Journal of The Gujarat Research Society
ISSN: 0374-8588
Volume 21 Issue 9, September 2019

MECHANICAL VENTILATION

Dr. Venkadeshwaran K
Department of Mechanical Engineering, Faculty of Engineering and Technology,
JAIN (Deemed-to-be University), Karnataka – 562112
Email id: k.venkadeswaran@jainuniversity.ac.in

Abstract

Mechanical ventilation is regularly carried out in a hospital to minimize breathing work, improve oxygenation or correct respiratory acidosis. Air conditioning is also available. While many of these objectives are accomplished by conventional mechanical ventilation techniques, they have major shortcomings. Any of these drawbacks can be discussed in other modes which are now usable on new fans. This essay explores general aspects of the functioning, weaknesses and future interests of conventional mechanical ventilation systems in some exciting modern modes.

Keywords: *Acute respiratory failure, ICU, Mechanical ventilation, Ventilator modes.*

I. INTRODUCTION

In order to reduce respiratory work, increase oxygenation or correct piratory acidosis, mechanical ventilation is frequently delivered to patients admitted to ICUs. In most cases, a ventilation device can be controlled completely shortly after intubation, based on a multinational survey of 5000 patients, including actual respiratory failure (69%), coma (17%) and chronic respiratory failure (13%), and neuromuscu-lar disorders (2%). The goal is to improve oxygenation without causing lung damage and to rest the breathing muscles. Then when the condition of the patient starts to improve, the ventilation of the patient is assisted until extubating[1]. Although this seems logical, there is no clear consensus on when, how and at which level the patient breathing should be reduced. This can also be done in any traditional modes in degree variable. Inadequate help can induce diaphragm tiredness or weakness and force the recruitment of spiral accessories, which sometimes result in breathing acidification[2]. Excessive help can cause respiratory alkalosis and reduce breathing movement, make patient fan asynchronous and sleep disorders easier. Ventilation modes summarize how the patient's respiratory system receives assistance through the ventilator. Control and phase variables are

normal defined. Flow (or volume) or pressure control variables are control variable variables. Ventilate controls a single variable (flow/volume or pressure) only when using traditional modes. The other (pressure or volume) reflects the mechanical properties of patient effort and respiratory system in accordance with the equation of respiratory system motion.

Figure I. Mechanical ventilator for positive pressure ventilation

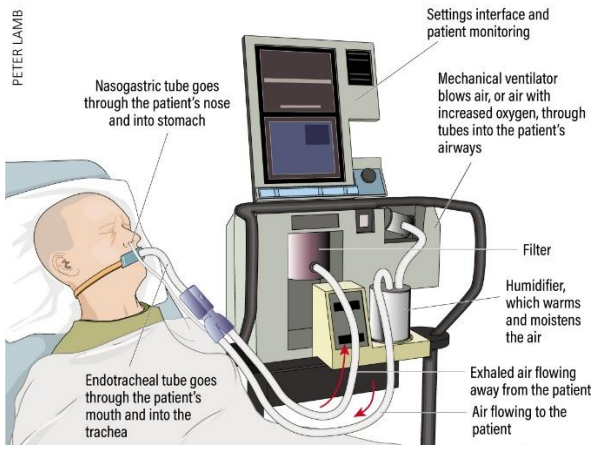

Fig. 1: Mechanical ventilation[3]

Mechanical breathing is a means of sustaining life (figure 1). A mechanical ventilator is a breathing system when a human cannot breathe adequately on her own. The electric fan is sometimes referred to as a fan, a respirator or a respirator. There are many reasons that a patient needs a ventilator, however low oxygen or extreme deficiencies the most prevalent causes are breath caused by an illness such as pneumonia[1].

If a person wants a fan, an endotracheal tube (ET tube) is inserted into the windpipe and the patient's nose or mouth (trachea). The tubing is attached to the fan. There are a number of functions in the endotracheal tube and fan. In order to bring oxygen into the company, the regulator forces an air and oxygen combination in the patient's lungs. The ventilator will also sustain a steady low pressure, called PEEP, in order to prevent the air sacks from failing in the lung. The endotracheal tube will extract molecules from the windpipe through suction for doctors and nurses[4].

II. LITERATURE REVIEW

In order to reduce respiratory work, increase oxygenation or correct piratory acidosis, mechanical ventilation is frequently delivered to patients admitted to ICUs. In most cases, a ventilation device can be controlled completely shortly after intubation, based on a multinational survey of 5000 patients, including actual respiratory failure (69%), coma (17%) and chronic

respiratory failure (13%), and neuromuscular disorders (2%). The goal is to improve oxygenation without causing lung damage and to rest the breathing muscles[5].

If a person wants a fan, an endotracheal tube (ET tube) is inserted into the windpipe and the patient's nose or mouth (trachea). The tubing is attached to the fan. There are a number of functions in the endotracheal tube and fan. In order to bring oxygen into the company, the regulator forces an air and oxygen combination in the patient's lungs[6].

III. DISCUSSION

"Alternative" modes were designed to help balance the need of patients for ventilation with the availability of ventilators. In the vast majority, "traditional" modes are updated to adapt support to those purposes using a fan half-processor. This may reflect multiple difficulty measures, from only a predefined minute ventilation or tidal length, to a complex modification of assistance in keeping with breathing habits or physiological variables. In the following paragraph we address the issue, clinical assessment and the restriction of alternate modes intended to optimize patient-assistance experiences.

A. Dual control modes: During support of conventional modes such as PSV or ACV the fan controls only one vector (pressure or volume/flow). Some fans also offer special modes which allow both variables to be controlled. However, only one variable is directly regulated at the certain part of the inspiration (pressure or volume/flow). Such techniques are also used in the phrase "dual control" modes. The nomination is heterogeneous, moves from fan to fan and is not quite insightful often.

B. Proportional Assist Ventilation: Proportional ventilation (PAV) varies conceptually from all mechanical ventilation modes available. The mode is activated by patients and operated with a pressure that adapts help in the inspiration loop according to the effort of the patient and to the mechanical properties. Contrary to previously described ventilation modes, the vector controlled by PAV (pressure) is adjusted during the inspiratory process after the instantaneous flow and volume values.

IV. CONCLUSION

In most cases, conventional mechanical ventilation modes ensure adequate ventilation control. However, as already described, the clinician may face a spontaneous respiratory patient with many problems. New modes like PAV, ASV or know-how are now available and appear to help enhance adjustment during the ventilation. However, further studies are needed to characterise clinical interest better and target the population which could benefit from its implementation before recommending its application.

V. REFERENCES

[1] B. D. Singer and T. C. Corbridge, “Basic invasive mechanical ventilation,” Southern Medical Journal. 2009, doi: 10.1097/SMJ.0b013e3181bfac4f.
[2] T. D. Girard and G. R. Bernard, “Mechanical ventilation in ARDS: A state-of-the-art review,” Chest, 2007, doi: 10.1378/chest.06-1515.
[3] “An overview of mechanical ventilation in the intensive care unit.” .
[4] K. Behbehani, “Mechanical ventilation,” in Clinical Engineering, 2003.
[5] P. Rodriguez, M. Dojat, and L. Brochard, “Mechanical ventilation: Changing concepts,” Indian Journal of Critical Care Medicine. 2005, doi: 10.4103/0972-5229.19765.
[6] N. Wong, “Mechanical ventilation,” Practical Emergency Resuscitation and Critical Care, vol. 9781107626850, no. April, pp. 28–34, 2013, doi: 10.1017/CBO9781139523936.005.