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Percutaneous Dilational Tracheostomy guided by rigid bronchoscopy in patients with cervical mass

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Glossary of abbreviations

PDT: Percutaneous Dilational Tracheostomy
FB: flexible bronchoscope
RB: Rigid Bronchoscope
ICU: Intensive Care Unit
Central Message

In intubated patients with airway obstruction by cervical mass, the use of RB rather than FB could facilitate the execution of PDT due to better visibility and higher suction capacity.

Central Picture

Tracheostomy cannula and tumor
Abstract

Herein, we proposed the PDT guided by rigid bronchoscope in intubated patients with airway obstruction. The presence of cervical mass discouraged us to perform an open tracheostomy as it could result in more blood loss than PDT, while the use of rigid bronchoscopy rather flexible bronchoscopy could facilitate the execution of PDT due to better visibility and suction capacity. This strategy was successfully applied in three consecutive intubated patients with airway obstruction due to cervical mass.
Introduction

PDT guided by FB is the procedure of choice for performing elective tracheostomy in critically ill patients [1]. However, this procedure may be challenging in patients with difficult airway. Herein, we reported the use of RB for performing PDT in intubated patients with tracheal stenosis due to cervical mass.

Technique

The procedure was performed in the operating room under general anaesthesia. A 8.5-mm outer diameter RB was introduced and advanced through the vocal cords (Figure 1A) into the larynx (Figure 1B) alongside the indwelling endotracheal tube. The balloon cuff of the endotracheal tube was deflated under endoscopic vision (Figure 1C), the tube was removed as the RB was carefully advanced into the trachea (Figure 1D). Jet ventilation through the RB provided ventilation. The RB forced the stenosis and reopened the airway; then, the tip of RB was positioned proximally to the stenosis and guided the PDT. The trachea was accessed with a 17- gauge needle (Figure 2A); and then a guide wire was inserted. The punch dilator introduced over the guide wire dilated the tracheal stoma (Figure 1B) and then tracheostomy tube was introduced after the dilation (Figure 1C). Finally, a FB was introduced through the tracheostomy and adjusted the length of the tracheostomy to compensate for the tumor size. The patient was ventilated through the tracheostomy tube and RB was withdrew (Figure 1D). Video 1 summarized the procedure.
Patients

This procedure was performed in three consecutive patients with airway stenosis due to cervical mass. In two cases, the mass was malignant and involved the local structure of the neck, including the skin. All patients underwent emergent intubation due to acute respiratory distress and elective tracheostomy was indicated to facilitate the weaning from the ventilator. No complications occurred during the PDT procedure. The patients’ informed written consent for the publication of the study data was obtained; IRB approval was not required.

Discussion

In our cases, tracheostomy was indicated to facilitate the weaning from the ventilator and to assure ventilation. The presence of cervical mass discouraged us to perform an open tracheostomy as it could result in more blood loss than PDT. Furthermore, the presence of a distorted airway let us to use RB instead of FB for guiding PDT. Several authors [1-5] performed PDT guided by RB in patients with difficult airway due to obesity, previous tracheostomy and/or radiotherapy, and existing tracheal stents and/or in those with high risk of bleeding for coagulopathy, but airway stenosis due to cervical mass was still considered a criterium of exclusion for PDT so far.

RB could offer many advantages over FB. (i) The better visibility and higher suction capacity allowed an effective control of intratracheal bleeding in case of tumor lesion. (ii) During PDT, the tip of RB lifted the trachea anteriorly and provided a natural abutment to the pressure from the dilatation, avoiding that the downward force necessary for dilatation hurt the tumor. (iii) In case of acute hypoxia, the progression of RB toward to the carina forced the stenosis, reopened the airway and assured ventilation. (iv) Endoscopic forceps can overcome some troubles of the procedure as the kinking of guide wire due to the distorted airway.
The main limit of this procedure was the removal of a secure airway to place RB, which could result in loss of airway. To avoid this critical situation, we suggested to use a RB of small size that could pass alongside the tracheal tube through the vocal folds. The patient was not extubated until the RB was in the laryngeal inlet.

Obviously, this technique should be considered as an adjunct to the standard strategies for performing tracheostomy and indicated in very selected cases, considered at high risk for standard PDT procedure. Considering the small number of patients, the feasibility of our approach should be corroborated by other and larger experiences.

References


**Figure Legends**

**Figure 1.** The picture showed the insertion of RB alongside the endotracheal tube through the vocal cords (A); the place of RB within subglottic area (B); the deflation of the cuff of the endotracheal tube (C); and the withdrawal of the endotracheal tube (D).

**Figure 2:** The pictures and the inserts summarized the main manoeuvres of PDT guided by rigid bronchoscope as the insertion of needle (A), of guidewire (B); of dilator (C), and of tracheostomy cannula (D).

**Video 1.** The video edited the main steps of the PDT guided by rigid bronchoscopy as the removal of the orotracheal tube and the insertion of rigid bronchoscope and the PDT guided by rigid bronchoscope.