (0.218 - 4.176)
PE	12	11	1	>0.999	0.779 (0.099 - 6.100)
Pneumonia	43	36	7	0.200	1.725 (0.745 - 3.995)
MI	4	3	1	0.357	2.884 (0.297 - 28.01)
Cardiac Complication	49	43	6	0.631	1.213 (0.502 - 2.931)
Sepsis	5	4	1	0.424	2.160 (0.239 - 19.53)
Discharge Destination (n=270)				0.254	
Home	192	175	17		
Rehab	39	35	4		
SNF	9	7	2		
Subacute Rehab	6	4	2		
Not listed	20	19	1		
Other	4	4	0		

Table 5: Post-operative course

Discussion

- We present the largest single institution study on readmission after free flap reconstruction
- Infectious complications were the most common cause for readmission
- In contrast with other studies^{6,7}, there was no significant increase in readmissions in patients with larger tumors or laryngeal defects

Conclusion

- Unplanned readmissions occur in a significant number of patients undergoing free flap reconstruction of the head and neck
- Patients with prior treatment to the head and neck and tumultuous post-operative courses are at higher risk for readmission and may benefit from early follow-up and monitoring

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