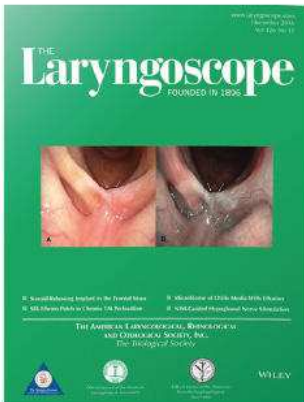


Premiere Publications from The Triological Society

Read all three of our prestigious publications, each offering high-quality content to keep you informed with the latest developments in the field.

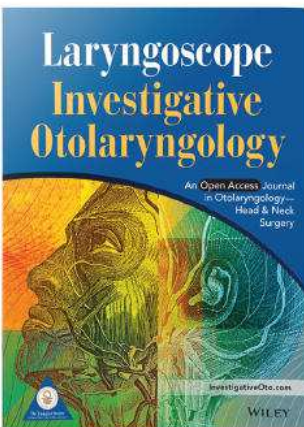


THE Laryngoscope FOUNDED IN 1896

Editor-in-Chief: Michael G. Stewart, MD, MPH

The leading source for information in head and neck disorders.

Laryngoscope.com



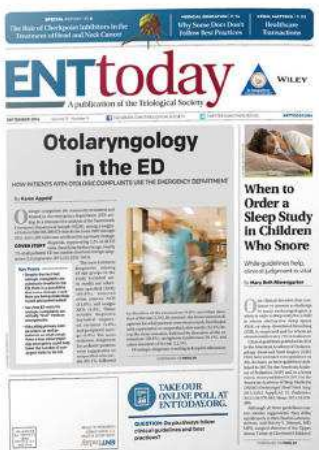
Laryngoscope Investigative Otolaryngology

Open Access

Editor-in-Chief: D. Bradley Welling, MD, PhD, FACS

Rapid dissemination of the science and practice of otolaryngology-head and neck surgery.

InvestigativeOto.com



ENTtoday

A publication of the Triological Society



Editor-in-Chief: Alexander Chiu, MD

Must-have timely information that Otolaryngologist-head and neck surgeons can use in daily practice.

Enttoday.org

WILEY

Risk Factors for Thirty-Day Readmission Following Flap Reconstruction of Oncologic Defects of the Head and Neck

Heather A. Osborn, MD ; Vinay K. Rathi, MD; Tjason Tjoa, MD; Neerav Goyal, MD ;
Bharat B. Yarlagadda, MD; Debbie L. Rich, RN; Kevin S. Emerick, MD;
Derrick T. Lin, MD; Daniel G. Deschler, MD; Marlene L. Durand, MD

Objectives: Unplanned 30-day readmission rate following hospital discharge is an important metric of healthcare quality. This study sought to characterize the rate, risk factors, and common causes of readmission in head and neck cancer patients following free or pedicled flap reconstruction.

Study Design: Retrospective cohort study.

Methods: Charts were reviewed of all patients who underwent free or pedicled flap reconstruction following resection of head and neck cancer at the Massachusetts Eye and Ear Infirmary 2009 to 2014. Readmission risk factors were evaluated by univariate and multivariate analysis.

Results: Of 682 patients with free (76%) or pedicled flap reconstruction, 135 patients (19.8%) were readmitted. Factors not associated with readmission included age, gender, American Society of Anesthesiologists status, operative time, prior radiation therapy, primary cancer site, and free (vs. pedicled) flap type. Significant readmission risk factors included surgical site infections (SSI) (45.2% vs. 9.9%), use of hardware (18.5% vs. 11.3%), and clean-contaminated or contaminated surgery (15.2% vs. clean 8.2%). Surgical site infections ($P < 0.001$) and use of hardware ($P = 0.03$) remained predictive of readmission on multiple regression analysis. Primary reasons for readmission included wound complications (61.5%) and supportive care (15.6%). The median time to readmission was 8 days, and 41% of readmissions occurred within 1 week. Seventy percent of readmissions occurred within 2 weeks, including 77% of readmissions for SSIs and 86% for supportive care.

Conclusion: Readmissions occurred in nearly one-fifth of patients following flap surgery. SSIs and use of hardware were risk factors, whereas wound complications were the most common cause of readmission.

Key Words: Readmission, oncology, head and neck surgery, head and neck oncology, free flap, free tissue, reconstruction, surgical site infection.

Level of Evidence: 4.

Laryngoscope, 128:343–349, 2018

INTRODUCTION

Unplanned 30-day readmission rate is an increasingly important metric of healthcare quality and has been identified as an area of potential cost containment. Centers for Medicare and Medicaid Services (CMS) has focused on readmissions within 30 days of discharge through its Hospital Readmissions Reduction Program.¹

From the Department of Otolaryngology (H.A.B., V.K.R., K.S.E., D.T.L., D.G.D.); the Department of Nursing (D.L.R.); the Department of Medicine, Infectious Disease Unit, Massachusetts General Hospital and Infectious Disease Service (M.L.D.), Massachusetts Eye and Ear Infirmary, Boston; the Department of Otolaryngology, Lahey Hospital and Medical Center (B.B.Y.), Burlington, Massachusetts; the Department of Otolaryngology, University of California (T.T.), Irvine, California; and the Penn State Milton S. Hershey Medical Center, Division of Otolaryngology Head and Neck Surgery (N.G.), Hershey, Pennsylvania.

Editor's Note: This Manuscript was accepted for publication May 8, 2017.

Presented at the Triological Society 2017 Combined Sections Meeting, New Orleans, Louisiana, U.S.A., January 19, 2017.

The authors have no funding, financial relationships, or conflicts of interest to disclose.

Send correspondence to Heather A. Osborn, Department of Otolaryngology–Head and Neck Surgery, Massachusetts Eye and Ear Infirmary, 243 Charles Street, Boston MA 02114.
E-mail: heather_osborn@meei.harvard.edu

DOI: 10.1002/lary.26726

Penalties were instituted by CMS beginning October 2012 to hospitals that had excess readmissions for certain medical conditions such as pneumonia, and the program was expanded in 2014 to 2015 to include select surgical procedures. Further expansion into the surgical specialties is expected. Determining accurate readmission rates for individual surgical procedures has financial implications for hospitals and insurers. More importantly, readmissions adversely affect patients. Identifying risk factors and reasons for unplanned readmissions will inform efforts to reduce these readmissions and improve patient care. As Merkow et al. note, instituting performance metrics that do not have established interventions to allow them to be met may result in ineffective or counterproductive behaviors and unintended consequences.²

The reported 30-day readmission rates in patients undergoing surgery for head and neck cancer range from 5.1% to 26.5%.^{3–7} This broad range primarily reflects the different methodology and inclusion criteria used for various studies. Rates reported from large de-identified data bases that include multiple types of otolaryngologic surgeries tend to be much lower than rates reported by individual institutions for defined procedures in a small patient population. Readmission rates after pedicled or free flap reconstruction are also higher,

reflecting the complexity of these procedures and the comorbidities of this patient population. The percentage of flap reconstructions included in a series will therefore affect readmission rates. Bur et al. reported a readmission rate of 5.1% for 7,605 head and neck cancer surgical patients, but this was based on a large deidentified database in which 48% of surgeries were outpatient procedures; flap reconstruction procedures were excluded; and the 30-day readmission period began at surgery rather than discharge.³ In contrast, Graboyes et al. reported a 26.5% readmission rate within 30 days of discharge for 155 laryngectomy patients at a single institution, 28% of whom had received flap reconstruction during surgery.⁷ Studies of large databases are subject to the accuracy of the data input by coding personnel at multiple hospitals, whereas single-center retrospective reviews can ensure a homogenous population but often involve too few patients to accurately determine risk factors. Information from both types of studies is valuable and complimentary.

The objective of the present study was to assess the rate, risk factors, and reasons for unplanned readmissions in over 680 head and neck cancer patients who underwent oncologic surgery involving free or pedicled flap reconstruction at a single specialty institution over a recent 5.5-year period. To our knowledge, there have been no prior retrospective chart review studies of this size involving both pedicled and free flap reconstruction surgeries for head and neck cancer.

MATERIALS AND METHODS

Approval was obtained from the Massachusetts Eye and Ear Infirmary (MEEI) institutional review board. A retrospective chart review was performed of all cases of free or pedicled flap reconstruction following oncologic resection at MEEI April 1, 2009, through September 30, 2014. Patients who died during the index hospitalization were excluded. All patients were categorized as readmitted or non-readmitted based on the presence of an unplanned readmission to either MEEI or the attached general hospital within 30 days of discharge. All patients had nasal culture on admission to screen for colonization by methicillin-resistant *Staphylococcus aureus* (MRSA).

Patients who underwent a second flap during the same admission were categorized according to their initial flap. Patients who had a scheduled readmission were noted but included in the non-readmitted cohort. Surgical site infections (SSIs) occurring within 30 days of surgery were identified using Centers for Disease Control and Prevention criteria, which include either 1) purulent drainage from the incision, 2) an incision that is deliberately opened or that spontaneously dehisces due to infection, 3) evidence of an abscess or deep infection on exam or imaging, or 4) diagnosis of a SSI by the surgeon or designee.⁸ A fistula was defined as a communication between mucosa (oral cavity, pharynx, or larynx) and skin. Fistulae that also met SSI criteria were counted as SSIs, whereas non-SSI related fistulae were not. Surgical site infections were categorized as recipient site (including the neck dissection site, tracheostomy site, and oncologic defect site) or donor site.

Statistical analysis was performed using SPSS 24.0 software package (SPSS, Chicago, Illinois, U.S.A.). The cohorts were characterized using descriptive statistics. Risk factors associated with an increased risk of readmission were identified using chi-squared tests for categorical variables and Student *t* tests for continuous variables. Variables with a *P* value of ≤ 0.2

were included in multivariate logistic regression. *P* values < 0.05 were considered statistically significant.

RESULTS

There were 682 admissions, excluding one patient who died during the initial hospitalization. Nine of the admissions included two flaps, and only the first flap was included in the analysis. Five hundred forty-seven patients (80.2%) either were not readmitted (532 patients, 78%) or had a planned readmission (15 patients, 2.2%), whereas 135 patients (19.8%) had an unplanned readmission within 30 days of discharge. Of note, including only the 30-day postoperative period would have resulted in a lower rate of readmission (105 patients, 15.4%).

Considering patients with unplanned readmissions within 30 days of discharge versus the remaining cohort (Table I), there were no significant differences in age, gender, American Society of Anesthesiologists (ASA) status, operative time, prior radiation therapy, admission MRSA colonization status, primary cancer site, free (vs. pedicled) tissue transfer, flap type, preoperative admission, or postoperative length of stay. Smoking status and use of alcohol were not assessed. Factors significantly associated with unplanned readmission included SSIs, the use of retained hardware (including plates and/or mesh), and clean-contaminated or contaminated (vs. clean) surgical class. On multiple regression analysis, SSIs ($P < 0.001$) and the use of hardware ($P = 0.03$) remained predictive of readmission.

Wound complications accounted for over 60% of unplanned readmissions (Table II). Nearly 40% of readmissions were due to recipient or donor SSI, whereas 11% were due to wound dehiscence, 5% to a leak or fistula, and 2% to flap failure. The second major reason for unplanned readmission was the need for greater supportive care (15.6%). Difficulty with enteral tube feeding—including obstructed or lost tubes; or patient-reported difficulty managing their tube or the inability to maintain adequate oral intake, which thus required insertion of a nasogastric or gastric tube—accounted for nearly 9% of readmissions, whereas tracheostomy or laryngectomy stoma care issues such as crusting or mucous plugging accounted for nearly 6%.

The remaining readmissions were due to pneumonia; bleeding or hematoma at a surgical site or stoma; nausea and vomiting; or other medical reasons such as diarrhea, seizures, hypercalcemia, hyponatremia, thrombocytopenia, pulmonary embolism, and Addisonian crisis.

The median number of days prior to all unplanned readmissions was 8 days (range 0–30 days). Readmissions were scattered throughout the 30-day postdischarge period (Fig. 1), although 41% occurred during the first week and 70% occurred during the first 2 weeks. Readmissions during the first 2 weeks included the majority of readmissions for SSIs (77%) and for supportive care (86%). Fifty-five percent of patients readmitted for supportive care were readmitted days 1 to 6 postdischarge. Of patients readmitted within the first

TABLE I.
Risk Factors for Unplanned Readmission.

Total (N = 682)	No Unplanned Readmission (N = 547)	Unplanned Readmission (N = 135)	P Value
Female	159 (29.1%)	51 (37.8%)	0.05
Age: mean(SD)	65.06 (12.3)	65.19 (12.3)	0.92
ASA: mean(SD)	2.63 (0.5)	2.59 (0.6)	0.35
Free flap	408 (74.6%)	108 (80.0%)	0.19
OR time (mins): mean (SD)	405.38 (110.2)	405.58 (108.9)	0.99
SSI (recipient plus donor)*	54 (9.9%)	61 (45.2%)	< 0.001
Tumor site:			0.45
Oral cavity [†]	270 (49.4%)	69 (51.1%)	
Oropharynx [†]	58 (10.6%)	15 (11.1%)	
Larynx [†]	74 (13.5%)	21 (15.6%)	
Hypopharynx [†]	25 (4.6%)	11 (8.2%)	
Cutaneous [†]	78 (14.3%)	12 (8.9%)	
Sinus/maxilla [†]	33 (6.0%)	7 (5.2%)	
Salivary gland [†]	6 (1.1%)	0 (0%)	
Flap utilized:			0.31
RFFF [‡]	324 (59.2%)	79 (58.5%)	
ALT [‡]	40 (7.3%)	15 (11.1%)	
Scapular [‡]	4 (0.7%)	2 (1.5%)	
FFF [‡]	38 (6.9%)	12 (8.9%)	
Pectoralis major [‡]	66 (12.1%)	17 (12.6%)	
Submental [‡]	14 (2.6%)	3 (2.2%)	
Supraclavicular [‡]	47 (8.6%)	7 (5.2%)	
Other flap [‡]	14 (2.6%)	0 (0%)	
Preoperative XRT	246 (45.0%)	71 (52.6%)	0.11
Preoperative admission	63 (11.5%)	16 (11.9%)	1.00
Postoperative length of stay, mean	11 days	12 days	0.84
Hardware	62 (11.3%)	25 (18.5%)	0.03
Clean surgical class	83 (15.2%)	11 (8.2%)	0.03
Preoperative MRSA colonization	34 (6.2%)	9 (6.7%)	0.87

*SSIs in patients without readmissions included 44 recipient SSIs, 8 donor SSIs, and 2 with both recipient and donor SSIs. Readmitted patients had 44 recipient SSIs, 12 donor SSIs, and 1 with both.

[†]Cancer resection site.

[‡]Flap donor site.

ALT = anterolateral thigh flap; ASA = American Society of Anesthesiologists status; FFF = fibular free flap; MRSA = methicillin-resistant *Staphylococcus aureus*; Other = latissimus dorsi or temporoparietal fascia flap; RFFF = radial forearm free flap; SSI = surgical site infection at recipient or donor site \leq 30 days postoperatively; XRT = radiation therapy.

week for any reason (55 patients), nearly half were readmitted for infections (24 SSIs, 3 pneumonias).

DISCUSSION

Several studies have examined readmission rates following flap reconstruction in the head and neck, as well as risk factors and reasons for these readmissions (Table III). The rates and risk factors have varied between studies. Offidile et al. reported an 11.6% readmission rate for 249 head and neck cancer patients who underwent free flap reconstruction at a single institution.⁴ Risk factors included prolonged hospitalization and tumors of the oropharynx, laryngopharynx, and hypopharynx. Wound complication was the most common reason for readmission. Carniol et al. used the American College of Surgeons National Surgical Quality

Improvement Program (NSQIP) database to evaluate over 1,200 head-and-neck free flap surgical patients and found a 9.6% readmission rate within 30 days of surgery.⁵ Risk factors for readmission included diabetes, hyponatremia, blood transfusion, and SSI. Garg et al. found a readmission rate of 8.8% using a similar cohort from the NSQIP database, and readmission risk factors included higher ASA scores, disseminated cancer, laryngopharyngectomy, and wound infection or dehiscence.⁶ In keeping with our assessment, multivariate logistic regression by these authors revealed wound complications, including infection and dehiscence, to be independent predictors of readmission.

Kim et al. utilized the NSQIP database to evaluate readmissions following free flaps used for various types of surgeries, including a high proportion of breast reconstruction cases.⁹ The overall readmission rate was 7.9%

TABLE II.
Causes of Unplanned 30-Day Readmissions Among 135 Patients.

Reason for Readmission	Number	Percent
Wound Complications	83	61.5%
SSI recipient	40*	29.6%
SSI donor	12	8.9%
Dehiscence	15	11.1%
Flap failure	3	2.2%
Leak/fistula	7	5.2%
Cellulitis, swelling, or seroma	6	4.4%
Supportive care	21	15.6%
NG/G/J tube problems	9	6.7%
Dehydration	3	2.2%
Tracheostomy care	8	5.9%
Pain	1	0.7%
Bleeding	7	5.2%
Pneumonia	9	6.7%
Nausea/vomiting	2	1.5%
Other medical reasons [†]	13	9.6%
Total	135	100%

*2 patients listed under SSI recipient had concurrent donor site infections

[†]Other medical reasons are listed in the text.

G = gastric; J = jejunostomy tube; NG = nasogastric; SSI = surgical site infection ≤ 30 days postoperatively.

but 10% for the head and neck subgroup. Predictors of readmission in the entire population included open wounds or SSIs, similar to the findings in other studies.

Several other studies have examined readmission rates in the larger head and neck oncology population. Bur et al. used the NSQIP database to review 7605 patients who underwent various procedures for head and neck cancer and found a 5.1% readmission rate within 30 days postoperatively.³ Free flap procedures were excluded, 48% were outpatient procedures, and 49% of surgeries were classified as clean. Clinical factors associated with readmission included age, diabetes, long-term steroid use, disseminated cancer, and a contaminated wound. A single-institution study by Dziegielewski et al. examined 660 operations performed by the head and neck surgery service over a 1-year period and reported a 7.3% readmission rate.¹⁰ The proportion of cases involving flap reconstruction was not reported separately but was included in the 59% of procedures considered to be high risk. Significant risk factors for readmission on multivariate analysis included coronary artery disease, chronic renal failure, failure to undergo a preoperative medical assessment, length of stay greater than 5 days, and the presence of a G-tube at discharge. Although these studies are useful in providing overall information about risk factors in head and neck oncology patients, the broad spectrum of surgical procedures included limits applicability to the head and neck free or pedicled flap population.

Patients undergoing laryngectomy or laryngopharyngectomy are at an elevated risk of surgical complications,

and several authors have examined readmission rates in this patient population. Helman et al. examined 871 patients who underwent total laryngectomy for laryngeal cancer using the NSQIP database and reported an 11.9% readmission rate within 30 days of surgery.¹¹ Patients undergoing free flap reconstruction were excluded. Nearly half of readmissions were due to wound infections or pharyngocutaneous fistula. Shenson et al. reported a readmission rate postdischarge of 20.6% for 116 patients undergoing total laryngectomy or laryngopharyngectomy at a single center.¹² However, only 24% underwent pedicled flap reconstruction, and 8% underwent free flap reconstruction. The most common reason for readmission was a SSI or pharyngocutaneous fistula (33% of readmissions). Graboyes et al. examined 155 patients who underwent total laryngectomy; 26.5% were readmitted within 30 days of discharge.⁷ Only 28% of these patients received a vascularized flap; of these, 80% were pectoralis flaps, whereas only 20% were free flaps. Significant predictors of unplanned readmission were postoperative complications after discharge, an emergency department visit within 30 days of discharge, salvage laryngectomy, and chylous fistula during initial hospitalization.

Chaudhary et al. limited their assessment to patients with laryngeal and oropharyngeal carcinoma who were aged 66 or older years (mean 74 years).¹³ They identified 1,518 cases using the Surveillance, Epidemiology, and End Results (SEER)–Medicare linked database. Only 1.8% of these patients underwent pedicled or free flap reconstruction. The incidence of 30-day readmission was 14.1%. Multivariate regression identified advanced stage disease, advanced age, comorbidity, divorced/separated marital status, preoperative tracheotomy, major surgical procedure, greater length of initial hospitalization, pneumonia, postoperative dysphagia, and cardiovascular events as risk factors. Patients with oropharyngeal cancer were more likely to be readmitted (24.3%) compared with laryngeal cancer (12.3%).

Although many of the studies noted above included only a small percentage of patients who underwent free or pedicled flap reconstruction, the present series included only patients who underwent tissue transfer

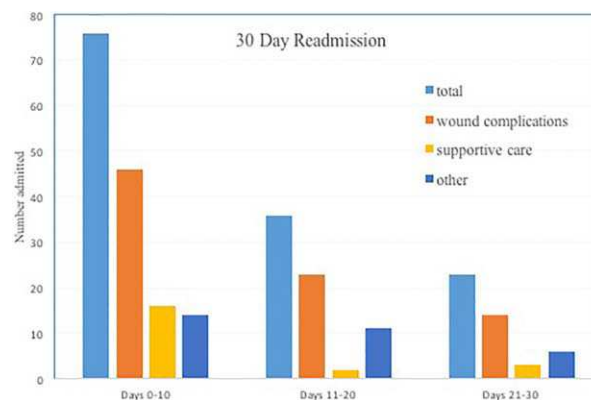


Fig. 1. Length of time between discharge and unplanned readmission. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

TABLE III.
Literature Review of Studies Relating to Head and Neck Cancer and/or Flap Reconstruction Surgery.

Author, Year	Study Type	Study Years	no. Patients	Surgery, Population	% Flaps	Readmission Rate
Carniol, 2017 ⁵	database (NSQIP)*	2011–2013	1,204	H&N cancer surgeries with free flaps	100%	9.6%
Garg, 2016 ⁶	database (NSQIP)*	2011–2014	1,063	H&N cancer surgeries with free flaps	100%	8.8%
Bur, 2016 ³	database (NSQIP)*	2012–2014	7,605	H&N cancer surgeries (48% outpatient)	0%	5.1%
Graboyes, 2017 ¹⁶	database (California State)	2008–2010	5,560	H&N cancer surgeries	N/A	10.1%
Chaudhary, 2017 ¹³	database (SEER-Medicare)	2004–2007	1,518	Laryngeal or oropharyngeal cancer surgeries, age > 65	1.8%	14.1%
Helman, 2016 ¹¹	database (NSQIP)*	2005–2014	871	Laryngectomy	0%	11.9%
Kim, 2015 ⁹	database (NSQIP)*	2011	774 (170 H&N)	Various free flap surgeries (breast, trunk, etc.)	100%	10% in H&N
Offidile, 2015 ⁴	single center	2000–2014	249	H&N cancer surgeries with free flaps	100%	11.6%
Dziegielewski, 2016 ¹⁰	single center	2011–2012	607	All H&N surgeries (80% cancer)	N/A	8.4% for “high-risk”
Graboyes, 2013 ¹⁴	single center	2011	1,271	All ENT admissions (58% H&N cancer)	N/A	7.3%
Graboyes, 2014 ⁷	single center	2007–2012	155	Laryngectomy	28%	26.5%
Goepfert, 2016 ¹⁷	single center	2010–2013	245	Laryngectomy	67%	13.9%
Shenson, 2017 ¹²	single center	2011–2015	116	Laryngectomy	32%	20.6%
Osborn [†]	single center	2009–2014	682	H&N cancer surgeries with free or pedicled flaps	100%	19.8%

*NSQIP studies counted readmissions within 30 days of surgery, while all other studies included readmissions within 30 days of discharge.

[†]Current study.

H&N = head and neck; N/A = not available; NSQIP = National surgical quality improvement program; SEER = Surveillance, epidemiology and end results program.

reconstruction, which may have contributed to the relatively high (19.8%) readmission rate. Head and neck cancer surgeries involving flap reconstruction are associated with relatively high rates of SSIs and other wound complications, and these factors are significant risk factors for readmission. In the present series, wound complications including SSIs were the most common reasons for readmission, and SSIs and the use of hardware were significant risk factors for readmission on multivariate analysis. These results are in keeping with the literature. Both Carniol et al. and Kim et al. found SSIs to be predictive of 30-day readmission in patients undergoing free flap reconstruction.^{5,9} Moreover, wound complications as a major determinant of readmission has been a consistent finding across the surgical literature. Graboyes et al. found that a SSI or wound dehiscence was associated with a nearly sevenfold increase in the risk of readmission in a large population of otolaryngology patients.¹⁴ Merkow et al. examined nearly 500,000 patients admitted for a wide range of surgical procedures and found that the most common overall reason for readmission across surgical specialties was SSI.²

The median time between discharge and readmission in the present series was 8 days, and this is similar to other studies.^{7,11,12} Many early readmissions were for wound complications, and 44% of readmissions during the first week postdischarge were for SSIs. It is possible that wound complications detected at an earlier stage would be amenable to ambulatory management as opposed to admission. As Garg et al. suggested, this raises the possibility that improved surveillance for wound-healing complications in early postdischarge period may decrease readmissions.⁶

A significant secondary group of patients was readmitted due to the need for increased supportive care. Most were readmitted within 2 weeks of discharge. An assessment of rehabilitative supports may identify areas of care intensification that may avert some readmissions. Abt et al. recently examined the impact of location of discharge on readmission rates in patients undergoing elective spinal surgery.¹⁵ They found that discharge to a rehabilitation facility was independently associated with decreased odds of 30-day unplanned readmission (OR = 0.41). Further studies are needed to determine if a higher level of rehabilitative support also may decrease readmissions in the head and neck surgical population.

The rate of readmission in the present study was higher than reported by studies utilizing the NSQIP database. However, the NSQIP database counts readmissions within 30 days of surgery rather than of discharge, a shorter interval. In contrast, we used the same 30-day postdischarge metric used by CMS. Had we included only readmissions within 30 days of surgery, we would have excluded over 22% of readmissions, and our readmission rate would have been 15.4%.

This study expands on the literature in several ways. To our knowledge, this is the largest study from a single center of 30-day readmissions following free and pedicled flap surgery performed for head and neck

cancer. Studies that examine large de-identified databases rely on the accuracy and completeness of data provided by multiple centers, whereas a single-institution study allows a more in-depth analysis of both inpatient and outpatient records, which can provide a more complete understanding of the reasons for readmission. Understanding these reasons may help to identify areas of intervention. The disadvantage of a single-institution study is that it reflects practices at that institution, whereas perioperative practices and thresholds for readmission may differ at other institutions.

Other limitations of this study include its retrospective nature and reliance on the completeness of the medical record. Although it is possible that some patients were admitted to other facilities without this being noted in the record, the number of such patients was likely to be very small. Finally, the list of risk factors analyzed was not exhaustive, and there may be other significant risk factors for readmission that were not assessed in this study.

CONCLUSION

Surgical site infections were the major risk factor for 30-day readmission. The median time to readmission was 8 days, and 70% of readmissions occurred within the first 2 weeks. The majority of readmitted patients returned to the hospital due to wound complications or the need for increased supportive care. Consideration should be given to increased wound surveillance in the early postdischarge period, as well as an assessment of rehabilitative supports to identify areas of intervention.

BIBLIOGRAPHY

- Centers for Medicare and Medicaid Services. Readmissions Reduction Program. Available at: <https://www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/readmissions-reduction-program.html>. Accessed Dec 18, 2016.
- Merkow RP, Ju MH, Chung JW, et al. Underlying reasons associated with hospital readmission following surgery in the United States. *JAMA* 2015;313:483–495.
- Bur AM, Brant JA, Mulvey CL, et al. Association of clinical risk factors and postoperative complications with unplanned hospital readmission after head and neck cancer surgery. *JAMA Otolaryngol Head Neck Surg* 2016;142:1184–1190.
- Offodile AC, Pathak A, Wenger J, Orgill DP, Guo L. Prevalence and patient-level risk factors for 30-day readmissions following free tissue transfer for head and neck cancer. *JAMA Otolaryngol Head Neck Surg* 2015;141:783–789.
- Carniol ET, Marchiano E, Brady JS, et al. Head and neck microvascular free flap reconstruction: an analysis of unplanned readmissions. *Laryngoscope* 2017;127:325–330.
- Garg RK, Wieland AM, Hartig GK, Poore SO. Risk factors for unplanned readmission following head and neck microvascular reconstruction: results from the National Surgical Quality Improvement Program, 2011–2014. *Microsurgery* 2016. doi:10.1002/micr.30116.
- Graboyes EM, Yang Z, Kallogjeri D, Diaz JA, Nussenbaum B. Patients undergoing total laryngectomy: an at-risk population for 30-day unplanned readmission. *JAMA Otolaryngol Head Neck Surg* 2014;140:1157–1165.
- Center for Disease Control. Surgical Site Infection (SSI) Event. Available at: <http://www.cdc.gov/nhsn/PDFs/pscManual/9pscSSICurrent.pdf>. Accessed Dec 18, 2016.
- Kim BD, Ver Halen JP, Lim S, Kim JYS. Predictors of 61 unplanned readmission cases in microvascular free tissue transfer patients: multi-institutional analysis of 774 patients. *Microsurgery* 2015;35:13–20.
- Dziegielewski PT, Boyce B, Manning A, et al. Predictors and costs of readmissions at an academic head and neck surgery service. *Head Neck* 2016;38:E502–E510.
- Helman SN, Brant JA, Moubayed SP, Newman JG, Cannady SB, Chai RL. Predictors of length of stay, reoperation, and readmission following total laryngectomy. *Laryngoscope*. 2016. doi:10.1002/lary.26454.

12. Shenson JA, Craig JN, Rohde SL. Effect of preoperative counseling on hospital length of stay and readmissions after total laryngectomy. *Otolaryngol Head Neck Surg* 2017;156:289–298.
13. Chaudhary H, Stewart CM, Webster K, et al. Readmission following primary surgery for larynx and oropharynx cancer in the elderly. *Laryngoscope* 2017;127:631–641.
14. Graboyes EM, Liou T-N, Kallogjeri D, Nussenbaum B, Diaz JA. Risk factors for unplanned hospital readmission in otolaryngology patients. *Otolaryngol Head Neck Surg* 2013;149:562–571.
15. Abt NB, McCutcheon BA, Kerezoudis P, et al. Discharge to a rehabilitation facility is associated with decreased 30-day readmission in elective spinal surgery. *J Clin Neurosci* 2017;36:37–42.
16. Graboyes EM, Kallogjeri D, Saeed MJ, Olsen MA, Nussenbaum B. Postoperative care fragmentation and thirty-day unplanned readmissions after head and neck cancer surgery. *Laryngoscope* 2017;127:868–874.
17. Goepfert RP, Hutcheson KA, Lewin JS, et al. Complications, hospital length of stay, and readmission after total laryngectomy. *Cancer* 2017;123:1760–1767.