Rescue tracheostomy for patients with unresectable large growing neck masses

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Running Head: Tracheostomy for Unresectable Masses

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Abstract

Most patients with undifferentiated thyroid cancer have an unresectable disease with very high rate of airway compromise. Tracheostomy typically entails technical issues in these cases. In fact, it can be very difficult to expose or simply locate the trachea beneath the mass, and the extensive soft tissue involvement can force the surgeon to cut the tumor to place the tracheostomy tube.

The combined use of rigid bronchoscopy and percutaneous tracheostomy techniques, applied in an open surgical procedure, can greatly simplify the procedure. Furthermore, by this method, the airways are quickly secured and the risk of intraoperative bleeding reduced.

Patients with undifferentiated thyroid carcinomas frequently have serious airway-related issues throughout the natural history of the disease, because of the high rate of tracheal invasion and bilateral vocal cord paralysis [1]. Although the ethical dilemma of whether or not to perform a tracheostomy in such a lethal form of cancer has not resolved, the surgeon is often involved in managing difficult airways in this clinical setting [2,3]. Although the current guidelines recommend that the tracheostomy must be avoided as long as possible in patients with Anaplastic Thyroid Cancer [4], the issue of impending asphyxia frequently is addressed under extremely difficult technical conditions. Tracheostomy can be a real challenge in these patients mainly because the trachea is displaced and/or infiltrated by the tumor and its exact position beneath the mass is not easy detectable from the operative field without precise anatomical landmarks.

A simple technique, developed for such situation, is herein presented.

Technique

Clinical setting: Patients with large infiltrating neck masses, requiring urgent tracheostomy (Fig 1-2).

The procedure must be performed in an operating room, under general anesthesia.

The steps of the technique are the following:

-The patient is placed in a supine position with his/her head slightly extended (sniffing/intubation position).

-The techniques of pre-oxygenation and induction of anesthesia have been described elsewhere [5].

-Tracheal intubation is performed with an 8.5 rigid bronchoscope (Storz Medical AG, Tagerwilen, Switzerland). The rigid bronchoscope is used to reopen the airway in case of endoluminal tumor growth; otherwise the tip of the bronchoscope is simply advanced up until the distal trachea.

-Spontaneous assisted ventilation is ensured through the channel of the rigid bronchoscope.

- Standard skin prepping and draping is performed.

-A collar cervical incision is made and the tumor obstructing tracheal access is exposed.

-Both the operating lamp and the operating room lights have to be turned off. The rigid bronchoscope is withdrawn to the cricoid level. The oblique telescope at 30° of the bronchoscope is faced forward and the intensity of xenon light is set at the maximum level so that the airways are transilluminated and the position of the trachea can be identified from the operating field.

-A partial debulking of the tumor can be required whenever the pretracheal mass is remarkably thick. The Harmonic Scalpel (Ethicon: Somerville, New Jersey, USA) can be used for this purpose. The tumor debulking is conducted until the position of the trachea is detectable by the transillumination maneuver.

-From the operating field a 23 Gauges needle is inserted through the tumor mass into the trachea, on the transillumination guide (Fig. 3A).

-When the endoscopic control shows that the needle is positioned in the midline of the trachea at the chosen level, the needle is removed and the puncture cannula of the PercuTwist set (Rüsch GmbH, Kernen, Germany) is inserted into the trachea.

-The internal metal guide of the puncture cannula is removed and the guide wire with the flexible J-tip is pushed forward into the distal trachea through the indwelling plastic cannula (Fig. 3B).

-The wet PercuTwist introducing dilator is advanced over the guide wire.

-The PercuTwist dilator is then screwed until the required dilation level is reached, while maintaining the dilator at an obtuse angle (about 130°) with respect to the carina (Fig. 3C). During this maneuver, the tip of the rigid bronchoscope is positioned proximally to the tracheostomy site, so that it can exert countertraction on the dilator.

-At this point the dilator is carefully removed, rotating it in a counter-clockwise direction while the guide wire remains in the trachea.

-A long tracheostomy cannula with the completely deflated tube cuff is loaded onto the introduction stylet (Fig. 3D) and placed into the trachea through the guide wire, using Seldinger's technique.

-Finally, there is the removal of the introduction stylet and guide wire, the inflation of the tracheostomy tube cuff, and the connection of the tracheostomy tube to a ventilator.

Comment

Patients with rapidly growing anterior neck masses may have a highly malignant thyroid cancer [5] and many of them develop severe airway problems. The aim of palliation in this setting needs to avoid death by suffocation, which is rarely achievable by endotracheal stents or laser vaporization of intraluminal growths [1].

In acute airway distress, unless the patient denies the consent, urgent tracheostomy should be considered, entailing two major technical problems related to intubation and surgical management. In our experience, the combined use of a rigid bronchoscopy and percutaneous tracheostomy techniques, but used in an open surgical procedure, has resulted in an easier and safer management, even in extremely challenging situations.

Rigid bronchoscopy is to be considered the most efficient method for controlling the airway, even in critical situations [5,6]. A rigid bronchoscope allows for several advantages: the airways are under control during the entire procedure; in the case of an endotracheal tumor, the airways can be reopened; the tracheal dilation is performed under direct sight; blood and secretions are adequately suctioned and the positioning of the tracheostomy tube is carried out under direct monitoring. Furthermore, the tip of the rigid bronchoscope exerts an effective countertraction on the tracheal dilator, thus preventing any risk of a tear regarding the posterior part of the trachea during the dilation maneuver. Another significant advantage of this method is its simplicity. The transillumination allows to identify the position of the trachea underneath the tumor with relative ease and, once the needle has been introduced into the selected location of the

trachea, the main technical problems can be resolved, thanks to the use of the percutaneous tracheostomy devices.

Dr. Majid et al. have already highlighted the advantages of the rigid bronchoscopy for successful percutaneous tracheostomies, in patients where the latter are relatively contraindicated [7]. Among the different percutaneous tracheostomy methods currently available, we prefer to use the PercuTwist technique in these circumstances. This is due to the fact that we found the screw dilator with its sharp threads to be highly reliable for creating the stoma opening through the neoplastic tissue. Although the procedure is theoretically associated with a high risk of bleeding, the PercuTwist dilator is able to produce an effective mechanical haemostasis and no procedure-related bleeding has been observed in our cases.

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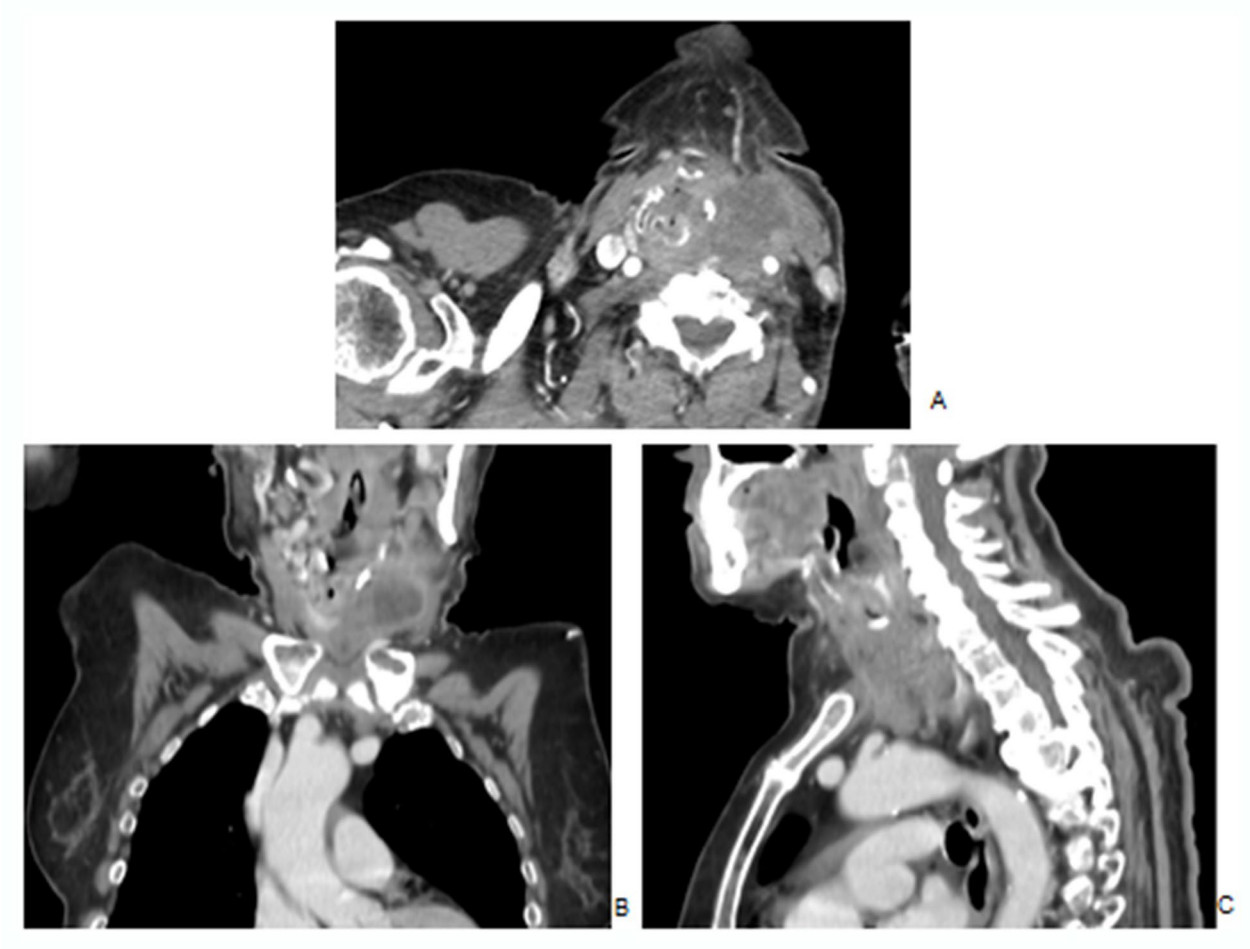
FIGURE LEGENDS

Fig 1: Computed tomographic images of the neck: 87-year-old patient with acute respiratory distress due to Anaplastic Thyroid Cancer infiltrating the airway.

Fig 2: Computed tomographic images of the neck: 84-year-old patient, with bilateral vocal cord paralysis due to necrotic undifferentiated thyroid carcinoma, marginally infiltrating the trachea.

Fig 3: The main steps of the technique from the view of the rigid bronchoscope: (A) the needle is inserted into the trachea from the operating field; (B) the guide wire is pushed forward into the distal trachea through the indwelling plastic cannula; (C) the tip of the PercuTwist introducing dilator is screwed inside the trachea; (D) the introduction stylet has been inserted and the tracheostomy tube is ready to be positioned into the trachea.



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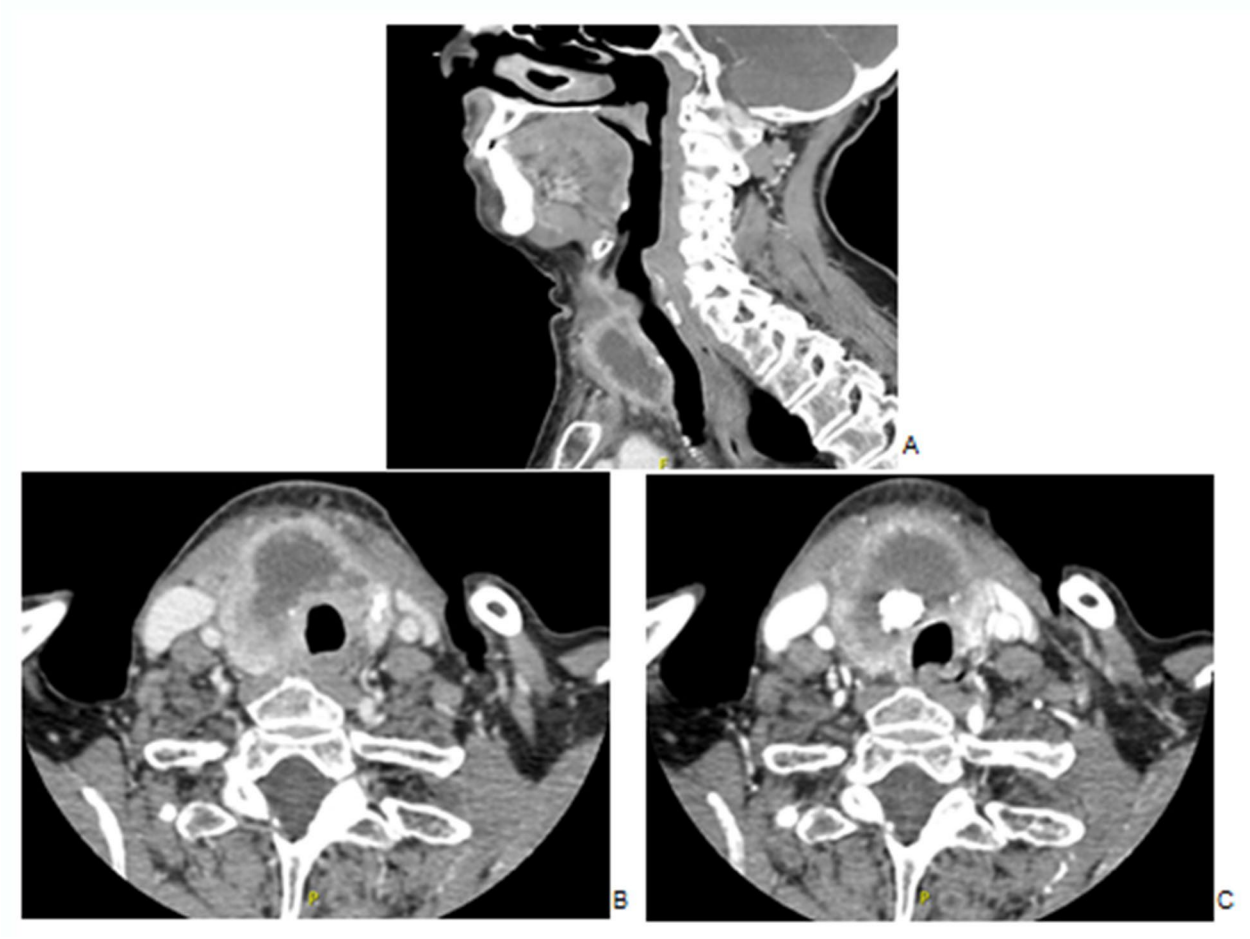

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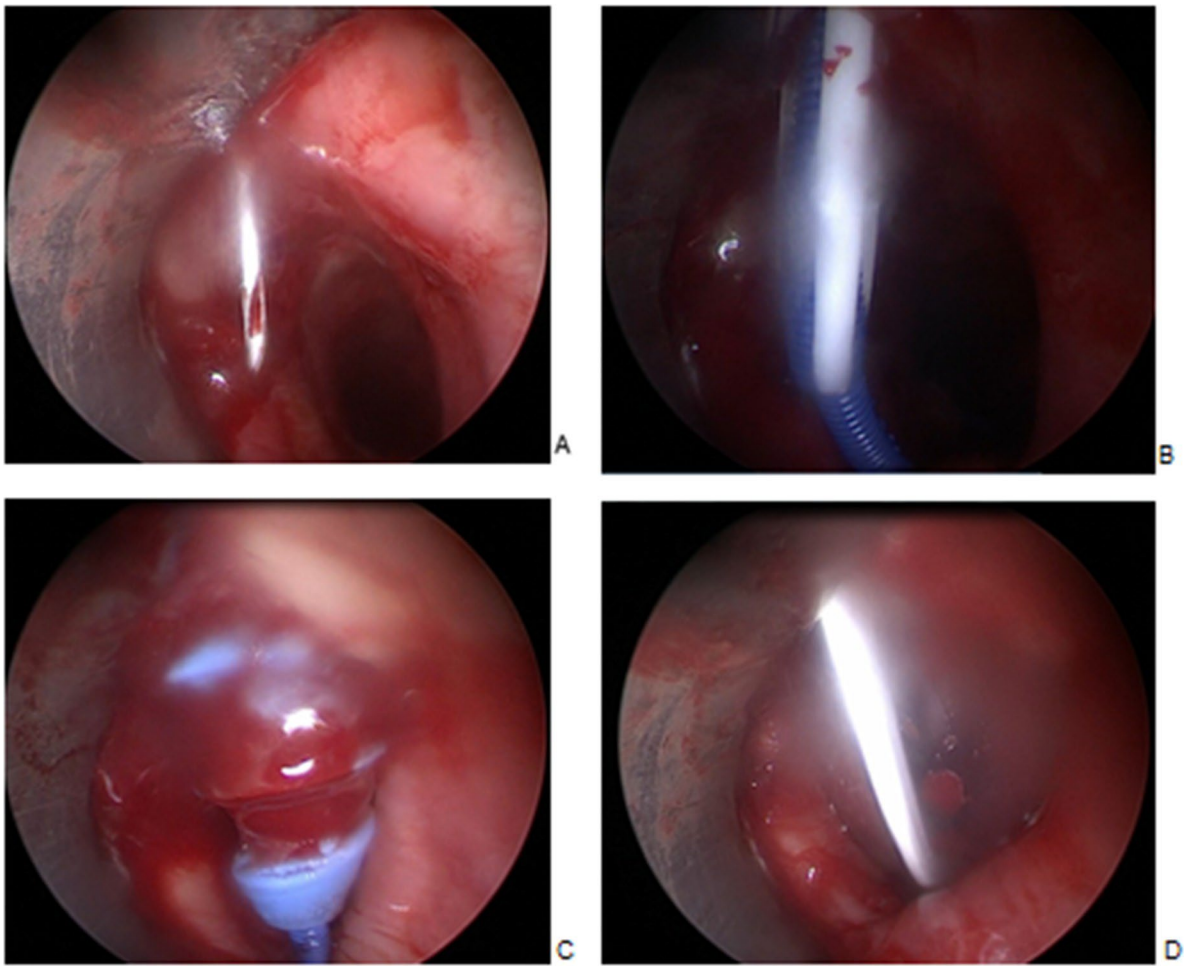

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