



Resurgence of Emergency Total Laryngectomy: An Impact of COVID-19 Pandemic

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Abstract

Laryngeal cancer is one of the most common head and neck cancers in India. Surgery is the preferred modality of treatment in majority of cT4a cases and selective cT3 cases of Carcinoma Larynx. COVID-19 outbreak became a global pandemic and caused significant delays and disruptions in every aspect of cancer care. Similarly, patients of laryngeal cancer presented with advanced disease and significant stridor. In such cases, Emergency total laryngectomy (ETL) proved to be a valid treatment modality in the place of conventional workup and treatment. We present our experience with Emergency laryngectomy during the COVID-19 pandemic and how we overcame its challenges.

Keywords Laryngeal cancer · COVID-19 pandemic · Emergency total laryngectomy · Emergency laryngectomy · Total laryngectomy

Introduction

Laryngeal cancer is one of the most common head and neck cancers in India. In 2012, an estimated 25,446 new cases were diagnosed and 17,560 deaths were attributed to laryngeal cancer in India [1]. Surgery is the preferred modality of treatment in majority of cT4a cases and selective cT3 cases of Carcinoma Larynx.

COVID-19, caused due to the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has caused a sudden and substantial disruption in every aspect of the human life. The World Health Organization (WHO) on March 11, 2020, has declared the novel coronavirus (COVID-19) outbreak a global pandemic [2]. This unprecedented pandemic had significant delays and disruptions in every aspect of cancer care. COVID-19 pandemic has resulted in late presentation of patients leading to delayed diagnosis and initiation of treatment for cancer. Similarly, patients of laryngeal cancer presented with advanced disease and significant stridor. In such cases, emergency laryngectomy proved to be a valid treatment modality in the place of conventional workup and treatment.

Emergency total laryngectomy has its own inherent challenges like lack of adequate time for patient preparedness, anesthetic considerations and availability of reliable frozen section. We present our experience with Emergency total laryngectomy during the COVID-19 pandemic and how we overcame its challenges.

Materials & Methods

The study was carried out at a tertiary care oncologic center in south India. Retrospective analysis of a prospectively maintained data base was done after due permission from

Institution: the entire work was done in Division of Head and Neck oncology, Dept. of Surgical Oncology at Basavatarakam Indo American cancer Hospital and Research Institute.

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Table 1 Showing Clinicodemographical details, HTN:Hypertension, DM: Diabetes Mellitus

S. No	Age	Sex	cTNM	pTNM	Prior treatment	Co-morbidities
1	65	M	T3N0M0	T4aN1M0	No	Nil
2	27	M	T4aN0M0	T4aN0M0	No	Nil
3	38	M	T4aN1M0	T4aN1M0	No	HTN
4	55	M	T4aN0M0	T4aN1M0	No	HTN, DM
5	59	F	T4aN0M0	T4aN0M0	No	HTN, DM
6	62	M	T4aN2cM0	T4aN2cM0	No	Nil
7	47	M	T4aN0M0	T4aN0M0	No	Nil
8	57	M	T4aN0M0	T4aN1M0	No	Nil
9	42	M	T4aN2cM0	T4aN2cM0	No	Nil
10	62	M	T3N0M0	T4aN0M0	No	HTN
11	53	F	T4aN0M0	T4aN0M0	No	HTN
12	49	M	T4aN1M0	T4aN1M0	No	Nil
13	58	M	T4aN0M0	T4aN1M0	No	Nil
14	67	M	T3N0M0	T4aN0M0	No	HTN, DM

institutional Ethics committee. Patients who have undergone Emergency total laryngectomy (ETL) from June 2020 to June 2021 at our center were included for analysis. Patients with history of laryngeal surgery, radiation therapy and tracheostomy were excluded from analysis.

For the purpose of the study “Emergency total laryngectomy (ETL)” is defined as total laryngectomy performed for malignant obstruction of the upper airway within 24 h. of admission. All the patients who had stridor were immediately admitted. Preoperative investigations included routine surgical blood profile, Contrast enhanced Computed tomography(CECT) of Neck and High Resolution CT of chest. Then the patient and relatives are given necessary counseling about total laryngectomy.

Intra-operatively airway is established by endotracheal intubation or by a high tracheostomy done under local anesthesia. Direct laryngoscopy is done to map the disease and biopsy is taken for frozen section analysis. After confirmation of malignancy on frozen section, total laryngectomy with bilateral neck dissection was carried out. Post-operative complications were noted according to Clavien-Dindo classification [3]. Patients were followed up according to the existing guidelines.

Results

The data pertaining to patient’s demographic profile, history, clinical presentation, surgical procedure and post-operative complications were retrieved from the database and analyzed. 14 patients underwent ETL during the study period. Clinic demographical details of patients are shown in Table 1. Majority of the patients are males (12,86%). Out of these 14 patients, 2 patients needed patch pharyngoplasty with Pectoralis major myocutaneous (PMMC) flap. In the post-op period 2 patients (Table 2) developed

pharyngocutaneous fistula (PC fistula), one was managed conservatively and the other needed pectoralis major muscle flap to control the leak (Table 2). In the present series there were no intraoperative or postoperative deaths. Voice rehabilitation was successfully done in 100% (14/14) of the patients.

Discussion

Laryngeal cancer is the 7th most common malignancy affecting Indian males. The main objective of treating Laryngeal cancers is functional organ preservation whenever feasible without compromising the oncological outcomes. Advanced-stage patients (stage III & IV) are treated by a combination of radiotherapy and chemotherapy to attain functional organ preservation. But functional organ preservation is not always possible especially in cT4a tumors where they erode thyroid/cricoid cartilages or invade the hyoid bone/extra laryngeal tissues. In such cases, primary total laryngectomy with neck dissection followed by adjuvant treatment is the standard of care [4].

COVID-19, caused due to the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has caused a sudden and substantial disruption in every aspect of the human life. COVID-19 pandemic also poised new challenges to oncologists in delivering cancer care. Prolonged surgical waiting lists at hospital coupled with nationwide lockdown and strained transportation services led to patients of laryngeal cancer presenting with advanced stage and stridor. In such cases, emergency laryngectomy proved to be a valid treatment modality in the place of conventional workup and treatment.

ETL was described extensively in the past by Wickham et al. and Narula et al. [5] but was not regularly practiced due to challenges like lack of adequate time for patient

Table 2 Showing post-operative complications and Rehabilitation, ET: Endotracheal, OTT: On table Tracheostomy, IC: I - closure, TC: T- closure, PP: Patch PMMC, CD: Clavien-Dindo grade, PCF: Pharyngo-cutaneous fistula, TEP: Tracheo-esophageal prosthesis

S. No	Intubation	Type of pharyngeal Closure	Complications	30 day Re-admission	Drain Removal	Ryles tube removal in POD	Voice rehab	Initiation of adjuvant therapy in POD
1	ET	IC	Nil	No	5	12	Electrolarynx	27
2	OTT	PP	CD-II	No	7	13	Electrolarynx	31
3	ET	TC	CD-II	No	6	12	TEP	33
4	ET	TC	Nil	No	5	12	Electrolarynx	24
5	ET	TC	PCF/CD-IIIb	Yes	11	27	Electrolarynx	44
6	ET	TC	Nil	No	5	11	TEP	29
7	ET	IC	Nil	No	5	12	Electrolarynx	33
8	ET	IC	Nil	No	6	11	Electrolarynx	31
9	ET	TC	Nil	No	6	11	Electrolarynx	29
10	OTT	IC	CD-II	No	5	13	TEP	35
11	ET	TC	Nil	No	7	12	Electrolarynx	27
12	ET	IC	Nil	No	7	12	Electrolarynx	29
13	ET	IC	Nil	No	5	11	Electrolarynx	29
14	ET	PP	PCF/CD-II	No	9	19	Electrolarynx	35

preparedness, anesthetic considerations and availability of reliable frozen section. We present our experience with ETL during the COVID-19 pandemic and how we overcame these challenges.

Patient preparation for ETL was a real task, both the patient and relative's apprehension about ETL and its consequences were addressed using audio-visual aids. These included videos of previous total laryngectomy patients who were successfully rehabilitated in terms of their voice and day to day life. This helped them in better understanding the procedure and its consequences. Our center has a successfully running laryngectomy club program, wherein the members visit and meet each other on a regular basis and also share their experiences with pre-operative patients. These meetings help in sharing the pain, suffering and create a social bond among themselves, that ultimately helps them in coping with the treatment. COVID-19 pandemic has prevented this, hence virtual laryngectomy club meets were successfully conducted to assist our patients. This way we could effectively counsel both the patients and their relatives in a limited time period [6].

Intubating and securing a compromised airway due to the presence of tumor is a challenge for the anesthetist. But the advent of advanced fiber-optic intubation systems coupled with flexible newer generation of endotracheal tubes have made it possible in most of the cases. In all the cases, surgical team was on standby to perform kleinsasser direct laryngoscopy or emergency tracheostomy for failed intubations.

Presently intra-operative frozen is readily available in most of the oncological centers around the world offering reliable reporting. Frozen section reporting also helps in reinforcing the decision of total laryngectomy.

Prior tracheotomy is frequently cited as the risk factor for stomal recurrence. Zhao et al. and Imauchi et al. have noted that patients with prior tracheostomy were at higher risk of developing stomal recurrence [7, 8]. The reason for stomal recurrence whether it is improper paratracheal nodal clearance or seeding during pre-operative tracheotomy is still controversial [9].

In most of the cases with prior tracheotomy infection and inflammation of surrounding tissues mimics tumor, this leads to excess skin removal during definitive surgery. ETL can help in avoiding both these scenarios as it avoids a prior tracheotomy.

The rate of PC fistula after ETL in our study is 14.2%(2/14) which is comparable to conventional total laryngectomy procedure. (19.0% by Busoni et al., 16.5% by Liang et al.) Only 7%(1/14) needed intervention in the form of pectoralis major muscle flap to control the leak [10, 11]. Ryles tube removal and initiation of oral feeds was done on par with conventional total laryngectomy procedure. (13.4 days after surgery). The mean interval of time between surgery and initiation of adjuvant therapy is 31.14 days.

Rehabilitative protocols used for conventional total laryngectomy procedures can be used for ETL to improve the quality of life of patients. As evident from the results, 100% (14/14) of the patients achieved successful voice restoration.

Conclusion

Emergency total laryngectomy (ETL) has been described in the literature long back but not routinely practiced due to its challenges. If these challenges are adequately addressed as discussed above, it becomes a valuable tool

in the armamentarium of Head & Neck oncologist. ETL can also be combined with complex reconstruction procedures with favorable results. ETL not only relieves stridor but also offers a definite treatment modality in one go. With the availability of round the clock expert multidisciplinary support, ETL can be practiced in most of the institutes with similar results.

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Declarations

Conflicts of interest/Competing Interests The authors have no relevant financial or non-financial interests to disclose.

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