

## Tracheostomy in patients on mechanical ventilation: when is it indicated?

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Tracheostomy is one of the oldest surgical procedures, being reported in Hindu medicine books as early as 1500 B.C. In 1850, the diphtheria epidemic in Europe made this procedure popular in medical practice, and it was then performed in order to relieve the obstruction of the upper airways.<sup>(1)</sup> In 1909, Chevalier Jackson standardized the procedure, and his surgical technique still persists, with minor changes, until today. With the control of diphtheria, by means of antibiotics and antitoxin, the procedure fell into disuse. In the 1950s, with the advent of the poliomyelitis epidemic and the use of intermittent positive pressure ventilation, interest in the procedure increased. In the early 1960s, the Sabin vaccine caused the procedure to fall into disuse again. In the mid 1960s, with the advent of positive pressure ventilators and intensive care units, tracheostomy finally found its place in the ventilatory support of critical patients. In patients submitted to prolonged ventilatory support, the benefits of tracheostomy are several, such as: lower self-extubation rates, more comfort for patients, possibility of communication with patients, possibility of oral ingestion, improved oral hygiene and easier handling for the nursing staff.<sup>(1-6)</sup> Therefore, in patients that are unlikely to be extubated within 10-14 days, tracheostomy should be considered. When the time on mechanical ventilation is clearly expected to be longer than 14 days, tracheostomy should be proposed as soon as possible. Tracheostomy allows patients to be transferred from the ICU to other wards. Patients may be even discharged if they have home ventilatory support.<sup>(1,2)</sup>

Traditionally, most surgeons performed only open tracheostomy and did so only in operating rooms. In many institutions, these remain the method and locale of choice. However, in recent years, various methods of bedside percutaneous tracheostomy have been introduced. Currently, the most popular technique is percutaneous dilatational tracheostomy. This technique was initially described by Ciaglia in 1985,<sup>(1)</sup> using the technique by Seldinger and various progressive dilators. Since the description by Ciaglia, there have been various studies on this new technique in the literature, evaluating the benefits and risks, as well as variations from the original technique by Ciaglia. Among the most significant variations: 1) the tracheal puncture is now

located below the cricoid, usually between the first and the second tracheal rings, which reduces the incidence of tracheal stenosis; 2) use of a single dilator instead of multiple dilators; 3) Monitoring the procedure with fiberoptic bronchoscopy. The aid of fiberoptic bronchoscopy is interesting, but not obligatory.<sup>(3)</sup> The use of a single dilator has the advantage of reducing the procedure time, which is 6 min on average, and minimizing the loss of tidal volume due to the exchange of progressive dilators. Initially, the reduced cost of percutaneous tracheostomy was a major reason for the popularity of this technique in the United States and other countries. The tendency toward minimally invasive surgical procedures and the development of intervention in nonsurgical care settings have increased the already considerable interest in percutaneous tracheostomy grow. When this technique was introduced, its proponents reported that it was easy to perform, presented a profile as safe as that of open surgical tracheostomy, significantly reduced hospital costs and allowed more efficient use of financial resources in the ICU. Costs were reduced because neither operating rooms nor anesthesiologists were necessary. The use of percutaneous tracheostomy as a procedure for critically ill patients paved the way for open surgical tracheostomy at the bedside. This technique has been developed in the last decades, being reported to be as safe as percutaneous tracheostomy.<sup>(2)</sup> Regardless of the technique adopted, the best place for performing tracheostomy remains a matter of debate. A study conducted in 2005<sup>(5)</sup> surveyed health care professionals regarding patients submitted to mechanical ventilation in 152 ICUs in France. Of those submitted to tracheostomy, 35.5% underwent the procedure in an operating room, whereas it was performed in the ICU in 24%. The questionnaire used in that study included options such as 'sometimes' and 'rarely'. It is important to mention that surgical tracheostomy was the method of choice of 73% of French physicians, which might have influenced surgeons to perform tracheostomy in operating rooms. This fact was corroborated in a study on tracheostomy conducted in Holland. In that country, among patients in the ICUs where the percutaneous technique was preferred, 94% of these procedures were performed in the ICU itself. In the ICUs where the surgical technique was preferred, 76% of

the procedures were performed in the operating room.<sup>(1)</sup>

We should also take into consideration that transporting patients on mechanical ventilation to operating rooms is not risk-free. Moving patients unnecessarily increases the risk of ventilator-associated pneumonia, as well as that of hemodynamic instability, hypoxia, arrhythmias, unscheduled extubation and loss of venous access. In addition, there is always a chance that equipment such as transport ventilators or infusion pumps will malfunction.<sup>(4)</sup>

In the study by Perfeito et al., published in the current issue of the Brazilian Journal of Pulmonology, the feasibility, complications and mortality related to bedside tracheostomy in the ICU were evaluated. This retrospective study comprised 73 patients submitted to this procedure in 2003. All patients were submitted to the surgical technique. The incidence of bleeding and local complications was low. There were no deaths related to the procedure. This was an interesting practical study, in which the experience that this group has had with this procedure in the ICU is reported. As in other such studies,<sup>(3,6)</sup> the authors showed the safety of bedside surgical tracheostomy in critical patients, the low incidence of complications, as well as how these patients benefit from not being unnecessarily moved from the ICU. It is known that tracheostomy in the ICU is a technique that is far from being standardized worldwide in terms of intubation time, the technique adopted and the location

at which the procedure is performed.<sup>(1,5)</sup> Gaining greater knowledge regarding our current situation is a step toward reducing the number of complications and achieving greater success when adopting this procedure.

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