

Timing of Esophageal Dilation for Dysphagia in Head and Neck Cancer patients receiving Radiation Therapy



Allis H. Cho, MD¹; Gloria Caldito, PhD²; Cherie-Ann O. Nathan, MD^{1,3}

¹Department of Otolaryngology – Head & Neck Surgery; ²Department of Bioinformatics & Computational Biology Louisiana State University Health Sciences Center and ³Feist Weiller Cancer Center – Shreveport, LA

ABSTRACT

Objectives: To determine 1) if timing of esophageal dilation (ED) after radiation therapy (XRT) affects patient's subjective scores of dysphagia, and 2) if specific patient and tumor characteristics affect these scores.

Design: Retrospective

Methods: Electronic medical records of head and neck cancer (HNC) patients who received ED after XRT between 2006-2009 were evaluated for subjective improvement scores of dysphagia. Factors that were evaluated included age (\leq or >50), sex, primary site, T and N-staging, total laryngectomy (TL) \pm cricopharyngeal myotomy (CPM), \pm chemotherapy, bougie size ($<$ or ≥ 50), \pm TEP at time of dilation, and time from radiation to dilation (<6 months, $<$ or ≥ 1 year). Post-operative improvement ratings from 0-10 with 10 being the best were measured at various intervals (1 week and 3, 6, 9, and 12 months or greater).

Results: 26 patients had ED after therapy. 13 (50.0%) patients had TL, and 9 (69.2%) of these patients had a CPM performed at the time of surgery. Majority of patients had ED >6 months (84.6%) and >12 months (69.2%) from XRT. Univariate and multivariate analysis revealed that ED performed <1 year from XRT, no concurrent chemotherapy, and CPM for TL patients had significantly improved scores at all post-operative time intervals ($p < 0.01$) with ED at < 6 months being significant in univariate analysis as well.

Conclusions: Esophageal dilations performed <1 year after XRT have improved subjective scores for dysphagia. Patients who have received chemotherapy or did not have CPM at the time of TL may need more aggressive dilations because of poorer outcomes.

INTRODUCTION

Dysphagia is a common complaint in HNC patients following treatment with XRT. It can greatly impact quality of life, and can lead to cachexia, depression, anxiety, aspiration, and death. The prevalence of dysphagia is approximately 12-69%.^{1,2}

XRT can cause dysphagia secondary to xerostomia, pharyngeal and esophageal stenosis, and fibrosis of the upper aerodigestive tract. Surgical treatment such as total laryngectomy can lead to disruption of normal swallowing mechanism, hypopharyngeal stenosis, cricopharyngeal dysfunction, and pseudoepiglottis formation.

The success rates of esophageal dilations vary (66-84%), with majority of patients requiring multiple dilations.^{3,4} Duration of relief usually lasts 14-16 weeks.

There has been no studies showing whether timing of esophageal dilations affect outcome. Our hypothesis is early esophageal dilations after radiation treatment lead to improved dysphagia subjective scores.

METHODS AND MATERIALS

This was a retrospective study of head and neck cancer (HNC) patients who received ED after XRT between 2006-2009. These patients were evaluated for subjective improvement scores of dysphagia.

Inclusion criteria: 1) XRT, 2) NED, 3) complete records to obtain subjective scores. Electronic medical records and modified barium swallow studies were reviewed.

Factors that were evaluated included:

- Patient and tumor factors: age (\leq or >50), sex, primary site, T and N-staging
- Treatment factors: total laryngectomy (TL) \pm cricopharyngeal myotomy (CPM), \pm chemotherapy, bougie size ($<$ or ≥ 50), \pm TEP at time of dilation, and time from radiation to dilation (<6 months, $<$ or ≥ 1 year)

Patients were asked to evaluate for post-operative improvement of their dysphagia. Rating values from 0-10 with 10 being the best (100% improvement) and 0 being the worst (no improvement) were measured at various intervals (1 week and 3, 6, 9, and 12 months or greater).

Characteristic	Number(%)
Age > 50	22 (85)
Male sex	17 (65)
T-stage: 1/2	13 (54)
3/4	11 (46)
Site: Larynx	3 (52)
OP	6 (24)
HP	3 (12)
NP	2 (8)
Thyroid	1 (4)
N-stage: 0	10 (42)
1	5 (21)
2	9 (37)
TL Surgery	13 (50)
CPM	9 (69)
Chemotherapy	12 (46)
Bougie ≥ 50	14 (56)
TEP	6 (23)
ED > 6 mo	22 (85)
ED > 1 yr	18 (69)
MBS	24 (92)
Multiple Dilations	5 (19)

Chart 1 – Patient Characteristics

Rating	Significant Factors	p-value
Post-op	Chemo ED > 1 yr	0.02 0.03
3 months	ED > 6 mo, > 1 yr	0.04, <0.01
6 months	ED > 6 mo, > 1 yr, CPM	0.03, <0.01 , 0.02
9 months	ED > 1 yr, CPM	<0.01 , 0.02
12 months	ED > 1 yr, CPM	<0.01 , 0.03
> 1 year	ED > 1 yr, CPM	<0.01 , 0.046

Table 2 – Univariate Analysis

Rating	Significant Factors	p-value
Post-op	Chemo ED > 1 yr	<0.01 <0.01
3 months	ED > 1 yr	<0.01
6 months	ED > 1 yr, CPM	<0.01 , 0.03
9 months	ED > 1 yr, CPM	<0.01 , 0.03
12 months	ED > 1 yr	<0.01
> 1 year	ED > 1 yr	<0.01

Table 3 – Multivariate Analysis

RESULTS

26 patients had ED after radiation therapy. Median time of ED was 16.5 months. Mean follow-up time was 19 months. 57% of patients had relief of dysphagia immediately post-op, 35% continued to have relief at 6 months, and 22% at 1 year. Patient characteristics are shown in Table 1, with highlighted factors being significant.

Table 2 and 3 show univariate and multivariate analysis. The most significant factors were ED performed <1 year from XRT, no concurrent chemotherapy, and CPM for TL patients. Patients with these factors had significantly improved scores at all post-operative time intervals ($p < 0.01$). ED at < 6 months was also significant in univariate analysis alone.

DISCUSSION

Rates of esophageal stricture after XRT are low (2.6%), however it increases with concurrent chemotherapy (22-37%).⁵ It is also still controversial whether CPM improves post-op dysphagia in TL patients. In this study, only 5 patients had multiple dilations that ranged from 2 months to 2 years. Only one of these patients had improvement in their dysphagia score, and this patient was dilated < 6 months after XRT with repeat dilations every 3 months for a total of 3 dilations. It may be that early intervention dilates the esophagus before significant fibrosis and scarring sets in.

CONCLUSION

Patients with early esophageal dilations performed <1 year after XRT have significantly improved subjective scores for dysphagia. Patients who received chemotherapy or did not have CPM at the time of TL may be at risk for poorer outcomes.

REFERENCES

- (1) Epstein JB, Emerton S, Kolbinson DA, et al. Quality of life and oral function following radiotherapy for head and neck cancer. *Head Neck* 2001;23:389-98.
- (2) Smith RV, Kotz T, Beitler JJ, Wadler S. Long-term swallowing problems after organ preservation therapy with concomitant radiation therapy and intravenous hydroxyurea. *Arch Otolaryngol Head Neck Surg* 2000;126:384-9.
- (3) Ahlawat SK, Al-Kawas FH. Endoscopic management of upper esophageal strictures after treatment of head and neck malignancy. *Gastrointest Endosc*. 2008; 68: 19-24.
- (4) Dhir V. Dilation of proximal esophageal strictures following therapy for head and neck cancer: experience with Savary Gilliard dilators. *J Surg Oncol*. 1996 Nov;63(3):187-90.
- (5) Lawson JD, Otto K, Crist W, Johnstone P. Frequency of esophageal stenosis after simultaneous modulated accelerated radiation therapy and chemotherapy for head and neck cancer. *Am J Otol Head & Neck Surg* 2009; 20: 13-19.