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CPAP Assembly on Tracheostomy Tube.

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ABSTRACT

Patients on long term mechanical ventilation are a challenge to wean. These patients become ventilator dependent either due to requirement of breaths, oxygen or just continuous pressure to recruit the lungs and alveoli. If these patients are provided CPAP, they can be weaned and stay off ventilator. However, tracheostomy patients can not be provided CPAP due to inherent risk of barotrauma. We provided CPAP to one such difficult to wean patient on tracheostomy which could make the patient off ventilator.

Keywords: CPAP, CPAP assembly on tracheostomy, weaning.

INTRODUCTION

A 62-year female known diabetic for the last 16 years presented to the hospital with complaints of black discoloration of the right foot. She had a history of OHA with compliance to medication. On admission, patient was drowsy with a Heart rate of 110, Blood Pressure of 90/60 torr. RBS was 310gm/dl with electrolytes within range. After initial resuscitation, debridement was done and she was started on Inj insulin for maintenance of sugar levels. The patient showed slow progress with delayed wound healing. During the course of treatment, she developed sudden cardiac arrest in ward where immediate resuscitation measures were taken, airway was secured and the patient returned to spontaneous circulation. She was shifted to the operation theatre for emergency below-knee amputation of right side. The patient was shifted to ICU for further management where she was successfully weaned after 48 hours with fluid and sugar corrections. However, the patient developed respiratory distress after 36 hours and was put on invasive ventilation again. After 21 days of intense therapy, she was conscious, but difficult to wean, although she was able to maintain with spontaneous support of 7-10 cm. A small modification in circuit assembly was made to provide her continuous pressure (CPAP) using swivel catheter mount, T piece, CPAP valve and a rebreathing bag. The whole assembly was connected to oxygen source @6 liters per min through which the patient could breathe spontaneously through a tracheostomy tube. [Figure 1] After initial intermittent use, she was on full-time spontaneous ventilation with assembly without the use of a ventilator.

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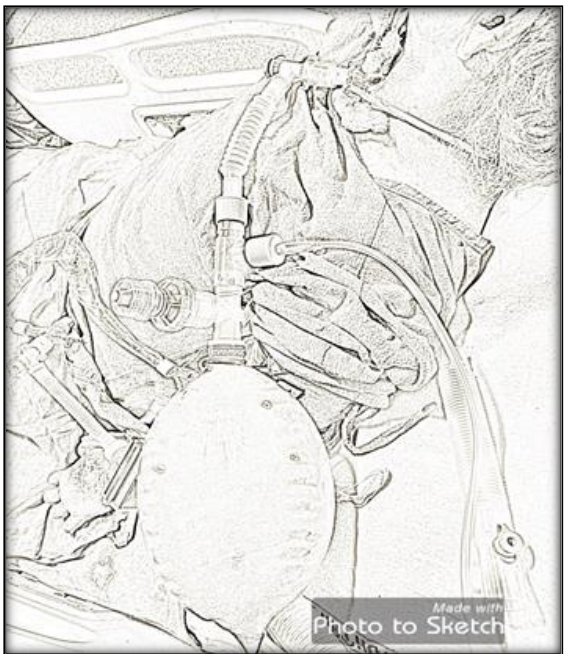
The device:

The device used to consist of an assembly of catheter mount, a T piece, a CPAP valve and a rebreathing bag. The swivel provided flexibility in a movement without the drag on tracheostomy, the T piece provided attachment to CPAP valve and oxygen/Air source with circuit while rebreathing bag provided visual monitoring of respiration. During weaning with conventional CPAP, delivery ventilator is required. There are few circuits available to provide spontaneously breathing patients, but their attachment on tube/ tracheostomy is individualized. One such device reported is Boussignac CPAP, where Pressurised air and oxygen with the desired oxygen fraction can be used to deliver CPAP to the tracheostomy tube.[1] Boussignac CPAP, combined with extended tubing, has been reported to be used on a child providing an action range of 10 m so she could play and develop motor skills.[2] Our plan was similar to provide CPAP while the patient can be brought off ventilatory support with the maintenance of her ventilatory requirements.



DISCUSSION

Weaning patients from long-term ventilation is always a challenge in clinical practice. Tracheostomy tube (TT) in such patients provide the option of gradual weaning from ventilatory support with intermittent support and spontaneous breathing. Tracheostomy also provides better oral hygiene, more effective airway suctioning, decreased dead space, and less need for sedation. An additional medical and economic advantage may be the earlier discharge of tracheostomy patients from the intensive care unit, which becomes a challenge in patients becoming dependent on positive support. Intermittent disconnections, T-piece trials, or continuous positive airway pressure (CPAP) are often used with varied success. Continuous positive airway pressure (CPAP) increases the ventilation in the lungs with the prevention of atelectasis and the continuous recruitment of alveoli. Mechanical ventilators or dedicated CPAP systems are used for this purpose. However, large and heavy tubing may hinder the mobilization of patients with CPAP.

The BCPAP is a disposable cylindrical plastic device initially devised to deliver CPAP for face masks. A jet flow of air and/or oxygen that accelerates through four parallel microchannels creates a flow-dependent pressure in the plastic tube.[1] Our system was based on the principle of valve assembly attached to the Mapleson C circuit, which creates pressure-regulated with an adjustable valve.

CONCLUSION

Simple assembly of available devices can be used to create a custom made solutions as per the patient's need. The assembly can further be refined to devise a commercially available lightweight system for patient use, which can allow free patient mobility enhancing recovery.

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