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Comparison and Efficacy of Percutaneous Versus Open Tracheostomy in Critically Ill Patients

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ABSTRACT

Tracheostomy is a surgical procedure most often performed on critically ill children and adults.[1,2] It can be performed urgently or electively, the indications are divided by age group, one of the most common causes is the need for chronic mechanical ventilation. [3,4]

The surgical technique that is preferred worldwide is the percutaneous dilatation technique with bronchoscopic control, since it has fewer complications, among these, higher rate of decannulation, fewer days of IMV, shorter stay in the ICU and low Charlson comorbidity index, compared to open tracheostomy. [5]

Complications secondary to the procedure are divided into early and late, the most frequent being bleeding or hemorrhage, infection, obstruction of the tracheostomy tube, and injury to the posterior wall of the trachea.[6,7,8]

KEYWORDS: Open tracheostomy, percutaneous tracheostomy, critically ill patients.

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INTRODUCTION

Tracheostomy is a common surgical procedure in the intensive care unit for both adults and pediatrics, an incidence of 2.2% to 19% is reported in children and 16 to 74% in adults hospitalized in the ICU. [1,2]

It is performed to help manage secretions, prevent airway obstruction, reduce anatomical dead space, and assist in weaning from mechanical ventilation in patients with chronic respiratory failure. Early tracheostomy is considered from 7 to 14 days of mechanical ventilation.[2]

The most frequent indications in children, according to a study carried out by Rios Deiddan et al, were airway pathology (70%) and prolonged ventilation (30%).[3]

The indications in adults are: upper airway obstruction (infection or inflammation of the airway, foreign body that cannot be removed by the Heimlich maneuver, supra-infraglottic disorders, stenosis or laryngeal trauma, facial fracture, and edema caused by burns, anaphylaxis, infection or trauma), prolonged mechanical ventilation, difficulty clearing secretions, severe obstructive sleep apnea unresponsive to positive pressure ventilation, and prophylaxis in head and neck surgery. [4]Tracheostomy can be urgent or elective. Mortality related to the technique is 0.7 to 3.6%. Mortality related to any complication of tracheostomy care such as cannula obstruction or displacement is 0.6%.[4]

Complications are divided into early and late, early complications are considered before 7 days and late complications after 7 days. A complication rate of 18 to 56% has been reported, the main ones being pneumomediastinum, pneumothorax, granulomas, accidental decannulation, and infections. [5,6]

The most common early complications are bleeding (5.7%), surgical site infection (6.6%), tracheostomy tube obstruction (0-3.5%), early extubation, subcutaneous emphysema (0-5%), and posterior wall injury of the trachea (0.2-12.5%). The detachment of the tracheostomy tube is a medical emergency. The incidence of late complications is 65%, they are divided according to the anatomical location in relation to the stoma into suprastomal, stomal and infrastomal. Complications are more frequent in open tracheostomy.[6,7,8] Younger patients with fewer comorbidities admitted to the Intensive Care Unit, who underwent percutaneous tracheostomy, benefit more from this technique versus open tracheostomy, since they had a higher rate of early decannulation, fewer days of invasive mechanical ventilation, lower rate of complications and shorter stay in the ICU. There are no differences in mortality, however, there are differences in the time to perform the procedure since there is more benefit if it is performed before 10 days from the start of mechanical ventilation. [9]

DISCUSSION

Tracheostomy is one of the most frequently performed surgical procedures in critically ill patients and therefore should be performed in the ICU as soon as the need is identified. Early tracheotomy is considered in patients with mechanical ventilation for 7 to 14 days; however, it is preferable to perform it before 10 days after starting mechanical ventilation. Tracheotomy can be emergency or elective, open or percutaneous.[1]The indications vary in children and adults, the most frequent causes of indication in the ICU is the need for prolonged mechanical ventilation, which is performed in up to 40% of these patients, as well as in those with the use of neuromuscular blockers as reported by the LUNG SAFE study, occurs more frequently in patients with acute respiratory distress syndrome (ARDS).[9]There are several tracheotomy techniques, however, the percutaneous dilation technique with bronchoscopic control is the most popular worldwide. Several studies mention that this technique has fewer complications than open tracheostomy. Percutaneous tracheotomy is superior to open tracheotomy since it presents 67% of early decannulation, shorter ICU stay, shorter mechanical ventilation time, and fewer complications associated with the procedure. [8,9]However, the percutaneous technique is contraindicated in pediatric patients, presence of a midline neck mass, uncorrected coagulopathy, and inability to palpate the laryngeal cartilages and tracheal rings. [4]Complications vary depending on the time when the procedure was performed; Observational studies suggest that the use of ultrasonography and bronchoscopy seems to reduce early complications, such as damage to the posterior tissue of the trachea, the formation of false tracts, and bleeding, so the percutaneous technique with bronchoscopic control is the one of choice it is preferred in critically ill patients. [5]

CONCLUSION

Tracheostomy is a surgical procedure that is performed mainly in children and adults in critical condition, the incidence varies according to age, being the most frequent procedure in adults, the most reported cause is ARDS.

The mortality rate has not been correctly estimated; however, up to 50% has been reported in critically ill patients undergoing tracheotomy, this mortality being secondary to comorbidities and complications derived from both these and the procedure, so it is important to identify how to reduce this percentage.Younger patients with fewer comorbidities in the ICU who required prolonged mechanical ventilation benefited from percutaneous tracheotomy, which is why it is the one of choice. It is preferred to perform it before 10 days after IMV due to the benefits it provides, including the shorter MV time and higher percentage of decannulation are more important, it has a positive impact on the reduction of complications compared to open tracheostomy, however the rate of airway injury can be high in both.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interest.

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