

Short Hospital Stay Following Neck Dissection

Jeremiah C. Tracy, MD; Jeffrey D. Spiro, MD

Objectives: To review the clinical characteristics of patients who had a short hospital stay (<24 hours) following neck dissection, and to assess the incidence and type of complications in this patient group.

Design: Case series.

Setting: University-based academic medical center.

Patients: All patients who underwent neck dissection at our institution from July 2004 through June 2008 and were discharged within 24 hours postoperatively (short stay) were included.

Main Outcome Measures: Patient demographics, cancer site and type, and details of the procedures performed were quantified. In addition, medical records were reviewed for complications requiring readmission within 30 days postoperatively.

Results: Review of a prospectively maintained surgical database identified 122 consecutive neck dissections performed at our institution from July 1, 2004, to June 30, 2008. Of these 122 procedures, 71 involved a subse-

quent postoperative stay of less than 24 hours. These 71 procedures were performed in 69 patients; they had a mean age of 59 years and a sex distribution that was 33% female and 67% male. Neck dissection alone was performed in 22 of the 71 short-stay cases (31%). The most commonly performed concurrent procedures included limited oral cavity or oropharyngeal resections (21 patients) and parotidectomy (13 patients). Modified radical neck dissection was performed in 22 of the 71 cases (31%); the remaining procedures were selective neck dissections. Cranial nerve XI, the internal jugular vein, and the sternocleidomastoid muscle were all preserved in 57 cases (80%). Of the 71 short-stay cases, only 2 (3%) required readmission for a surgical complication within 30 days of their procedure.

Conclusions: In carefully selected patients, discharge within 24 hours following neck dissection seems to be safe and appropriate. Given the potential for substantial cost savings, short stay should be studied further in this patient population.

Arch Otolaryngol Head Neck Surg. 2010;136(8):773-776

NECK DISSECTION HAS BEEN recognized as an integral part of the surgical therapy of head and neck cancer since the 19th century.^{1,2} Since then, the procedure has undergone many refinements; in particular, it has been modified to preserve vital nonlymphatic structures while maintaining its therapeutic efficacy. Neck dissection is commonly used in the management of cervical lymphatics in the treatment of malignant disease of the upper aerodigestive tract, thyroid, parotid, and skin of the head and neck.³ Although estimates of complication following neck dissection vary from 6% to 28%, it is generally a well-tolerated procedure. Most complications affect local tissue only and typically do not require additional hospitalization.^{4,5} Placement of closed suction

drains has been shown to minimize postoperative complications.⁶

In recent decades, both clinical factors and economic pressures have led to streamlining of care in many surgical procedures. Specific examples include thyroidectomy and axillary lymph node dissections, which have moved from multiple- to single-day postoperative hospitalizations.⁷⁻⁹ The economic benefits of shorter hospital stay are well documented.¹⁰⁻¹² There are also clinical benefits to the patient as demonstrated by Goodman and Mendez⁹ in the field of breast surgery. Furthermore, a recent study¹³ indicated an increasing rate of nosocomial infections in hospitalized patients.

We reviewed our recent institutional experience with patients who underwent neck dissection and had a subsequent hospital stay of less than 24 hours. A previ-

Author Affiliations: School of Medicine (Dr Tracy) and Health Center, Division of Otolaryngology–Head and Neck Surgery (Dr Spiro), University of Connecticut, Farmington; and Department of Otolaryngology, Tufts Medical Center; Boston, Massachusetts (Dr Tracy).

Table 1. Patient Data

Characteristic	Patients, No. (%)	
	Short-Stay Group (n=69)	Long-Stay Group (n=51)
Age, mean (range), y	60 (19-88)	63 (25-92)
Sex		
Female	23 (33)	15 (29)
Male	46 (67)	36 (71)
Comorbidity		
HTN	30 (43)	21 (41)
HLD	12 (17)	11 (22)
DM	5 (7)	3 (6)
CAD	5 (7)	10 (20)
COPD	4 (6)	3 (6)
spCVA	2 (3)	1 (2)
spCABG/stent	2 (3)	5 (10)
Prior neck RT/CRT	1 (3)	4 (10)

Abbreviations: CAD, coronary artery disease; COPD, chronic obstructive pulmonary disease; DM, diabetes mellitus; HLD, hyperlipidemia; HTN, hypertension; RT/CRT, radiation therapy/chemoradiation therapy; spCABG, status post-coronary artery bypass grafting; spCVA, status post-cerebrovascular accident.

Table 2. Disease Characteristics

Characteristic	Patients, No. (%)	
	Short-Stay Group (n=69)	Long-Stay Group (n=51)
Tumor classification		
TX/T0	24 (35)	8 (16)
T1	20 (29)	8 (16)
T2	20 (29)	18 (35)
T3	4 (6)	15 (19)
T4	1 (1)	2 (4)
Nodal classification		
N0	16 (23)	23 (45)
N1	26 (38)	19 (37)
N2	23 (33)	9 (18)
N3	4 (6)	0
Tumor histologic characteristic		
Squamous cell carcinoma	52 (75)	45 (88)
Thyroid neoplasms	9 (13)	2 (4)
Salivary gland neoplasms	6 (9)	3 (6)
Melanoma	2 (3)	0
Osteosarcoma	0	1 (2)

ous study¹⁴ on short stay after neck dissection demonstrated that a short stay is safe and appropriate in certain patients. In addition, Chen et al¹⁵ recently published a clinical pathway advocating discharge of patients following neck dissection on postoperative day 2, with closed-suction drains in place. In reviewing our relatively large case series, we hope to expand on these data and demonstrate that a short hospital stay is a safe alternative for carefully selected patients undergoing neck dissection.

METHODS

For many years, it has been the practice of the senior author (J.D.S.) to discharge selected patients the day following neck dissection. This decision is based on clinical criteria with the scope of pro-

cedure playing a central role; only patients undergoing clean neck surgery with either no primary site resection or limited per-oral or endoscopic excision are eligible for short stay. All patients discharged in the short-stay group had returned to their baseline level of function, had vital signs within normal limits, and had appropriate help at home. In addition, patients received drain-care instructions by a staff nurse. Patients were directed to strip and empty drains, recording the output, every 8 or 12 hours. They were advised of signs of wound infection and instructed to call the otolaryngology office or on-call physician with any questions. Discharge with a drain in place was contingent on the patient's physical and mental capacity to manage their drain, or the ability of a competent family member to assist if necessary.

Review of a prospectively maintained surgical database identified 122 consecutive neck dissections performed at our institution from July 1, 2004, to June 30, 2008. In 71 of these 122 cases, patients were discharged within 24 hours. Patients in this group were classified as "short-stay" patients. Patients' characteristics (age, sex, comorbidities, and cancer site and type) and details of the procedures performed (levels dissected, structures sacrificed, and concurrent procedures) were reviewed. In addition, medical records were examined for any hospital admission within 30 days postoperatively. In the event of a readmission, additional information, including admission diagnosis and length of stay, was reviewed.

RESULTS

Review of our prospectively maintained surgical database identified 122 consecutive neck dissections performed in 118 patients from July 1, 2004, to June 30, 2008. All of these procedures were performed by the senior author (J.D.S.). Of these 122 procedures, 71 cases met the criteria of our short-stay group. These 71 neck dissections were performed in 69 patients. Characteristics of both short- and long-stay groups are illustrated in **Table 1**. The short-stay group had a mean age of 59 years, with 23 female and 46 male patients (33% and 67%, respectively). The most common comorbidities observed were hypertension in 30 patients (43%) and hyperlipidemia in 12 (17%). In addition, some patients in our short-stay group had more severe comorbidities, such as coronary artery disease (7%) and chronic obstructive pulmonary disease (6%). Only 2 patients in the short-stay group (3%) had prior radiation or chemoradiation therapy.

Disease characteristics are recorded in **Table 2**. The most common histologic type of cancer treated was squamous cell carcinoma (n=52 patients), which comprised 75% of cases. Other diseases treated were papillary thyroid carcinoma, salivary gland tumors, and malignant melanoma. Sixteen of the patients (23%) had clinically negative necks, and 49 (71%) had nodal disease classified as N1 or N2 at presentation. In the short-stay group, tumor classification was T0 or T1 in most cases (64%). In the long-stay group only 32% of patients had T0 or T1 disease.

The extent of neck dissection performed is presented in **Table 3**, which includes comparable data for our long-stay cases. Twenty-three short-stay cases (32%) were radical or modified radical neck dissections. The remainder of cases were selective neck dissections. Cranial nerve XI, internal jugular vein, and sternocleidomastoid muscle were

Table 3. Procedure Data

Procedure	Patients, No. (%)	
	Short-Stay Group (n=71)	Long-Stay Group (n=51)
Side of dissection		
Bilateral	2 (3)	9 (18)
Right	42 (59)	21 (41)
Left	27 (38)	22 (41)
Levels, No. ^a		
>3	23 (32)	9 (18)
3	35 (50)	31 (61)
<3	13 (18)	11 (21)
Structures sacrificed (CN XI, IJV, SCM)		
None	57 (80)	42 (82)
1	7 (10)	2 (4)
2	3 (4)	5 (10)
3	4 (6)	2 (4)

Abbreviations: CN XI, cranial nerve XI; IJV, internal jugular vein; SCM, sternocleidomastoid muscle.

^aMaximum number of levels dissected on a single side of the neck (ie, if levels 2-4 were on the right and levels 2-3 were on the left, then it was counted as "3").

all preserved in 57 short-stay cases (81%). The extent of neck dissection was similar between the 2 groups. Simultaneous bilateral neck dissection was performed in 9 patients in the long-stay group (18%) but was performed in only 2 patients in the short-stay group (3%) and was limited to selective neck dissections in those 2 cases.

Concurrent procedures performed are documented in **Table 4**. Isolated neck dissection represented 22 of the 71 short-stay cases (31%). The most commonly performed concurrent procedures in the short-stay group were limited per-oral resections of the oral cavity or oropharynx (21 cases). More extensive concurrent open procedures, such as laryngectomy, segmental mandibulectomy, and mandibulotomy, as well as free flap reconstruction, were performed only in the long-stay group.

As detailed in **Table 5**, the short-stay oral cavity and oropharyngeal resections were composed almost entirely of tonsillar fossa/pillar resection, partial glossectomy, and floor of mouth excision. All but 1 patient in this group had primary lesions that were classified as T1 (n=11 [52%]) or T2 (n=9 [43%]). The 1 exception was a patient with a small upper gingival carcinoma with limited bone involvement classified as T4.

Of the 69 patients discharged within 24 hours following neck dissection, only 2 (3%) required readmission for a surgical complication within 30 days of their procedure. These 2 surgical complications were a local wound infection and a pharyngocutaneous fistula. One other patient was readmitted on postoperative day 30 with a diagnosis of nausea and vomiting; this admission was not considered a surgical complication.

COMMENT

In a climate of increasing health care costs and decreasing hospital resources, the economic benefits of a short hospital stay are well documented.^{10,12} However, eco-

Table 4. Concurrent Procedures

Procedure	Patients, No. (%)	
	Short-Stay Group (n=71)	Long-Stay Group (n=51)
No concurrent procedure	22 (31)	3 (6)
DL ± Bx	13 (18)	0
Primary site excision	36 (51)	48 (94)
Oral cavity/oropharyngeal resection	21 (30)	30 (59)
Superficial parotidectomy	10 (14)	6 (12)
Total parotidectomy	3 (4)	2 (4)
Thyroidectomy	2 (3)	0
Total laryngectomy	0	5 (10)
Partial laryngectomy	0	4 (8)
Mandibulotomy	0	2 (4)
Segmental mandibulectomy	0	7 (14)
Free flap reconstruction	0	4 (8)

Abbreviations: Bx, biopsy; DL, direct laryngoscopy.

Table 5. Oral Cavity and Oropharyngeal Resections

Type of Procedure	Patients, No. (%)	
	Short-Stay Group (n=21)	Long-Stay Group (n=30)
Tonsillar fossa/pillar resection	8 (38)	1 (3)
Partial glossectomy	6 (28)	5 (17)
Floor of mouth resection	5 (24)	4 (13)
Partial maxillectomy	1 (5)	0
Marginal mandibulectomy	1 (5)	1 (3)
Segmental mandibulectomy	0	7 (23)
Base of tongue resection	0	4 (13)
Pharyngeal resection	0	3 (10)
Parapharyngeal space dissection	0	2 (7)
Mandibulotomy	0	2 (7)
Free flap reconstruction	0	1 (3)

nomic benefits must be weighed against any potential increase in morbidity or mortality for the patient. Randomized controlled trials to assess clinical outcomes related to hospitalizations of long or short duration are simply not feasible. A patient's clinical condition must be considered in making discharge decisions, and clearly it will be a carefully selected subset of patients undergoing neck dissection that is ultimately deemed appropriate for short stay.

We reviewed a large series of neck dissections (71 procedures) with a complication rate of 3%. This low rate of complications is not surprising because these are patients who underwent either an isolated neck dissection or limited concurrent surgery and who were deemed clinically fit for discharge on the first postoperative day. There were no patients with neck wounds that could be classified as contaminated or clean-contaminated. The fact that this is a generally healthier population than patients who undergo neck dissection as a whole is supported by the mean age of 59 years in the short-stay group. Previous studies^{4,16} on neck dissection irrespective of hospital length of stay have reported a mean age of 66 to 67 years, and indeed the mean age in our own long-stay group was 63 years. Although patients appropriate for short-

stay hospitalization typically represent a relatively healthier group, it is important to note that some of the patients in our study group had clinically significant comorbidities. Five patients had diabetes mellitus, 5 had coronary artery disease, and 4 had chronic obstructive pulmonary disease. Two each had prior cerebrovascular accidents and had undergone open heart surgery.

Weaknesses of this study have already been addressed in part. As a retrospective case series, the data of this study can be only minimally extrapolated. As previously noted, the limited extent of concurrent surgery and lack of previous treatment in our short-stay group limits direct comparison between our population of short-stay patients and other patients undergoing neck dissection. All procedures in our study were performed by a single surgeon. Although this has a positive impact on the consistency of postoperative care, it limits the generalizability of our results because outcomes observed may reflect personal experience.

Although neck dissection is one of the most widely performed procedures in head and neck surgery, research on patient treatment for this procedure has been lacking. There has been considerable systems research attempting to characterize an optimal hospital course following other common procedures, including thyroidectomy and axillary lymph node dissection.^{7-9,17} Such research has brought about a notable decrease in length of stay and associated health care costs for these procedures. With appropriate patient selection, it may be possible to see the length of stay similarly reduced for patients undergoing neck dissection. Chen et al¹⁵ previously introduced a clinical pathway for the management of these patients, and further analysis and refinement of such a pathway are clearly warranted.

The impact of length of stay on health care costs has been demonstrated in other surgical fields.^{11,12} Economic considerations are not the only potential benefits of reducing length of stay. Nosocomial infections are more common today than in prior decades, and research in other surgical fields has demonstrated real patient benefit from earlier hospital discharge.^{9,13} In carefully selected patients, discharge within 24 hours following neck dissection seems to be safe and appropriate. In an environment of increasing scrutiny on health care costs and rising rates of nosocomial infection, the potential benefits of shorter hospital stay are considerable and warrant further investigation.

Submitted for Publication: January 15, 2010; final revision received March 12, 2010; accepted March 17, 2010.
Correspondence: Jeremiah C. Tracy, MD, Department of Otolaryngology, Tufts Medical Center, 800 Washington St, Boston, MA 02111 (jtracy@tuftsmedicalcenter.org).

Author Contributions: Both authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Tracy and Spiro. *Acquisition of data:* Tracy and Spiro. *Analysis and interpretation of data:* Tracy. *Drafting of the manuscript:* Tracy. *Critical revision of the manuscript for important intellectual content:* Tracy and Spiro. *Administrative, technical, and material support:* Spiro. *Study supervision:* Spiro.

Financial Disclosure: None reported.

Previous Presentation: The study was presented as a poster at the American Head and Neck Society Annual Meeting; May 30, 2009; Phoenix, Arizona.

REFERENCES

1. Ferlito A, Rinaldo A, Silver CE, et al. Neck dissection: then and now. *Auris Nasus Larynx*. 2006;33(4):365-374.
2. Crile GS. Excision of cancer of the head and neck with special reference to the plan of dissection based on 132 patients. *JAMA*. 1906;47(22):1780-1786.
3. American Head and Neck Society. Practice guidelines. <http://www.headandneckcancer.org/>. Accessed January 10, 2010.
4. Bland KI, Klammer TW, Polk HC Jr, Knutson CO. Isolated regional lymph node dissection: morbidity, mortality and economic considerations. *Ann Surg*. 1981;193(3):372-376.
5. Olofsson J, Tylor M. Complications in neck dissection. *ORL J Otorhinolaryngol Relat Spec*. 1985;47(3):123-130.
6. Byers RM, Ballantyne AJ, Goepfert H, Guillaumondegui OM, Larson DL, Medina J. Clinical effects of closed suction drainage on wound healing in patients with head and neck cancer. *Arch Otolaryngol Head Neck Surg*. 1982;108(11):723-726.
7. Clark JA, Kent RB III, Kambouris A. One-day hospitalization following modified radical mastectomy. *Am Surg*. 1992;58(4):239-242.
8. Nahas ZS, Farrag TY, Lin FR, Belin RM, Tufano RP. A safe and cost-effective short hospital stay protocol to identify patients at low risk for the development of significant hypocalcemia after total thyroidectomy. *Laryngoscope*. 2006;116(6):906-910.
9. Goodman AA, Mendez AL. Definitive surgery for breast cancer performed on an outpatient basis: physical, psychological, and economic advantages of accelerated discharge after surgical treatment for breast cancer. *Arch Surg*. 1993;128(10):1149-1152.
10. Dimick JB, Chen SL, Taheri PA, Henderson WG, Khuri SF, Campbell DA Jr. Hospital costs associated with surgical complications: a report from the private-sector national surgical quality improvement program. *J Am Coll Surg*. 2004;199(4):531-537.
11. Husted H, Hansen HC, Holm G, et al. Length of stay in total hip and knee arthroplasty in Denmark, I: volume, morbidity, mortality and resources: a national survey in orthopaedic departments in Denmark [in Danish]. *Ugeskr Laeger*. 2006;168(22):2139-2143.
12. Ehsani JP, Jackson T, Duckett SJ. The incidence and cost of adverse events in Victorian hospitals 2003-04. *Med J Aust*. 2006;184(11):551-555.
13. Weinstein RA. Nosocomial infection update. *Emerg Infect Dis*. 1998;4(3):416-420.
14. Ha PK, Couch ME, Tufano RP, Koch WM, Califano JA. Short hospital stay after neck dissection. *Otolaryngol Head Neck Surg*. 2005;133(5):677-680.
15. Chen AY, Callender D, Mansyur C, Reyna KM, Limitone E, Goepfert H. The impact of clinical pathways on the practice of head and neck oncologic surgery: the University of Texas M. D. Anderson Cancer Center Experience. *Arch Otolaryngol Head Neck Surg*. 2000;126(3):322-326.
16. Urquhart AC, Berg RL. Neck dissections: predicting postoperative drainage. *Laryngoscope*. 2002;112(7, pt 1):1294-1298.
17. Tan LR, Guenther JM. Outpatient definitive breast cancer surgery. *Am Surg*. 1997;63(10):865-867.