Case Report

EARLY TRACHEOSTOMY IN PROLONGED MECHANICAL VENTILATION DUE TO SEVERE HEAD INJURY TO PREVENT VENTILATOR-ASSOCIATED PNEUMONIA (VAP)

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ABSTRACT

Introduction: Early tracheostomy needs to be considered if the use of a ventilator is expected to be used for a long time. Early Tracheostomy is recommended because it can improve respiratory function, reduce the risk of Ventilator Associated Pneumonia (VAP), improve patient comfort, cleanse secretions in the throat, reduce laryngeal ulceration, improve mobilization and speech efforts, and allow treatment outside the Intensive Care Unit (ICU). Case Report: We report four cases of severe head injury with early tracheostomy which illustrates prevent of VAP. In these four cases, early tracheostomy was performed (≤ 4 days) with consideration of the initial critical GCS, the location of the lesion, and mechanical ventilation is expected to be used for a long period of time. During treatment there is no VAP signs which is evidenced by Clinical Pulmonary Infection Score (CPIS), rontgen thorax and a sputum culture examination. Based on a meta-analysis study early tracheostomy can reduce mortality due to VAP by up to 50% and reduce the length of stay in ICU compared to delayed/late tracheostomy (> 10 days) or prolonged intubation (> 14 days). Conclusion: In this case series early tracheostomy (<4 days) was found to be associated with reduced ventilation time and ICU and hospital stays without an increased risk of VAP. VAP prevention efforts are carried out by applying early tracheostomy and VAP bundle also. Early tracheostomy provides more benefits than prolonged intubation or delayed/late tracheostomy.

Keywords: Early Tracheostomy; Prolonged Mechanical Ventilation; Severe Head Injury; Ventilator Associated Pneumonia (VAP)

ABSTRAK

Pendahuluan: Trakeostomi dini perlu dipertimbangkan jika penggunaan ventilator diperkirakan akan digunakan untuk waktu yang lama. Trakeostomi dini direkomendasikan karena dapat meningkatkan fungsi pernapasan, mengurangi Pneumonia terkait Ventilator (VAP), meningkatkan kenyamanan pasien, membersihkan sekresi di tenggorokan, mengurangi ulserasi laring, meningkatkan upaya mobilisasi dan bicara, dan memungkinkan perawatan di luar Unit Perawatan Intensif (ICU).

Laporan Kasus: Kami melaporkan empat kasus cedera kepala berat dengan trakeostomi dini yang dapat menggambarkan pencegahan pencegahan. Pada empat kasus tersebut, trakeostomi dini dilakukan (≤ 4 hari) dengan pertimbangan GCS awal, lokasi lesi, dan penggunaan ventilasi mekanik yang diperkirakan untuk jangka waktu yang lama. Selama perawatan tidak ada tanda-tanda VAP yang terjadi dibuktikan dengan Clinical Pulmonary Infection Score (CPIS), pemeriksaan rontgen thorax dan kultur sputum. Berdasarkan studi meta-analysis didapatkan bahwa trakeostomi dini (≤ 4 hari) dapat mengurangi angka kematian akibat VAP hingga 50% dan mengurangi lama perawatan di ICU, dibandingkan dengan trakeostomi lama (> 10 hari) atau intubasi yang lama (> 14 hari).

Kesimpulan: Pada kasus serial ini ditemukan bahwa trakeostomi dini (<4 hari) berkaitan dengan pengurangan waktu menggunakan Ventilator serta perawatan ICU dan RS tanpa disertai peningkatan resiko VAP. Upaya pencegahan VAP dapat dilakukan dengan menerapkan Bundle VAP dan Trakeostomi dini. Trakeostomi dini memberikan manfaat lebih banyak daripada intubasi berkepanjangan atau trakeostomi lama.

Kata kunci: Trakeostomi dini; Ventilasi Mekanik lama; Cedera Kepala Berat; Pneumonia terkait Ventilator/Ventilator Associated Pneumonia (VAP)
INTRODUCTION

Tracheostomy is a surgical measure to open the anterior wall of the trachea in order to allow mechanical ventilation through tracheostomy tube. Tracheostomy is one of the most common procedures performed in ICU (1). Early tracheostomy (< 4 days) is considered if the use of ventilator is expected to be used in the long term (more than 14 days) and also recommended because it can improve the respiration function, reduce the risk of nosocomial infection (Ventilator Associated Pneumonia/VAP), more rapid weaning from mechanical ventilation, increase the patient’s comfort and safety, ability to communicate, clean secretions in the throat, reduce laryngeal ulceration, increase mobilization and talking effort, as well as allow treatment outside the ICU (2-4). So, patients may have shorter intensive care unit stays, days of Mechanical Ventilation, and length of stay (LOS) in hospital. The objective of this case series report is to describe the advantages of early tracheostomy in several cases of severe head injury with prolonged mechanical ventilation.

CASE REPORTS

A. Ch. D, 13 years old, not using helmet, the injury mechanism is unknown. In Resuscitation Room, Vital Sign is obtained, blood pressure is 112/54 mmHg, pulse rate is 113x/minute, respiratory rate is 12x/minute, temperature is 38.7°C as well as GCS E1M3V1, bilateral isochoral pupils and there is a light reflex. Head CT-scan without contrast showed contusion in the left frontal, bleeding in the intraventricular (IVH) and subarachnoid (SAH), and sinistra media fossa cranii base fracture. Decided for non-operative management. Then the patient is moved to Intensive Care Unit (ICU) in an intubated state, pressure control mode ventilator is installed as well as administered by mannitol and anticonvulsants.

B. Mr. S, a man, 45 years old, found lying on the side of the road, used helmet, however the injury mechanism is unknown. In Resuscitation Room, Vital Sign is obtained, blood pressure is 110/75 mmHg, pulse rate is 120x/minute, respiratory rate is 13x/minute, temperature is 36.5°C as well as GCS E1M2V1, anisocoria pupils 2/5 mm, and there is a light reflex but slow. Head CT-scan without contrast showed bleeding in the intracerebral (ICH) dextra and sinistra basal ganglia region, as well as intraventricular (IVH). Neurosurgery decided a conservative therapy. The patient then intubated and connected to the ventilator then moved to the ICU.

C. Mrs. N, a woman, 55 years old, hit by a car, used helmet. In Resuscitation Room, Vital Sign is obtained, blood pressure is 147/88 mmHg, pulse rate is 95x/minute, Respiratory rate is 14x/minute, temperature is 36.5°C as well as GCS E1M1V4, isochoral pupils 3/3 mm, and there is a light reflex but slow. Head CT-scan without contrast showed ICH of Dextra temporal front region. Neurosurgery decided to perform Dextra ICH Evacuation Craniotomy. Post Operation patient is observed in the ICU.

D. Mr. M, a man, 42 years old, motorcycle vs motorcycle, history of vomiting (+). In Resuscitation Room, Vital Sign is obtained, blood pressure is 100/80 mmHg, pulse rate is 90x/minute, Respiratory rate 116

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is 20x/minute, temperature is 36.5°C, GCS E1M1V3, isochoral pupils 3/3 mm, and there is a light reflex. Head CT-scan without contrast showed frontal thin EDH (D), Occipital Parieto Impression Fracture (D) as well as Cerebral Edema (D). Neurosurgery decided to perform EDH Evacuation Craniotomy, Reconstruction and ICP Monitor. Post Op patient is observed in the ICU.

Management

Patient Ch. D on the 3rd day of treatment is performed early tracheostomy because it is expected will use a long-term ventilator (more than 14 days). On the 5th day of treatment repeat head CT is performed which showed infarction at the sinistra temporal base. Until the 7th day the use of broad spectrum antibiotic, culture results of blood, urine and sputum no bacteria growth was found. We also obtained thorax photo to make sure there is no infection, Weaning ventilator can be performed in patient on the 9th day. On the 10th day patient can be moved to Ward with GCS E3M6Vx. Patient went home on the 30th day of treatment with GCS E4M6V4.

Patient Mr. S on the 4th day of treatment is performed early tracheostomy because there is no significant increase in consciousness and a lot of sputum production. After the tracheostomy is performed, weaning ventilator can be performed in patient on the 5th day of treatment, then patient can be moved to HCU with GCS E2M2Vx. Rontgen thorax and culture obtained but there is no infection signs. The culture results of blood and sputum showed there is no bacteria growth found during treatment. Patient is discharged on the 49th day of treatment with GCS E4M6Vx.

Patient Mr. M on the 3rd day of treatment a early tracheostomy is performed, during treatment there is no increase in consciousness and a lot of sputum production. After the tracheostomy is performed, weaning ventilator can be performed in patient on the 5th day of treatment, then patient can be moved to HCU with GCS E2M2Vx. Broad spectrum antibiotic is still continued after treatment, then from the culture results of blood and sputum no bacteria was found and also from laboratory result and thorax photo and finally we decided to stop antibiotic. Patient went home on the 54th day of treatment with GCS E4M6Vx.

DISCUSSION

Several potential advantages of tracheostomy over endotracheal intubation have been proposed, it can improve the respiration function, reduce the risk of nosocomial infection (Ventilator Associated Pneumonia/VAP), more rapid weaning from mechanical ventilation, increase the patient’s comfort and safety, ability to communicate, clean secretions in the throat, reduce laryngeal
ulceration, increase mobilization and talking effort, as well as allow treatment outside the ICU. Based on the meta-analysis research obtained results that performed early tracheostomy (<4 days) can reduce the mortality rate because of VAP until 50% and reduce the treatment days in ICU and hospital (length of stay/LOS) compared to late tracheostomy (>10 days) or prolonged intubation (>14 days) (2-4). Early tracheostomy is performed in critical III patient which is expected to use long-term mechanical ventilation or Prolonged Mechanical Ventilation (more than 10-14 days) (1, 5, 6, 7). Patient is said to be prolonged mechanical ventilation if the use of mechanical ventilation in the ICU >5 days (8). Early tracheostomy has many advantages compared to late tracheostomy or prolonged intubation, such as reduce in VAP, duration of use of the ventilator and duration of treatment in the ICU. VAP is one of the leading causes of nosocomial death (9). VAP Bundle is performed in every ICU patient who used ventilator, and can be proven scientifically that the implementation of VAP Bundle can reduce the incidence rate of VAP 25%. Still early tracheostomy is performed on patients who are expected to be on a ventilator for a long time, and one of the advantages is reducing the incidence of VAP. The prevention effort of VAP can be conducted by implementing VAP Bundle:

1. Elevation Head of Bed 30-45°
2. Oral Care with chlorhexidin every 4-6 hours
3. Sedation vacation each day, allowing patient to wake up, once every 24 hours
4. The assessment of the readiness of mechanical weaning ventilation each day
5. Stress Ulcer Prophylaxis in the first 24 hours of the use of mechanical ventilation

Deep Vein Thrombosis (DVT) Prophylaxis in the first 24 hours of the use of mechanical ventilation (10-12)

CONCLUSION

In this case series, early tracheostomy (<4 days) was found to be associated with reduced ventilation time and ICU and hospital stays without an increased risk of VAP. Early tracheostomy have certain advantages compared to prolonged intubation or late tracheostomy, namely reduce the incidence rate of VAP, improved patient comfort, more effective airway suctioning, decrease airway resistance, enhanced patient mobility, reduce the duration of use of the ventilator, reduce the length of stay (LOS) in the ICU and also hospital costs. Future studies with more case to study are needed to draw definitive conclusions regarding early tracheostomy.

REFERENCES:


