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Early complications of percutaneous tracheostomy using the Griggs method

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ABSTRACT

This article presents our observations and experiences with the Griggs method of percutaneous dilation tracheostomy (PTD). We performed 200 tracheostomies on neurosurgical and surgical patients who needed temporary ventilatory support and protection. Early complications were defined and registered. Frequency of early complications was 22,5 %. The majority of complications were minor and improved quickly. Therefore, PTD was shown to be a safe and appropriate technique for patients treated in the intensive care unit (ICU). Unfortunately, lack of standardization and defined criteria deprive the opportunity for good comparisons between the Griggs method and other PTD methods.

Key words: percutaneous tracheostomy, Griggs method, early complications, surgery, neurosurgery

Introduction

The method of percutaneous tracheostomy tube placement has become a strong tool in the hands of intensivists in good airway management and respiratory support for critically ill patients, thanks to the introduction of the Seldinger technique. (1) Respiratory failure is a common problem in intensive care units (ICU) in patients who require prolonged ventilatory support. This pertains especially to patients with multiorgan failure, and neurosurgical and neurotrauma patients with neurologic disorders. Tracheostomy has become one of the most frequently performed procedures in critically ill patients. Percutaneous dilation tracheostomy (PTD) has replaced conventional tracheostomy in the majority of ICU patients. PTD is rapid and simple, and thus it can be performed at the bedside. Complications associated with the transport of patients and the need for an operating room is avoided. (2,3) In addition, the exclusion of surgical intervention improves the cost benefit ratio. (4) Three guide wire PDT methods (according to Ciaglia, Schachner and Griggs) are routinely used in the ICU. (5-7) Unfortunately, there is no standardized approach that would distinguish one of these methods, and therefore their application depends mainly on the preference and experience of the staff of a particular ICU. In this study we present the results obtained with the Griggs method of PTD.

Materials and Methods

The retrospective cohort study was performed in the ICU of the Department of Anesthesiology and Intensive Care Sisters of Mercy Hospital in Zagreb. All patients that required PTD, between 2000 and 2007, were included in the study. The Portex tracheostomy kit was utilized, and the Griggs method was performed in all patients. (6) Informed consent was obtained in accordance with the instructions of the Ethics Committee of our hospital. Patients with local anatomical abnormalities and abnormalities of the thyroid gland, coagulation disorders, and those with local skin changes were excluded from the study. The attending anesthesiologist and nurse performed the procedure at the bedside, under usual aseptic conditions. Ventilatory and hemodynamic parameters, including electrocardiography, blood pressure and oxygen saturation were monitored continuously. Sedation, analgesia and muscle relaxation were performed with midazolam, fentanyl and vecuronium. After insertion, the position of the tracheostomy tube was checked by X-ray. Complications were defined according to the classification of acute tracheostomy complications by Durbin and al. (8)

Table 1. Early complications of percutaneous dilation tracheostomy (PDT)

Complications	No (%)
Hypotension	6 (3)
Hypoxemia	5 (2,5)
Bronchospasm	2 (1)
Cardiac dysrhythmias	5 (2,5)
Difficult tube placement	7 (3,5)
Unwanted extubation	2 (1)
Cuff leak of tube	1 (0,5)
Minor bleeding	16 (8)
Major bleeding	1 (0,5)
Major continued bleeding	2 (1)
Barotrauma	-
False route	-
Paramedial stoma placement	-
Knotted guide wire or dilator	1
Tracheal ring fracture	2
Major posterior wall injury	-
Esophageal injury or fistula	-
Total	200 (100)

Results

The procedure was performed in two hundred patients during the period 2000 to 2007.

There were 118 (59%) males (aged between 17 and 87) and 82 (41%) females (aged between 22 and 80).

The majority of patients (148, 74%) were neurosurgical patients. The mean ventilator time prior to the procedure was 8,6±6,2 days. The mean procedure time from skin incision to tube insertion was 4,2±3,1 minute (range 2-16 minutes).

The observed complications are presented in table 1.

There were no accidental deaths due to procedure complications.

Discussion

This retrospective cohort study demonstrates the experience of our ICU, where the Griggs method is preferred in patients who require PDT. The studies that deal with the Griggs technique are scarce. The percentage of perioperative complications vary between 4%-25%, and depend substantially on the defined attributes of complications used in particular studies. (9-12) Powell et al. compared safety and efficacy among the four methods of PDT in their review article. (13) In 9 studies Rapitrac technique was used, and in 29 studies Ciagliy technique was used. In only 3 studies was the Griggs technique was preferred. Perioperative complication rate was high (22.9%) in patients with Rapitrac technique. On the contrary, only 8 complications were reported in patients in whom the Griggs technique was used, and they were all benign hemorrhages. (14) Petros and Engelman documented a complication rate of 11% with Ciaglia method. The rate of acute complications dropped from 18.5% to 6% due to the learning curve. (15) Anon and Gomes compared Ciaglia and Griggs method in 63 critically ill patients, and found no significant difference in the rate of complications between the two groups. (16)

In our study the overall complication rate was 22.5%. The majority of complications were not serious and quickly improved. The comparison of our data with the experiences of others published so far is impeded by the lack of systematic comparability of analyses. The only existing classification of the acute complications of PDT, used also in this study, by Durbin et al. has been proposed only recently. (8)

Great differences among the rates of complications found in studies published so far are due to lack of definitions of acute complications. There are no common standard definitions of risk and complications associated with PDT. This pertains to the Griggs method in particular. Lack of standardization and defined criteria of complications remains a capital problem in comparing not only the risk of procedures, but also in comparing the outcome of patients. (13-15) Our data suggest that the Griggs method can be considered a safe method for tracheostomy in patients in ICU. However, the data on the frequency, type, and severity of complications found in our study will be useful for comparison with results of further studies that will use the proposed methodology. (8) Further prospective studies, controlled and randomized, with strictly defined and standardized complication criteria will give more information about the rate of complications and compatibility of the existing PDT methods.

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