



Original Research

Debulking Advanced Cancer Larynx in the Patients with Laryngeal Obstruction

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Abstract

Background: Debulking advanced cancer larynx in the patients with laryngeal obstruction is an important health issue.

Aim: This study aimed to assess the efficiency of advanced cancer larynx debulking in patients with airway obstruction.

Methods This prospective study was carried out in Oto-Rhinolaryngology Department, Al-Thawra Modern General Teaching Hospital, Sana'a, Yemen, in the period between January 2014 and March 2019. This study included 52 patients with advanced cancer larynx presenting with airway compromise. Debulking of cancer had done to secure the airway.

Results: The mean age of the patients was 57 years. High incidence of cancer larynx in the age group 46-55 (36.5%). The successful rate of debulking was (92.3%), Tracheotomy had done in (7.7%). Presenting symptoms, change of voice, difficulty breathing, stridor, cough, and dysphagia.

Conclusion: Debulking of cancer larynx is a safe and effective alternative to tracheotomy in selected patients in securing the airway in cases with laryngeal cancer to avoid tracheotomy.

Keywords: Airway Obstruction, Debulking, Laryngeal Cancer, Tracheotomy, Yemen

1. Introduction

Treatment of patients with airway obstruction by a malignant tumor of the larynx is a common clinical problem. These cases need to be evaluated, diagnosed, and managed with care. Three methods are available to control the airway obstruction: tracheotomy, emergency laryngectomy, and tracheal intubation with or without tumor debulking [1].

Debulking is the surgical removal of a part of a malignant tumor that cannot be completely excised, so as to enhance the effectiveness of radiation or chemotherapy or to relieve the airway obstruction and an alternative to tracheotomy [2].

The conventional treatment for patients with upper airway obstruction secondary to malignancy is a tracheotomy, an alternative debulking part of the tumor causing airway obstruction to maintain the airway until the definitive procedure. Laser debulking is a viable alternative to tracheotomy in a patient with malignant

upper airway obstruction [2,3,4].

Endoscopic debridement of obstructing laryngotracheal carcinoma with microdebrider is an alternative to CO₂ laser excision or emergency tracheotomy [5]. Coblation technology can be used in the larynx for removing or debulking tumors. Recent studies about airway fires suggest that, under normal operation circumstances, using coblation technology in place of traditional electrosurgical or laser devices can significantly reduce the risk of igniting an airway fire [6,7,8]. Patients with upper aerodigestive tract tumors can have a development of airway compromise both before and during chemoradiation. Tracheotomy is the classic method for securing a safe airway, but tumor debulking may also be used [9]. This study aimed to assess the efficiency and safety of debulking of advanced cancer larynx as an alternative to tracheotomy.

2. Methods

This study is a based-hospital prospective study including the patients who underwent debulking for primary

treatment of advanced cancer larynx (T3, T4), between January 2014 and March 2019, at Oto-Rhinolaryngology Head Neck Surgery Department, Al-Thawra Teaching Hospital, Sana'a, Yemen. A total of 52 patients were included in this study, the patients most likely to have airway compromise, specifically those with T3 or T4 tumors of the larynx. Exclusion criteria, benign tumors, granulomas, trauma, and early cancer larynx, previous laryngeal surgery, and post-radiation. All patients underwent full medical history, physical examination, followed by laboratory investigations, hematology, endocrinology, renal function tests, liver function tests.

The radiological study, X-ray chest and neck CT, and MRI, ultrasound neck and abdomen. Under general anesthesia and orotracheal tube no.5 or 5.5 mm, inner diameter inserted. If intubation by endotracheal tube was unsuccessful, patients were shifted to the tracheotomy procedure. If successful intubation was done, the patients underwent direct laryngoscopy performed and tumor debulking surgery was done, using standard laryngeal instruments. Surgical removal of as much tumor as possible in the larynx was the main purpose of maintaining the airway patency. Debulking carrying laterally through the width of the tumor was continued until an adequate airway was obtained. If hemorrhage was encountered, suction diathermy was used to control bleeding. Dexamethasone I.V. injection .5mg/kg in a reduced method for seven days postoperative if there are no contraindications. Enrolling patients provided written informed consent. Department review board approval was obtained.

Data were analyzed and tabulated used SPSS Version 20 (social package of Statistical Science) were checked for normally distribution, continuous variables and categorical data were expressed as the percent of the total. The significant difference was indicated if *P* value < 0.05.

3. Results

A total of 52 patients were included in this study. 47 (90.4%) males and 5 (9.6%) females, and age ranged from 35-70 years with mean age 57 years, age categories showed in Table 1. Noticed high incidence cancer larynx found in the age group 46-55 years (36.5%) and less incidence was found in the old age, more than 65 years (9.6%). Presenting symptoms, all patients were presented with change of voice 52 (100%) difficulty of breathing 52 (100%), stridor 40 patients (76.9%), cough 30 patients (57.7%), dysphagia 10 (19.2%), and cervical lymph node metastasis 5 (10.4%) Table 2.

Signs, common finding was fungated masses 40 (76.9%), and less was unilateral cervical lymph nodes enlargement 5 cases (10.4%) Table 3. According to location of cancer (Table 4), glottic region 30 cases (57.7), T3 20 cases and T4 10 cases of them, supraglottic region 18 (34.6%), T3 10 and T4 8 cases, and transglottic 4 cases (7.7%) Over all T3 was 34 (65%) and T4 18 (35%). Success rate of debulking was 48 cases (92.3%) failed in 4 cases (7.7%), two due to difficulty intubation and one due to post-operative

difficulty breathing, and tracheotomy has done to securing airway (*P* < 0.001).

Table 1: Age categories of the study participants (n=52)

Groups	Age	No.	%
1	36-45	13	25.00%
2	46-55	19	36.54%
3	56-65	15	28.85%
4	>65	5	9.62%
Total		52	100%

Table 2: Symptoms among the study participants (n=52)

Item	No.	%
Change of voice and Difficulty of breathing	52	100
Stridor	40	76.9
Cough	30	57.7
Dysphagia	10	19.2
Cervical LNs.	5	10.4

LNs. lymph nodes

Table 3: Signs among the study participants (n=52)

Item	No.	%
Fungated mass	40	76.9
Inspiratory stridor	30	57.7
Friable necrotic mass	10	19.2
Biphasic stridor	10	19.2
Cervical LN. unilateral	5	10.4

LN. lymph node

Table 4: Location of cancer among the study participants (n=52)

Region	No.	%	T. stage
Glottic	30	57.70	T3 - 20
			T4 - 10
Supraglottic	18	34.60	T3 - 10
			T4 - 8
Transglottic	4	7.70	4

4. Discussion

Respiratory compromise is a common presenting sign and symptom of advanced upper airway tumors. Classically, all patients or most of these patients would have undergone tracheotomy or emergency laryngectomy. Emergency laryngectomy may be inappropriate, and safe airway management should be balanced with earnest effort to minimize the use of tracheotomy and tumors debulking is an alternative choice [9]. Concerns have been raised in literature regarding the risk of seeding the upper aerodigestive tract with cancer cells with a tracheotomy [10], and proposal have been made to preferentially perform debulking of obstructing airway lesions either as a stabilization procedure before definitive surgery [1] or a palliative measure [3].

The development of a stomal recurrence after temporary tracheotomy for malignant disease of the head and neck is a rare complication. The findings suggest that tumor-cell implantation is an important mechanism of stomal recurrence and operative technique, as well as the timing of tracheotomy placement, is important in reducing the risk of encountering this complication [2,11,12]. Although some studies associated antecedent tracheotomy with poor prognosis and high risk of stomal recurrence

[13,14]. While, others disagree and suggested peristomal recurrence may be due to incomplete removal of the primary tumor, subglottic extension, or metastasis to the paratracheal lymph nodes [15,16,].

Our patients presented with main complaint respiratory compromise and change of voice these consistent with previous studies [11,12]. In our study, debulking was succeeded in (92.3 %) of patients and (7.7%) needed tracheotomy pre or post-operative to relieve difficulty breathing, successful means that the patients remain for 4-6 weeks without respiratory compromise until definitive cancer treatment. These results were consistent with the previous study, Laccourreye et al. [2] reported a success was rate (93%). The use of laser debulking in the management of obstructive endolaryngeal tumors is an alternative option along with tracheotomy. Various authors [16,17,18], have reported the successful use of the CO2 laser debulking procedure was introduced either as before definitive therapy for cure or as palliative treatment. Advanced laryngeal tumors were more likely to require tracheotomy or debulking, T3 tumors were more often successfully debulked than T4 tumors. Tracheotomy or debulking did not affect response to cancer treatment, but the tracheotomy may be developed a recurrence at stoma, also there were complications [9], as infection, locally and chest and stomal bleeding. Laryngectomy through a contaminated field after tracheotomy may increase the risk of wound inflammation and tracheostoma construction [19,20]. Surgical debulking was directed only at the exophytic portion of tumors, with an effort to spare any anatomic areas [9]. Patients with T4 glottic and other cancer with deep tumor extension are not optimal candidates for debulking and should be monitored carefully and follow up post-debulking. It is critical that the head and neck surgeon remain involved to monitor for airway compromise and complications [19]. Management of airway obstruction in patients with laryngeal cancer before definitive treatment is among the most challenging problem in head and neck cancer an adequate airway. All methods used to ensure airway control, emergent tracheotomy, emergent laryngectomy, and tumor debulking have advantages and disadvantages [20]. Even an experienced physician may fall to establish an adequate airway in certain advanced cancers larynx. Unlike emergent tracheotomy which increased possibly peristomal recurrence, tumor debulking did not increase the perioperative complication rate. Those few complications reported after debulking for tumor of the upper aerodigestive tract including, postoperative bleeding, laryngeal oedema, subcutaneous emphysema, and aspiration. Bleeding was the most common complication, with incidence (1.4-7%) depend on the site and stage of the primary tumor [21,22]. None of the patients in our study had this complication. The absence of this complication in our study may be because our patients had not aggressive tumor debulking. Only 2 patients had aspiration pneumonia post-debulking and treated by

antibiotics and nasogastric tube no 16 for 5 days. There were no adverse events from tumor debulking which suggests that it may be a viable option for bridging selected patients with airway obstruction to definitive treatment. Certain tumor locations or growth patterns such as exophytic bulky supraglottic may be amenable to debulking than others [23]. Previous research [24] showed that a diagnosis of head and neck malignancy treatment in low socio-economic status is a risk fact for patients' noncompliance. These factors should be taken into consideration since patients at risk for noncompliance are unlikely good candidates for tumor debulking. Large, bulky lesions typically have areas of central tumor necrosis, which may be extensive. It is difficult to deliver chemotherapy agents effectively to such massive tumors that have outstretched their blood supply. So, the combined modality approach of debulking the tumor may increase chance that chemotherapy or radiation will kill the tumor cells. In addition, mal-positioned tracheotomy incision may make salvage laryngectomies difficult [4,16]. An emergent tracheotomy, with no prospect reversal in the immediate future can have a profound effect on patient's lifestyle psychological will being at least in the initial period [4].

5. Conclusion

Debulking is a safe and effective alternative to tracheotomy in selected patients with cancer-related airway obstruction. Debulking procedure immediately establishes the airway in patients with advanced laryngeal cancer presenting with airway obstruction and avoid tracheotomy complications. Patients treated with debulking should be monitored closely for recurrence of airway compromise.

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Competing interests

The authors declare that they have no competing interests.

References

- Bradley PJ. Treatment of the patients with upper airway obstruction Caused by cancer of the larynx. *Otolaryngol Head Neck Surg* 1999; 120(5): 737-41.
- Laccourreye O, Lawson G, Muscatello L, Biacabe B, Laccoureye L, Brasnu D. Carbon dioxide laser debulking for obstructing endolaryngeal carcinoma: a 10-year experience. *Ann Otorhinolaryngol.* 1999;108(5): 490-4.
- Pateri V, Stafford FW, Sammut MS. Laser debulking in malignant upper airway obstruction. *Head Neck.* 2005;27(4): 296-301.
- Gul F, Teleke YC, Yalciner G, Babademez MA. Debulking obstructing laryngeal cancers to avoid tracheotomy. *Barz J Otolaryngol.* 2019;87(1): 74-9. Doi.10.1016 /j.bjor. 2019.7.004PMD: 31540868.
- Semoni P, Peters GE, Magnuson JS, Carroll WR. Used of endoscopic debrider in the management of airway obstruction from laryngotracheal carcinoma. *Ann Otorhinolaryngol.* 2003;112(1): 11-13.
- Smith LP, Roy S. Operating room fires in otolaryngology: risk factors and prevention. *Am J Otolaryngol.* 2011;32(2): 109-14.
- Roy S, Smith LP. Device related risk of fire in oropharyngeal surgery:

- A mechanical model. *Am J Otolaryngol.* 2010; Sep 3(5): 356-9.
8. Matt BH, Cottee LA. Reducing risk of fire in the operating room using Coblation technology. *Otolaryngol* 2010;143(3): 454-5.
 9. Langerman A, Patel RM, Cohen EW, Blair EA, Stenson KM. Airway management before chemoradiation for advanced head and neck cancer. *Head Neck.* 2012;34: 245-59.
 10. Campbell AC, Glied LL, Barrett WI, Gluckman JL. Cancerous seeding of the tracheostomy site in patients with upper aerodigestive tract squamous cell carcinoma. *Otolaryngol Head Neck Surg.* 1999;120: 601-3.
 11. Halfpenny W and McGuk M. Stomal recurrence following temporary tracheostomy. *J Laryngol Otol.* 2001;115(3): 202-4.
 12. Szyfter W, Kruk-Zagajewska A, Borucki L, Gawecki W, Milek P. Stomal recurrence after total laryngectomy. *Otolaryngol Pol.* 2006;60(2): 149-55.
 13. Wang ZY, Li ZQ, Ji H, Chen W, Wu KM, Zhu MH, et al. Influence of risk factors on stomal recurrence after total laryngectomy for laryngeal carcinoma. A meta-analysis. *J Can Res.* 2017;13: 856-61.
 14. Liang Y, Zhu X, Zeng W, Yu T, Fang F, Zhao Y. Which risk factors are associated with stomal recurrence after total laryngectomy for laryngeal cancer? Meta-analysis of the last 30 years. *Braz J Oto Rhino Laryngol.* 2020;86(4): 502-12.
 15. Yotakis J, Davris S, Kontozoglou T, Adamopoulos G. Evaluation of risk factors for stomal recurrence after total laryngectomy. *Clin Otolaryngol & Allied Sci* 1996;21(2): 135-8.
 16. Varghese L, Mathew J, John S, Job A. Treatment of advanced carcinoma of the larynx and hypopharynx with laser followed by external Radiotherapy. *Iran J Otolaryngol.* 2017;29(94): 247-53.
 17. Petrovic Z, Djondjevic V. Stomal recurrence after primary total laryngectomy. *Clin Otolaryngol Allied Sci.* 2004;29(3): 270-3.
 18. Zhao H, Ren J, Zhuo X, Ye H, Zou J, Liu S. Stomal recurrence after total laryngectomy: a clinicopathological multivariate analysis. *Am J Clin Oncol.* 2009; 32(2): 154-7.
 19. Wong RJ, Shah JP. The role of head and neck surgeon in contemporary Multidisciplinary treatment programs for advanced head and neck cancer. *Curr Opin Otolaryngol Head Neck Surg.* 2010;18: 79-82.
 20. Chu PY, Lee TL, Chang SY. Impact and management of airway obstruction in patients with squamous cell carcinoma of the larynx. *Head Neck.* 2011;33: 98-102.
 21. Ellies M, Steiner W. Peri and postoperative complications after laser surgery of tumor of the aerodigestive tract. *Am J Otolaryngol.* 2007;28: 168-172.
 22. Hinni MI, Salassa JR, Grant DJ, Pearson BW, Hayden RE, Martin A, et al. Transoral laser microsurgery for advanced laryngeal carcinoma. *Arch Otolaryngol Head Neck Surg.* 2007;133: 1198-1204.
 23. Du E, Smith RV, Ow JT, Tassler AB, Schiff BA. Tumor debulking in management of laryngeal cancer airway obstruction. *Otolaryngol Head Neck Surg* July. 2016;155: 805-807.
 24. Ohri N, Rapkin BD, Guha D, Haynes-lewis H, Guha C, Kalniki S, et al. Predictors of radiation therapy noncompliance in Urban academic cancer center. *Int J Radiat Oncol Biol Phys.* 2015;91: 232-238.