

Swallowing Outcomes Following Primary Total Laryngectomy

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Introduction

- Despite advances in organ preservation protocols, total laryngectomy (TL) continues to be an important option for treatment of advanced laryngeal malignancy. While significant improvements have been made in alaryngeal voice rehabilitation, post-surgical swallowing is an equally important factor for a patient’s quality of life.
- Our study aimed to quantify swallowing outcomes after primary TL and assess for factors predictive of poor outcome.
- In particular we choose to focus on whether a patient was referred to a swallow study as an indicator of a patient reporting swallowing difficulties.

Methods

- Retrospective cohort study of all patients who underwent primary TL for laryngeal cancer between 1/1/2001 and 8/31/2018 at a single tertiary care institution.
- Primary outcome was swallowing impairment after primary TL, measured by referral for swallowing study (RSS).
- This was compared to diet status at last clinical follow-up and dysphagia diagnosed on MBS.
- RSS included only swallowing studies performed for the evaluation of a swallowing complaint, excluding those performed post-operatively for oral diet initiation.
- Cox proportional hazards analysis was used to analyze predictive factors.

Results

- 125 patients were included with a median follow-up of 40.7 months (IQR 11.1-63.0).
- Pathologic disease stages were T2 (2, 1.6%), T3 (35, 28%), T4 (88, 70.4%), and N0 (53, 42.4%), N1 (11, 8.8%), N2 (53, 42.4%), and N3 (8, 6.4%) and did not differ significantly between the groups.
- On multivariable analysis, mild (HR=0.45, p=0.12), moderate (HR=0.36, p=0.0049), and severe (HR=0.39, p=0.033) pre-existing voice dysfunction were all associated with a lower likelihood of RSS when compared to normal preexisting voice function.
- Feeding tube re-insertion (HR=3.28, p=0.002), and unplanned hospitalizations (HR=2.0, p=0.02) were associated with a higher likelihood of RSS.

Referred to Swallow Study (N=32)		
Median time of referral	217 days	(IQR 95-275)
Type of Swallow Study		
MBS	17 (53.1%)	
Esophagram	8 (25%)	
Referred but did not complete	7 (21.8%)	

MBS Subgroup (N=17)	
Findings	
Normal	0
Functional	7 (41.2%)
Dysphagia	10 (58.8%)

Esophagram Subgroup (N=8)	
Findings	
Normal	3 (37.5%)
Leak	1 (12.5%)
Stenosis	4 (50%)

Baseline Characteristics	No Referral (N=93)	Referred to Swallow Study (N=32)	p
Male	74 (79.6%)	23 (71.9%)	0.51
Age at diagnosis	62.53 (10.6)	65.05 (9.3)	0.24
Ethnicity			0.27
Asian	0 (0.0%)	1 (3.1%)	
Black or African American	19 (20.4%)	8 (25.0%)	
Unknown	2 (2.2%)	0 (0.0%)	
White	72 (77.4%)	23 (71.9%)	
ECOG Performance Status	0.92 (0.61)	0.90 (0.55)	0.91
Smoking History			0.49
Current use	49 (52.7%)	16 (50.0%)	
Former use (Quit >3 months ago)	36 (38.7%)	14 (43.8%)	
Never smoker	5 (5.4%)	0 (0.0%)	
Use during or after treatment	3 (3.2%)	2 (6.2%)	
Tobacco pack years	24.0 (13.3)	27.8 (13.7)	0.18
Heavy Alcohol Consumption	38 (40.9%)	11 (34.4%)	0.66
Pre-existing Voice Grade			0.08
Mild, self resolves	9 (9.7%)	7 (21.9%)	
Moderate, medical evaluation indicated	49 (52.7%)	10 (31.2%)	
Severe, whispered speech or trach	20 (21.5%)	11 (34.4%)	
None	15 (16.1%)	4 (12.5%)	
Extracapsular/Extranodal Extension	31 (33.3%)	17 (53.1%)	0.08
Free Flap?	32 (34.4%)	12 (37.5%)	0.92
Chemotherapy?	18 (19.4%)	9 (28.1%)	0.43
Type of Radiation			0.25
3DRT	4 (4.3%)	0 (0.0%)	
IMRT	39 (41.9%)	19 (59.4%)	
None	26 (28.0%)	8 (25.0%)	
Unclear	24 (25.8%)	5 (15.6%)	

Outcomes			
Feeding Tube Re-insertion	10 (10.8%)	8 (25.0%)	0.091
Unplanned Hospitalization	40 (43.0%)	22 (68.8%)	0.021
Diet Status at Last Clinical Follow-Up			0.037
Normal	74 (79.6%)	19 (59.4%)	
Modified	8 (8.6%)	8 (25.0%)	
Feeding Tube	11 (11.8%)	5 (15.6%)	
Any Stricture Dilations?	11 (11.8%)	9 (28.1%)	0.059
Number of Stricture Dilations	1.50 (0.85)	3.67 (6.22)	0.290

Discussion

- There are many different ways to measure swallowing function. In our study, only 8.0% of primary TL patients were formally diagnosed with dysphagia on MBS.
- However, only 75% of patients were consuming a normal diet at last clinical follow-up. This suggests that using the strict criteria of dysphagia diagnosed on MBS fails to capture the true extent of swallowing difficulties among primary TL patients, although the precise reason for diet modification in these patients is unknown.
- Why pre-existing voice dysfunction is associated with a lower likelihood of RSS when compared to normal pre-existing voice function remains unclear.

Conclusion

- In this retrospective cohort study, 8.0% of primary TL patients were formally diagnosed with dysphagia.
- However, 25.6% received RSS for evaluation of a swallowing complaint.
- Furthermore, only 79.6% of non-RSS and 59.4% of RSS patients had a normal diet at last follow up.
- This suggests that using the strict criteria of diagnosed dysphagia underestimates the prevalence of clinically significant, symptomatic swallowing impairment among primary TL patients.