Mini Review

Difficulties of tracheotomy in patients with anaplastic thyroid carcinoma

Erdem Atalay Cetinkaya, Ozer Erdem Gur, Omer Tarik Selcuk, Muhammet Yildiz

Department of Otorhinolaryngology, University of Health Sciences, Antalya Training and Research Hospital, Antalya, Turkey

Received: 01 September 2019 / Accepted: 21 September 2019

Abstract

Anaplastic thyroid carcinoma (ATC) is an extremely destructive tumor with a median survival time not longer than eight months. ATC often presents with a swiftly expanding neck mass causing loco-regional symptoms. The trachea is outside the normal position due to pushing by the mass, likewise, the palpation of the trachea is impossible due to the increased rigid irregular tumor tissue between the skin and trachea. Vocal cord paralysis is possible or the tumor can invade the tracheal lumen. Airway management should always have the priority. Imaging evaluation should be scheduled efficiently as such information is critical for planning the tracheotomy. Tracheotomy should be executed to support ventilation in circumstances of life-threatening upper airway obstruction. Given these patients' short life expectancy, a balanced decision on the role and timing of tracheotomy must be achieved. This review provides fundamental knowledge on ATC patient tracheotomy from an objective perspective.

Keywords: anaplastic thyroid carcinoma, airway management, tracheotomy

Introduction

Anaplastic thyroid carcinoma (ATC) is elucidated around 2 percent of all thyroid cancer cases. Frequently, ATC presents with a swiftly expanding neck mass causing loco-regional symptoms. It is aggressive, leading to upper airway compression, often a common cause of death [1]. The trachea is outside the normal position due to pushing by the mass, likewise, the palpation of the trachea is impossible due to the increased rigid irregular tumor tissue between the skin and trachea. Vocal cord paralysis is possible because the tumor can invade the recurrent nerve or the tumor can invade the tracheal lumen. Upper airway management should always have the priority. In those patients with ATC and stridor, airway management offering instruction in ATC tracheotomy promotes completion of palliative treatment. Radiologic imaging should be scheduled efficiently as such information is critical for planning the tracheotomy. Tracheotomy should be executed to support ventilation in circumstances of life-threatening upper airway obstruction [2,3]. Although airway management is a challenging issue in the therapy of ATC, little in the literature has been released. The present report aims to describe timing the tracheotomy, examination of the neck, imaging evaluation, difficulties of surgical approach and to review the literature.

Address for Correspondence: Erdem Atalay Cetinkaya, Department of Otorhinolaryngology, University of Health Sciences, Antalya Training and Research Hospital, Antalya, Turkey. E-mail: drerdemcetinkaya@gmail.com

DOI: 10.5455/im.64947

This is an Open Access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (https://creativecommons.org/licenses/by-nc/4.0/)
Difficulties in clinical and surgical approach

Timing
Timing the tracheotomy is often a difficult decision for the surgeon. Given these patients’ short life expectancy, a balanced decision on the role and timing of the tracheotomy must be achieved. The guidelines state that a tracheotomy should be performed in circumstances of a life-threatening situation. Recommendations for tracheotomy include (I) acute dyspnea, (II) unresectable tumors that do not benefit from debulking, (III) mild dyspnea unresponsive to conventional treatment such as corticosteroids, (IV) non-intubatable and unstable cases [4]. But, the timing of the tracheotomy in ATC is disputable because this issue may be attached to direct infiltration of the tumor in the tracheal lumen, level of stridor, vocal cord paralysis, laryngeal edema. Moreover, infiltrated submucosally trachea may bleed in the tracheal lumen, leading to acute airway distress and rapid fatality. Patients may also develop acute airway distress during radiation therapy [4-6].

Examination
Most cases of difficult palpate trachea have been reported in patients with ATC because of their increased skin-to-tracheal distance. Physical examination may disclose a large, visible mass involvement from the anterior neck to the lateral aspect, occupying virtually the entire thyroid bed. Airway compromise on presentation may be evident or may grow during therapy. The tumor mass may be firm, nontender upon palpation and comparatively fixed. The trachea wall was difficult to palpate as it was covered by the tumoral mass anteriorly [7,8]. Examination including a fiberoptic laryngoscopy is an essential part of the management of difficult airway. It is particularly necessary for difficulty with face mask ventilation and difficulty with tracheal intubation. In patients with symptoms indicative of tumor extension, the bronchoscopic assessment also necessary. Skin metastases normally consist of in the setting of ATC and the presence of a poor prognosis. A solid, multiple violaceous, blue-colored central neck skin lesions can be seen around the tracheotomy incision site [7-9].

Imaging
Imaging evaluation before tracheotomy is very important in order to provide good conditions for surgery. High-resolution neck ultrasound (USG), computed tomographic (CT) and magnetic resonance cross-sectional imaging (MRI) of the neck should be obtained before tracheotomy. Therefore, it is clinically useful to define the radiological characteristics of ATC that can help. USG is an easy and rapid imaging procedure for detecting ATC extension. It may show tracheal distortion, suspected laryngotracheal airway invasion and revealed, hypoechoic, irregular-shaped masses containing punctuate calcifications. In CT scans of an ATC patient; tracheal deviation and upper mediastinal shift expansive lung metastases, the involvement of central or lateral lymph nodes can be seen. Metastatic disease to the other intrathoracic organ is also observed. MRI of the neck can show a degree of infiltration and involved multiple structures. Tracheal deviation, suspected laryngotracheal invasion, airway invasion can be seen. Also, in fludeoxyglucose positron emission tomography of the ATC patient with locally advanced disease, metastatic disease to the lymph node can be seen within the tracheotomy field. Such information is critical before tracheotomy [10-12].

Tracheotomy
Implementing tracheotomies in ATC patients can be burdensome due to the tumor mass anterior to the trachea, tracheal distortion or in those with airway compromise resulting from radiotherapy because of laryngeal edema. Both surgeon and anesthesiologist choose general anesthesia with an endotracheal tube or laryngeal mask. At this time, an additional ultrasound to assist incision planning and localization verification may be used [10,13,14]. The tumor mass may make tissue dissection and tracheal lumen identification. In this case, a cricopharyngeal or partial surgical debulking would be necessary. In cases where inserting a tracheotomy tube is impossible, serious insertion complications such as significant bleeding, pneumothorax, posterior tracheal wall injury and death may be encountered. It is also difficult to secure a tracheotomy tube in ATC patients due to the distance between the skin and the tracheal lumen [15]. In this situation, a long or adjustable length tracheotomy tube is recommended [16]. Additionally, to bypass tracheal narrowing, long tubes may also be needed. Sometimes, the tracheal narrowing and compression may extend up to the carina due to involving the mediastinum. This makes ventilation very difficult. Some patients may need positive pressure ventilation. Besides tracheotomy being difficult or even impossible, it is related to high morbidity and high incidence of post-tracheotomy problems. Post-tracheotomy requires inclusive care from the patient, nursing staff and family members. It is prospectively complicated by tube displacement, bleeding and fungation of the tumor on all sides of the tracheostomy field. As cancer progresses, the tumor may ultimately obstruct the tracheotomy tube. Poor wound healing at the tracheotomy site may delay palliative radiotherapy. Particularly, the patient may also be left without the ability to speak and swallowing dysfunction [3,15].
Conclusion
ATC is an extremely destructive tumor with a median survival time not longer than eight months. Because of the highly aggressive nature of ATC, the American Joint Committee on Cancer describes all tumor stages as stage IV. Upper airway adjustment is a particularly distressing factor of terminal ATC both for the patient and family members. Death from ATC is attributed to upper airway obstruction in 50 percent of patients. The symptoms are generally airway related and include stridor, dyspnea, aspiration and vocal cord paralysis. A compromised airway can lead to respiratory distress and eventually to death. The therapy of cases with ATC is not uniform. For most cases, therapy is usually palliative. Surgery is limited to tracheotomy and sometimes tumor debulking. Airway management in these patients is a challenge, especially with regard to when or whether to perform tracheotomy or surgically decompress these patients in a disease that has such a bad prognosis. Although airway management is a challenging issue in the therapy of ATC, very little in the literature has been released. Holling et al outlined their tracheostomy experience for ATC emergency respiratory management [16]. The authors indicated that in the group of patients needing a tracheostomy, survival was considerably smaller. Shaha et al characterized patients with thyroid pathology with acute airway distress [2,7]. Similarly, comprehensive experience with tracheal resection and segmental laryngotracheal resection for invasive thyroid carcinoma was revealed by Gaisser et al from the Massachusetts General Hospital [17]. Tracheal obturation can be relieved with tracheostomy or tracheal stenting. Tracheostomy in ATC cases can be surgically challenging owing to tracheal distortion. Potentially complicated, extensive care is needed from the patient, family and nursing staff after a tracheotomy procedure. Complete planning of tracheotomy is very important in order to provide a suitable upper airway and improve prognosis. Radiologic imaging should be scheduled adequately. Protective tracheotomy should not be applied in cases that do not have indications of upper airway obstruction. In the literature, few studies of tracheal stenting present a less invasive palliative option in ATC cases. Stent usage may relieve upper airway obstruction symptoms and improve quality of life [18-21].

Conflict of interest
The authors have no conflict of interest to declare.

Funding
The authors have no competing financial interests in relation to the work described.

References

