SIGNA VITAE 2009; 4(1): 21 - 23

ORIGINAL

Tracheotomy versus prolonged intubation in medical intensive care unit patients

BOUBAKER CHARRA • ABDELHAMID HACHIMI • ABDELLATIF BENSLAMA • SAID MOTAOUAKKIL (✉)
Service de Réanimation Médicale
CHU Ibn Rochd1
Rue des Hôpitaux, Quartier des Hopitaux,
Casablanca 20 100, Morocco
Phone: 00212 22 22 88 17
GSM: 00212 61 15 53 11
E-mail : smotaouakkil@yahoo.fr
reamedcasa@gmail.com

BOUBAKER CHARRA • ABDELHAMID HACHIMI • ABDELLATIF BENSLAMA • SAID MOTAOUAKKIL

ABSTRACT

Introduction. The contribution of tracheotomy in comparison to intubation in patients on the resuscitation ward is debated. The main purpose of our study is to assess if tracheotomy compared to prolonged intubation, reduces the whole duration of ventilation, the frequency of nosocomial pneumopathy, the mean duration of hospitalisation in the resuscitation ward and mortality.

Patients and method. It is a retrospective and comparative study between two groups of patients who presented neurological or respiratory pathology and required mechanical ventilation for more than three weeks. The study lasted 7 years and involved 60 patients divided into 2 groups : the Tracheotomy Group (TG, n=30), in which a tracheotomy was performed between the eighth day and the fifteenth day, after the first period of tracheal intubation; and the Intubation Group (IG, n=30), where the patients were intubated throughout the period of hospitalization until extubation or death. We monitored the whole duration of ventilation, the frequency of nosocomial pneumopathy, the incidence of each technique as well as the mean duration of hospitalization in the resuscitation ward and the mortality rate. The two groups were similar in age, sex and gravity score : SAPS II and APACHE II.

Results. The results showed a significant statistical decrease of the whole duration of mechanical ventilation for the TG: 27.03 ± 3.31 days versus 31.63 ± 6.05 days for the IG (P = 0.001). However, there is no significant difference between the two groups, whereas the frequency of nosocomial pneumopathy is about 53.3% in the group with tracheotomy versus 70% for the intubated group (P = 0.18). This shows, on the other hand, the late prevalence of nosocomial pneumopathy in the tracheotomy group patients.

We noticed one case of bleeding after tracheotomy. Sinusitis was also diagnosed but without a significant difference between the two groups, 6.7% (2 cases) in the TG and 10% (3 cases) for the IG (P = 0.31). The mean duration of hospitalization didn't differ between the two groups; it was 30.96 ± 9.47 days for the TG versus 34.26 ± 9.74 days for the IG (P = 0.10). The study shows that there is no statistically significant difference in mortality between the two groups, 26.7% in the TG versus 46.7% for the IG (P = 0.10).

Conclusion. It seems that tracheotomy, in medical ICU patients, leads to a shorter duration of ventilation, delayed nosocomial pneumopathy without the modification of its frequency and the mean duration of hospitalization or death.

Keywords: tracheotomy, prolonged intubation, pneumopathy, mechanical ventilation, mortality

Introduction

Tracheotomy is performed during the ventilation of patients who present with difficulty weaning. The contribution of precocious tracheotomy in ICU (intensive care unit) patients is still debated in comparison with prolonged intubation. The main purpose of our study was to assess if tracheotomy compared to prolonged intubation, reduces the duration of ventilation, frequency of nosocomial pneumopathy (NP), length of stay and mortality in a medical ICU.

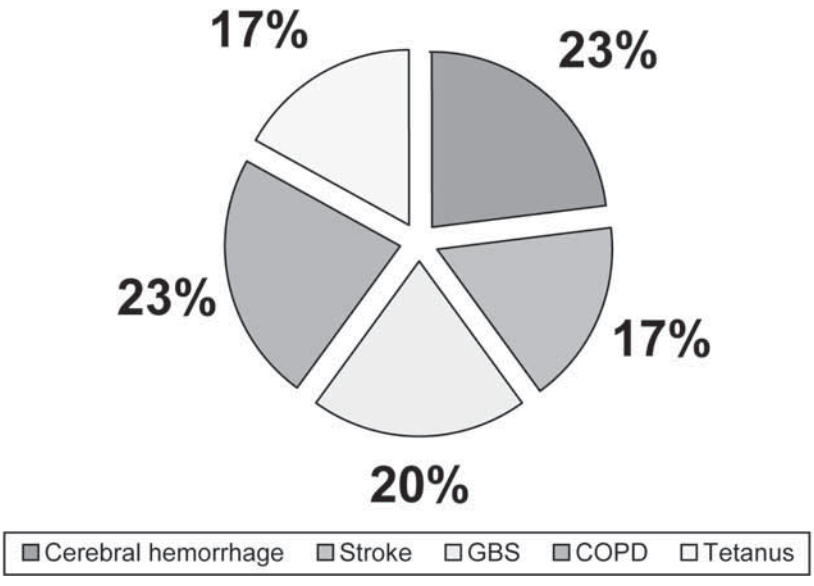
Patients and methods

It was a retrospective and comparative study, conducted during seven years

(2001-2007) in the medical intensive care unit at Ibn Rochd University hospital. We included patients who presented with neurological injuries or respiratory failure and required mechanical ventilation (MV) for more than three weeks. We divided them into 2 groups: Tracheotomy Group (TG, n=30) (the tracheotomy was performed between the eighth day and the fifteenth day, after the first period of tracheal intubation; and Intubation Group (IG, n=30) (patients are intubated throughout the period of hospitalization until extubation or death). Tracheotomy was performed using a surgical technique in the ICU by a critical care physician with low pressure tracheotomy tube cuffs. We measured duration of ventilation, frequency of NP, length of stay in ICU, incidence of each technique and mortality in ICU. NP is a ventilator associated pneumonia, defined by fever (>38.3 °C), leukocytosis or leucopenia, purulent bronchial secretions, and a new or persistent infiltrate on chest radiography after 48 hours stay in ICU, and confirmed by bronchalveolar lavage. The two groups were similar in mean age (40 ± 9 vs. 42 ± 11 years), sex-ratio (1.2 vs. 1.4), gravity score (SAPS II and APACHE II) (table 1) and diagnosis (figure 1). The parameters in each group were compared using Chi-2 test and Fischer's exact test when necessary for qualitative variables. We compared qualitative variables using Student's t test. $P < 0.05$ was considered significant. All data were analyzed with SPSS 11.0 for Windows.

Results

A total of 60 patients, who required MV, were recruited in our study. The mean age was 41 ± 11 years. Cerebral hemorrhage and chronic obstructive pulmonary disease were the predominant diagnoses, 23 % respectively (figure 1). The mean length of stay for all patients in ICU was 32 ± 9.6 days (23 – 57). The mean time for MV patients was 29 days (22-50) and shorter in TG (27.03 ± 3.31 days) than in IG (31.63 ± 6.05 days) (table 2). Tracheotomy was realized between the eighth day and the fifteenth day. Nosocomial pneumopathy was precocious in the IG than TG (table 2). We noticed one case of minor bleeding after tracheotomy, and no difference in the incidence of sinusitis. No tracheal stenosis has been noted in the two groups. Statistically, there was no difference in mortality in the ICU (TG 26.7 % vs. IG 46.7 %; $p = 0.1$) and in the duration of stay in ICU (TG 30.96 ± 9.47 vs. 34.26 ± 9.74; $p = 0.2$) between both groups.



Guillain Barre syndrome (GBS), chronic obstructive pulmonary disease (COPD)

Figure 1. Diagnosis on admission.

Discussion

Tracheotomy is frequently performed in the ICU. It is recommended to: improve respiratory mechanics, nutrition, patient comfort and clearance of secretion, to reduce laryngeal ulceration, enhance mobility and speech and it enables care of the patient outside the ICU. (1) The optimal time to perform a tracheotomy remains controversial. Early tracheotomy in critically ill medical patients who undergo ≥ 14 days of ventilation may have significant benefits over delayed tracheotomy. These include reduction in mortality rate, frequency of pneumonia, duration of mechanical ventilation, and length of time in intensive care. (2) In surgical ICU patients, Bouderka concluded that early tracheotomy decreases the total days of the ventilator and mechanical ventilatory time after pneumonia in isolated severe head injury. It did not reduce either ICU stay or the frequency of pneumonia or mortality. (3) Our study demonstrates that early tracheotomy has advantages over prolonged intubation in medical ICU patients who required ventilation > 14 days. The first group spent significantly less time on ventilation and had delayed nosocomial pneumopathy. The last finding in our study is not found in others papers. In critically ill adult patients who require prolonged mechanical ventilation, performing a tracheostomy at an earlier stage than is currently practiced may shorten the duration of artificial ventilation and length of stay in intensive care. On the one hand, we think that, in the tracheotomy group, the number of tracheal aspirations is less frequent and easy. On the other hand, ventilator weaning is precocious, which decreases alveolar aggressions due to the mechanical ventilation.

Laryngo-tracheal injuries constitute an important element for specifying the optimal moment for performing trache-

otomy, in patients requiring prolonged ventilation. Several authors affirm that the greater the duration of intubation, the greater the impact and gravity of these injuries. Rumbak concluded, through a prospective and randomized survey, that the maximum of these lesions occur with tardive tracheotomy, showing the profit of precocious tracheotomy as soon as possible. (2) Otherwise, Stauffer in a prospective survey including 150 patients showed that prolonged intubation provokes less tracheal complications than tracheotomy (62% versus 66%), particularly tracheal stenosis (19% versus 65%). (4) Tracheomalacia as well as esotracheal fistulas are more frequent with tracheotomy than with intubation. (5) Maxillary sinusitis occurs more often with intubation than with tracheotomy. (6) The tracheotomy mortality is minimal, Rodriguez (7) reported 0%, and Berlauk 3%. (8) A recent meta-analysis concluded that critically ill adult patients who require prolonged mechanical ventilation, performing a tracheostomy at an earlier stage than is currently practiced may shorten the duration of artificial ventilation and length of stay in intensive care. (9)

Table 1. Patient characteristics on admission.

	TG (n = 30)	IG (n = 30)	P
Age (years)	40.03 ± 10.15	41.7 ± 12.41	0.53
Sex-ratio (F/M)	12/18	14/16	0.32
SAPS II	28.13 ± 3.57	29.97 ± 5.83	0.64
APACHE II	12.13 ± 2.54	14.67 ±10.26	0.17

Tracheotomy Group (TG),Intubation Group (IG)

Table 2. Comparison of ventilatory and nosocomial pneumopathy data.

	TG (n = 30)	IG (n = 30)	P
Number of weaning tentative	1.31 ± 0.47	1.18 ± 0.40	0.37
Total length of mechanical ventilation (day)	27.03 ± 3.31	31.63 ± 6.05	0.001
Nosocomial Pneumopathy (NP) n (%)	16 (53.3)	21 (70)	0.18
Appearance of NP (day)	11.12 ± 2.72	8.8 ± 1.50	0.003
Number of days of mechanical ventilation after NP	10 ± 2.36	15.04 ± 11.17	0.23

Tracheotomy Group (TG),Intubation Group (IG)

Conclusion

It seems that tracheotomy in medical ICU patients leads to decreased duration of ventilation, delayed nosocomial pneumopathy without modifying its frequency and the mean duration of hospitalization or death.

REFERENCES

1. De Leyn P, Bedert L, Delcroix M, Depuydt P, Lauwers G, Sokolov Y, et al. Tracheotomy: clinical review and guidelines. Eur J Cardio-Thoracic Surg 2007;32(3):412-21.
2. Rumbak MJ, Newton M, Truncale T, Schwartz SW, Adams JW, Hazard PB. A prospective, randomized, study comparing early percutaneous dilatational tracheotomy to prolonged translaryngeal intubation (delayed tracheotomy) in critically ill medical patients. Crit Care Med 2004;32(8):1689–94.
3. Bouderka MA, Fakhir B, Bouaggad A, Hmamouchi B, Hamoudi D, Harti A. Early tracheostomy versus prolonged endotracheal intubation in severe head injury. J Trauma 2004;57(2):251-4.
4. Stauffer JL, Olson DE, Petty TL. Complications and consequences of endotracheal intubation and tracheotomy: A prospective study of 150 critically ill adult patients. Am J Med 1981;70(1):65–76.
5. Racy E, Bobin S. Locoregional, laryngeal and tracheal complications of endotracheal prosthesis. In: News in resuscitation and emergency. Paris: SRLF Publishing; 2000. p. 405-12.
6. Heffner JE, Scott MK, Sahn SA. Tracheostomy in the intensive care unit. Part 2: complications. Chest 1986;90(3):430–5.
7. Rodriguez JL, Steinberg SM, Luchetti FA, Gibbons KJ, Taheri PA, Flint LM. Early tracheostomy for primary airway management in surgical critical care setting. Surgery 1990;108(4):655–9.
8. Berlauk JF. Prolonged endotracheal intubation versus tracheostomy. Crit Care Med 1986;14(8):742-5.
9. Griffiths J, Barber VS, Morgan L, Young JD. Systematic review and meta-analysis of studies of the timing of tracheostomy in adult patients undergoing artificial ventilation. Br Med J 2005;330(7502):1243–8.