



Predictors of Unplanned Reoperation After Neck Dissection

Zachariah Chandy BA; Rijul Kshirsagar BS; Hossein Mahboubi MD, MPH; Sunil Verma MD
Department of Otolaryngology - Head and Neck Surgery
University of California Irvine



Introduction

- Neck dissection is a common surgery performed by otolaryngologists to manage head and neck malignancies.¹
- Unplanned reoperation is costly to the healthcare system and places a significant burden on patients.
- This study reviews all neck dissections included in the 2011 ACS-NSQIP database to determine the incidence of unplanned reoperation and establish risk factors for development of unplanned reoperation following neck dissection.

Methods and Materials

- The American College of Surgeons National Surgical Quality Improvement Program dataset from 2011 was queried.
- Neck dissection cases were identified and extracted using the Current Procedural Terminology (CPT) codes: 31365, 31390, 31395, 38700, 38720, 38724, 41135, 41145, 41155, 41153, 42426, 60252, 60254, and 69155.
- The primary outcome measured was unplanned reoperation within thirty days of surgery. In addition perioperative variables and patient demographic variables were extracted.
- Univariate analysis and multivariate logistical regression were performed to determine if any perioperative or patient demographic variables were associated with occurrence of unplanned reoperation.

Results

- Data from 2304 patients who underwent neck dissection in 2011 were collected and analyzed.
- A total of 95 patients experienced unplanned reoperation within 30 days of surgery, which corresponds to an incidence of 4.1%.
- Univariate analysis demonstrated a significant association between the occurrence on unplanned reoperation and increased age, diabetes, current smoker, dyspnea, decline in functional status, history of COPD, history of CHF, hypertension, disseminated cancer, weight loss > 10%, history of bleeding disorder, and increased total work RVU (Table 1).
- Multivariate logistical regression demonstrated disseminated cancer, wound classification of 2, current smoking status, increased total work RVU, and increased age were independent risk factors for unplanned reoperation (Table 2).

Table 2. Multivariate analysis of risk factors associated with unplanned reoperation following neck dissection

	OR (95% CI)	P Value
Age	1.02 (1.002-1.038)	0.032
Total Work RVU	1.05 (1.014-1.087)	0.006
Diabetes	1.296 (0.729-2.304)	0.378
Current Smoker	1.711 (1.032-2.838)	0.037
Dyspnea	1.581 (0.809-3.089)	0.18
COPD	1.548 (0.716-3.344)	0.266
Hypertension	1.574 (0.965-2.568)	0.069
Disseminated Cancer	2.889 (1.643-5.080)	<0.001
ASA Classification 3	1.002 (0.625-1.607)	0.992
Wound Classification 2	2.376 (1.409-4.007)	0.001

Table 1. Comparison of demographics and comorbidities between patients undergoing neck dissection with or without unplanned reoperation

Variable	No Unplanned Reoperation (N=2209)	Unplanned Reoperation (N=95)	P Value
Age in yrs, mean (SD)	52.80 (15.92)	61.63 (14.69)	<0.001
BMI in kg/m ² , mean (SD)	27.97 (7.35)	26.85 (6.31)	0.145
Sex			0.002
Male	907 (41.1%)	56 (58.9%)	
Female	1301 (58.9%)	39 (41.1%)	
Race			0.691
Asian	103 (4.7%)	2 (2.1%)	
Black	101 (4.6%)	4 (4.2%)	
White	1719 (77.8%)	77 (81.1%)	
Other	286 (12.9%)	12 (12.6%)	
CPT Code			<0.001
31365	43 (1.9%)	6 (6.3%)	
31390	10 (0.5%)	2 (2.1%)	
31395	9 (0.4%)	3 (3.2%)	
38700	20 (0.9%)	0 (0%)	
38720	56 (2.5%)	4 (4.2%)	
38724	714 (32.3%)	29 (30.5%)	
41135	66 (3.0%)	7 (7.4%)	
41145	4 (0.2%)	2 (2.1%)	
41153	11 (0.5%)	3 (3.2%)	
41155	27 (1.2%)	7 (7.4%)	
42426	47 (2.1%)	5 (5.3%)	
60252	1053 (47.7%)	22 (23.2%)	
60254	149 (6.7%)	5 (5.3%)	
Diabetes	246 (11.1%)	18 (18.9%)	0.019
Current smoker	362 (16.4%)	32 (33.7%)	<0.001
Dyspnea	113 (5.1%)	14 (14.7%)	<0.001
Functional Status	26 (1.2%)	4 (4.3%)	0.032
COPD	64 (2.9%)	11 (11.6%)	<0.001
CHF <30 days before surgery	5 (0.2%)	2 (2.1%)	0.031
Hypertension	782 (35.4%)	55 (57.9%)	<0.001
Acute renal failure	2 (0.1%)	0 (0%)	1
Dialysis	8 (0.4%)	2 (2.1%)	0.061
Disseminated cancer	133 (6.0%)	19 (20%)	<0.001
Open wound or wound infection	32 (1.4%)	3 (3.2%)	0.173
Steroid use	43 (1.9%)	3 (3.2%)	0.436
>10% weight change in <6 months	56 (2.5%)	8 (8.4%)	0.001
Bleeding disorders	28 (1.3%)	4 (4.2%)	0.04
Systemic sepsis	8 (0.4%)	1 (1.1%)	0.316
Chemotherapy < 30 days	41 (1.9%)	1 (1.1%)	1
Radiotherapy < 90 days	33 (1.5%)	3 (3.2%)	0.183
Prior operation within 30 days	49 (2.2%)	1 (1.1%)	0.721
Preoperative Transfusion	1 (0%)	1 (1.1%)	0.081
Emergency Case	10 (0.5%)	1 (1.1%)	0.371
Wound Classification			<0.001
1-Clean	1799 (81.4%)	45 (47.4%)	
2-Clean/Contaminated	384 (17.4%)	48 (50.5%)	
3-Contaminated	22 (1.0%)	2 (2.1%)	
4-Dirty	4 (0.2%)	0 (0%)	
ASA Classification			<0.001
1	122 (5.5%)	2 (2.1%)	
2	1161 (52.6%)	28 (29.5%)	
3	875 (39.6%)	57 (60%)	
4	49 (2.2%)	7 (7.4%)	
5	0 (0%)	1 (1.1%)	
Total work RVU, mean (SD)	24.11 (4.34)	28.09 (7.72)	<0.001

Discussion

- Unplanned reoperation has been proposed as a quality of care measure.^{2,3} With this in mind, this study hopes to provide a nationwide benchmark regarding the incidence of and predictors for unplanned reoperation following neck dissection.
- This study found the incidence of unplanned reoperation following neck dissection to be 4.1%. Unfortunately, the dataset used does not include information regarding the reason for reoperation or the procedure performed, which limits our understanding of the cause of reoperation.
- Predictors of unplanned reoperation included disseminated cancer, wound classification of 2, current smoking status, increased total work relative value unit, and increased age. Many of these factors are known to impair wound healing,⁴ which may have contributed to the need for reoperation.
- The results of this study may help surgeons better understand which patients are at higher-risk of unplanned reoperation following neck dissection. Further studies investigating the cause of unplanned reoperation following neck dissection are warranted.
- This study has limitations, which are important to acknowledge. For example, the data represents findings from a single year, which limits the power of the study. In addition, it is possible that patients may have received care, including unplanned reoperations, at hospitals not included in the ACS-NSQIP database. This could lead to an underestimation of the rate of unplanned reoperation.

Conclusions

- Following neck dissection, the incidence of unplanned reoperation is 4.1%.
- Disseminated cancer, wound classification of 2, current smoking status, increased total work relative value unit, and increased age are risk factors for unplanned reoperation after neck dissection.

References

1. Robbins KT. Indications for selective neck dissection: when, how, and why. *Oncology*. 2000 Oct;14(10):1455-64; discussion 1467-9.
2. Morris AM, Baldwin L-M, Matthews B, et al. Reoperation as a Quality Indicator in Colorectal Surgery: A Population-Based Analysis. *Annals of Surgery*. 2007;245(1):73-79.
3. Birkmeyer JD, Hamby LS, Birkmeyer CM, Decker MV, Karon NM, Dow RW. Is Unplanned Return to the Operating Room a Useful Quality Indicator in General Surgery?. *Arch Surg*. 2001;136(4):405-411.
4. Guo S, DiPietro LA. Factors Affecting Wound Healing. *Journal of Dental Research*. 2010;89(3):219-229.

Contact

Sunil Verma, MD
 Director, University Voice and Swallowing Center
 Dept. of Otolaryngology-Head and Neck Surgery
 University of California, Irvine
 62 Corporate Park, #115
 Irvine, CA 92606, USA
 Email: verma@uci.edu