

Case Report

Bolus Regurgitation Post Total Laryngectomy with Pharyngotomy and Cricopharyngeal Myotomy

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ABSTRACT

Laryngeal cancers are typically treated by total laryngectomy (TL). Life after TL comprises a series of challenges, one among which is manifested as difficulty in swallowing food. Although several evidences are reported in literature the concept is still not completely understood. Hence the present study focused to shed light upon a case presenting with dysphagia post TL. We received a 70 year old Male with complaint of throat pain and change in voice since a year with history of cigarette smoking. Ulcero-proliferative growth on the entire left vocal fold extending up to sub-glottic region was visualized and was mapped T₃N₀M_x laryngeal cancer. He was treated with TL with pharyngotomy and cricopharyngeal myotomy (CPM) for maintenance of life. Two weeks following TL he complaint of difficulty in swallowing liquids. A comprehensive swallow investigation was performed using Manipal Manual for Swallowing Assessment. Results revealed intact sensory and motor functions across lips, tongue, teeth, soft palate and jaw. Wherein different consistencies of swallow, bolus regurgitation across 5 ml and 10 ml thick liquids and thin liquids was observed with multiple swallow. No difficulty was observed for solids. Collectively, he was diagnosed as pharyngeal stage dysphagia. Observable results can be attributed to failure in opening upper oesophagus sphincter and absent hyo-laryngeal elevation. Adding on to the altered physiology is failure of CPM, whose application in the patient did not yield good swallow outcome. To conclude, we can infer that monitoring swallow outcome measures after TL must not be overlooked.

Keywords: Laryngeal cancer, Total Laryngectomy, Geriatric, Pharyngeal Dysphagia.

INTRODUCTION

Laryngeal cavity is one of the common sites of origin for carcinogenic tumors. ^[1] Generally, the treatment involves excision of the carcinoma by a non-conservative approach called TL. This consequently results in a lifetime changes in respiration, speech production and swallowing, but with maintenance of life

and health status. ^[2] Keeping this into account, recent studies have stated varied symptoms of dysphagia among individuals post TL. For instance, 17% of total laryngectomee complaint of residue remaining in the pharynx type dysphagia. ^[3] There have also been reports of TL individuals characterizing 42% of intolerance towards normal diet, 70% of

dysphagia symptoms like nutrition changes, diet modifications and consistency issues on a long term basis. [4,5] Dysosmia, dysgeusia, increased oral transition time and decreased pharyngeal pressure are also the most commonly reported swallowing difficulties post TL. [6] Although these highlights are well documented in literature, there is no clear cut evidence that every total laryngectomy shall exhibit these challenging symptoms. Issues pertaining to swallowing issues, to a large extent, depend upon organ preservation protocol during surgical resection of base of tongue and pharynx during laryngectomy. [7] Furthermore, physiology of swallow post TL is a concept that has not been well explored and understood completely due to multiple factors. This dictates the need to understand the multifaceted phenomena of laryngeal cancers and sheds light on the present case study, who presented with bolus regurgitation post TL with pharyngotomy and cricopharyngeal myotomy.

CASE REPORT

A 70 year old male presenting with complaint of throat pain and change in voice, since a year, was referred to the Department of Audiology and Speech Language Pathology of an institution based multidisciplinary hospital setup. He also reported breathlessness and vocal fatigue with frequent episodes of coughing post onset of the voice change. Case history ascertained cigarette smoking for past 30 years. On laryngeal evaluation ulcero-proliferative growth on the entire left vocal fold extending up to sub-glottic region was brought to light. No significant observations were noted on right vocal fold, arytenoids, pyriform fossa and epiglottis region. The patient was mapped of having T₃N₀M_x stage of laryngeal cancer. Otherwise, he did not report any pre-morbid conditions of systemic disease, neurological disorder, hearing loss,

dysphagia, chemotherapy and/ or radiotherapy. TL with pharyngotomy and CPM was performed under general anaesthesia with patients consent. Following which, sections of laryngectomy specimens was studied microscopically. Histopathological findings revealed features of moderately differentiated squamous cell carcinoma infiltrating to deeper muscular tissue. Normal histology was reported in the sections studied from proximal, distal and deeper resection margins.

Two weeks after TL voice rehabilitation program was initiated at the Department of Speech Language Pathology of the same institute with oesophageal speech as the mode of communication. During this course of time, the patient also complained of difficulty while swallowing liquids. Hence, a detailed swallowing assessment was done by a Speech Language Pathologist. Measures of swallowing were tested using Manipal Manual for Swallowing Assessment. [8] This manual is proposed to carry out a comprehensive assessment of sensory and motor based issues related to swallowing, with emphasis on influence of consistencies and quantity of bolus across oral to pharyngeal stages of swallow.

RESULTS

Observations under MMSA assessment of structure revealed intact articulators at rest. However, a molar and canine teeth were missing on the lower right and left side of the patient. In assessment of function sensory sub-section the patient was able to identify light and deep pressure correctly lips, gums, cheeks, tongue, hard palate and light pressure for soft-palate. This conveys intact sensory skills. On the continuum, the second sub-section of motor assessment revealed inability to puff cheeks, swallow with tongue protruded out, voluntary cough and voicing. Although intact lip and tongue

function was observed. Prior to investigating phases of swallowing, the subject was able to perform dry swallow and saliva swallow with no signs of aspiration. For phases of swallowing, as measured using 5ml and 10 ml of solids, we observed no signs of oro-pharyngeal dysphagia. In thick liquids consistency, presence of bolus in the posterior 1/3rd of the tongue was noticeable due to oral

regurgitation. Bolus that was not ingested was expectorated by the patient to a disposable cup. Regurgitation findings were also reported for 5ml and 10 ml thin liquids. Total time taken for swallowing thin liquids was more than the clinically acceptable duration. Scores obtained by the patient under each subscale and its respective normative is highlighted below in Table 1.

Table 1: Scores of swallow investigation

	Assessment of Function		Assessment of Phases of Swallowing	Total
	Sensory	Motor		
70 years Male	2	23	14	39
Normative	0.18 (±0.39)	0.54(±1.74)	0.33(±1.09)	1.05(±2.96)

While administering 90 ml water swallow test, the patient was able to swallow maximum quantity of 20 ml after which he was unable to continue and complete the swallow task because of excessive oral regurgitation. Hence, further testing with such higher quantity was not carried out. Safe swallow was observed for 5 ml thin liquid. However, multiple repetitions of swallow were performed prior to ingestion. The patient was tolerant to all consistencies and able to follow the instructions correctly. Based on these collective findings he was diagnosed as individual with pharyngeal stage of dysphagia. Following which, he was put under nasogastric tube to facilitate safe swallow.

DISCUSSION

Dysphagia is a common adverse condition seen frequently in individuals who have undergone TL. [9] In the present case study also we observed interesting findings of swallowing difficulties. Generally, TL involves complete excision of the larynx with permanent relocation of trachea from the pharynx. [3] For which the trachea is typically brought below the larynx followed by suturing it to the base of the neck above the sternal notch. This results in a permanent stoma thereby separating the common pathway that otherwise earlier lead to trachea and

oesophagus. With this separation, one can rarely expect dysphagia. However, we noted swallowing difficulties in our patient, moreover, unlike many case reports cited in literature, we observed oral regurgitation of ingested bolus. This could possibly be due to failure of the bolus entering into the tubular oesophagus after it passed the pharyngeal musculature. Physiologically the upper oesophagus sphincter (UES) opens due to the relaxation of the crico-pharyngeus muscle, hyo-laryngeal elevation caused by tensing of supra-hyoid and thyro-hyoid muscles and pharyngeal pressure generated. [10] These principal changes were absent or altered as a surgical outcome of TL.

Pharyngotomy is usually performed in conjunction with TL because of extensive spread of the carcinoma. Thereafter, one is expected to evidence decreased pharyngeal tissue residue leading to reduced generation of pharyngeal pressure consequently resulting in limited pharyngeal bolus clearance. [6] This in turn would have resulted in a persistent bolus retention or pooling of bolus at the level of throat and/ or lower third parts of neck, therefore leading to backward flow of the bolus into the oral cavity. Similar evidences are observed in previous investigations. [11] As a result of this the patient had multiple swallows for one quantity of bolus till the UES opened

to further propel the bolus lower down the food pipe. On the continuum, in the early 1970s it was shown that hyo-laryngeal movements along with the relaxation of the cricopharyngeal muscle is crucial for opening of the upper oesophagus. [12] This acts as a primary contributor and facilitates bolus propulsion along with pharyngeal peristalsis. Relaxation of the crico-pharyngeal muscle follows up with opening of the UES thereby propelling the bolus into the food pipe. This, in addition to absence of hyo-laryngeal elevation is observed in our patient after TL, thereby delaying or altering the relaxation of the UES which in turn impedes bolus propulsion into the oesophagus. Several authors have acknowledged applicability of myotomy in vagus nerve injury, pharyngotomy and partial laryngectomy. [13] Despite its application in treating abnormal contraction and relaxation of crico-pharyngeal muscle candidacy for advocating myotomy is still an unanswered question. [14]

Differences in thin and thick liquids swallow observed in the patient can be attributed to variations in the viscous property of the bolus. Studies suggest that thick liquids have higher viscous properties in comparison to thin liquids. [15] Therefore, transporting thick liquids into the pharynx becomes comparatively slower, allowing clinically more time for the laryngeal valve to close. This is done in view of protecting the airway and allowing the UES to open. Consequence of these physiological changes should result in greater degree of bolus control that is vital for safe swallow. Despite the swallowing difficulty, the patient did not present any issues with solids because of the voluntary process of breaking the food into bolus via mastication and softening by salivation allowed for preparation of bolus into the consistency necessary for safe swallow. It also pin point towards compensatory strategy developed by the patient overtime to overcome the difficulty

in uncoordinated opening the UES during swallow. In general, based on the swallow investigation results we can classify the patient under 17% of laryngectomee with material remaining in the pharynx type TL. [3]

CONCLUSION

In conclusion, our study evidences a clinical presentation of bolus regurgitation due to uncoordinated opening of the UES and poor pharyngeal muscle contraction in a patient treated for laryngeal cancer. Pharyngotomy with CPM served as a bane for safe swallow in our patient. Accordingly, one can also imply pharyngotomy with CPM can be viewed as an indicator for predicting swallow outcomes in head and neck cancer. Physiology of swallowing after TL is a concept that is still unclear and not well understood. Despite such remarks, refined reconstruction of pharynx with optimal maintenance of pharyngeal constrictor muscles serves as a good prognostic indicator for swallow rehabilitation. Moreover, regardless of less in its prevalence, one must not overlook the possibilities of swallow difficulties that may arise post TL. Continuous monitoring of swallowing must be an integral part of all post laryngeal cancer treatment to enhance patient health care and quality of life.

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REFERENCES

1. Murphy BA, Ridner S, Wells N, Dietrich M. Quality of life research in head and neck cancer: A review of the current state of the science. *Crit Rev Oncol Hematol*. 2007; 62(3):251-67.
2. Maclean J, Cotton S, Perry A. Variation in surgical methods used for

- total laryngectomy in Australia. *J Laryngol Otol.* 2008; 122(7): 728-32.
3. Balfe DM. Dysphagia after laryngeal surgery: Radiologic assessment. *Dysphagia.* 1990; 5(1): 20-34.
 4. Ward EC, Bishop B, Frisby J, Stevens M. Swallowing outcomes following laryngectomy and pharyngo-laryngectomy. *Arch Otolaryngol Head Neck Surg.* 2002; 128(2):181-6.
 5. Watts K. Swallowing difficulties experienced by people who have undergone a total laryngectomy for head and neck cancer [honours thesis]. Melbourne: La Trobe University; 2006.
 6. Landera MA, Lundy DS, Sullivan PA. Dysphagia after total laryngectomy. *Perspectives on Swallowing and Swallowing Disorders.* 2010; 19: 39-44.
 7. Starmer HM, Tippet DC, Webster KT. Effects of laryngeal cancer on voice and swallowing. *Otolaryngol Clin North Am.* 2008; 41(4): 793-818.
 8. Balasubramaniam RK, Bhat JS. *Manipal Manual for Swallowing Assessment.* Manipal: Manipal University Press; 2002.
 9. Lazarus CL. Management of swallowing disorders in head and neck cancer patients: Optimal patterns of care. *Semin Speech Lange.* 2000; 21(4): 293-309.
 10. Shaw DW, Cook IJ, Gabb M, Holloway RH, Simula ME, Panagopoul V et al. Influence of normal aging on oral-pharyngeal and upper esophageal sphincter function during swallowing. *Am J Physiol.* 1995; 268(3):389-96.
 11. Rao SM, Satishchandra T, Murthy PSN. Cricopharyngeal myotomy revisited. *Int J Phono & Laryngology.* 2011; 2: 76-9.
 12. Ellis F. Upper esophageal sphincter in health and disease. *Surg Clin North Am.* 1971; 51:553-5
 13. Mitchell R, Arminini G. Cricopharyngeal myotomy treatment of dysphagia. *Ann Surg.* 1975; 81:262-6.
 14. Jacobs JR, Logemann J, Pajak TF, Pauloski BR, Collins S, Casiano RR et al. Failure of Cricopharyngeal Myotomy to Improve Dysphagia Following Head and Neck Cancer Surgery. *Arch Otolaryngol Head Neck Surg.* 1999; 125(9):942-6.
 15. Robbins J, Hamilton JW, Lof GL, Kempster GB. Oropharyngeal swallowing in normal adults of different ages. *Gastroenterology.* 1992; 103: 823-9.

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