



The Egyptian Society of Chest Diseases and Tuberculosis
Egyptian Journal of Chest Diseases and Tuberculosis

www.elsevier.com/locate/ejcdt
www.sciencedirect.com



ORIGINAL ARTICLE

Role of adaptive support ventilation in weaning of COPD patients

Kamel Abd Elaziz Mohamed ^{a,*}, Sameh kamal El Maraghi ^b

^a Critical Care Department, Cairo University, Egypt

^b Critical Care Department, Beni Suef University, Egypt

Received 7 December 2013; accepted 31 December 2013

Available online 24 January 2014

KEYWORDS

COPD patients;
ASV;
PSV;
Mechanical ventilation (MV)

Abstract *Introduction:* Adaptive support ventilation (ASV) is an improved closed-loop ventilation mode that provides both pressure-controlled ventilation and PSV according to the patient's needs.

Aim of the work: To compare the short-term effects of Adaptive support ventilation (ASV), with conventional Pressure support ventilation (PSV) in weaning of intubated COPD patients.

Patients and methods: Fifty patients admitted in the intensive care with acute exacerbation of COPD and needing intubation were included in the study. All patients were initially ventilated with control/assist control mode, in a stepwise manner and were receiving standard medical therapy. Patients were randomized into two groups to receive either ASV or PSV.

Results: Out of fifty patients included in the study forty one patients in both studied groups were weaned successfully according to their ABG data and weaning indices. APACHE II score showed no significant difference in both groups. There were statistically significant differences between the groups in term of, duration of mechanical ventilation, weaning hours and length of ICU stay being shorter in (group 1) weaned by ASV. Re-intubation and mortality rate were higher in (group 1) weaned by conventional PSV, however the differences were not significant.

Conclusion: ASV can provide automated weaning and achieve shorter weaning time for COPD patients hence leading to reduction in the total duration of MV, length of stay, and hospital costs.

© 2014 The Egyptian Society of Chest Diseases and Tuberculosis. Production and hosting by Elsevier

B.V. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Chronic obstructive pulmonary disease (COPD) is a disease with an increasing prevalence and mortality worldwide [1]. The prevalence of COPD is increasing. Recent estimates suggest that there are approximately 23.6 million men and women with COPD in the U.S. and more than 52 million sufferers around the world [2].

* Corresponding author. Tel.: +20 1153156505.

E-mail address: kamel.abdalla64@gmail.com (K.A.E. Mohamed).

Peer review under responsibility of The Egyptian Society of Chest Diseases and Tuberculosis.



Production and hosting by Elsevier

Acute respiratory failure (ARF) due to COPD is becoming an ever-larger medical and economic problem not only in developed, but also in developing countries [3].

There is no evidence to prefer a given ventilatory mode to provide stable support. Assisted modes are used to controlled modes because in addition to unloading of fatigued muscles, they allow some patient control over the ventilatory pattern and reduce disuse atrophy [4]. Patients with acute exacerbations of chronic obstructive pulmonary disease (COPD) often require either non invasive mechanical ventilation (NIMV) or invasive mechanical ventilation (IMV) and prolonged weaning times [5,6]. Although rapid weaning is preferable, there is still debate on the best weaning procedure. Pressure support ventilation (PSV) is a common method of weaning, but it requires close patient observation for indicators of possible failure [7].

Moreover, intensive care unit (ICU) staff experience with PSV is necessary to set the appropriate level of pressure [8,9]. The last decade has seen extensive research being done in the area of weaning from mechanical ventilation with well designed randomized controlled trials [10,11]. This has given clinicians data to support effective decision making in weaning. In the recent years several ventilatory support modes have been developed in an attempt to automatically wean patients by feedback from one or more ventilator measured parameters [12]. Volume support, adaptive support ventilation and a knowledge based system for adjusting pressure support have been tried in selected population [13,14]. Adaptive support ventilation (ASV) is an improved closed-loop ventilation mode that provides both pressure-controlled ventilation and PSV according to the patient's needs [15,16].

While there have been descriptions of modes for weaning, including intermittent mandatory ventilation (IMV) and pressure support ventilation (PSV), to date no one method has been shown to have a clear advantage [17–19].

Aim of the work

To compare the short-term effects of adaptive support ventilation (ASV), an advanced closed-loop mode, with conventional pressure support ventilation (PSV) in weaning of intubated COPD patients.

Patients and methods

We collected data over a period of 22 months (June 2010 to April 2012) in general intensive care unit that contains 22 beds in Riyadh care hospital, Saudi arabia where this study was carried out. The study was approved by local ethics committee and a written informed consent was obtained from the patient and/or next of kin. Fifty COPD patients, admitted to ICU due to acute exacerbation of their illness and needing intubation were included in this study. A two group, prospective randomized controlled study was carried out. Acute hypercapnic respiratory failure in COPD was defined according to Global Initiative for Chronic Obstructive Lung Disease GOLD 2007 [20] as severe dyspnoea in the absence of objectively documented causes such as pneumonia, and with arterial blood gas analysis (ABG) findings of:

- pH < 7.33 (breathing at room air).
- PaO₂ < 50 mmHg.
- PaCO₂ > 50 mmHg.

Intubation was done objectively due to respiratory arrest, loss of consciousness, psychomotor agitation requiring sedation and hemodynamic instability or accumulation of secretions. Patients who had concomitant neurological disease (other than hypercapnic encephalopathy), cardiac arrest, pulmonary oedema, heart failure, acute myocardial infarction, surgical abdominal problem, postoperative respiratory failure and patients found with high category APACHE-II score (more than 30) were excluded from the study. Intubation was done through the orotracheal route with an endotracheal tube of 8 mm internal diameter or more to minimize the negative effect of tube resistance. The decision to initiate invasive ventilatory support was taken by the treating physician if the response to conservative medical treatment was poor as evidenced by the deterioration of arterial blood gas levels as well as clinical signs. All patients were initially ventilated with control/assist control mode, in a stepwise manner and were receiving standard medical therapy with nebulized bronchodilators corticosteroids and antibiotics if needed. Sedation was achieved with midazolam and/or fentanyl. Muscle relaxants and sedation were used as required. Standard ventilator settings for COPD i.e., respiratory rate of 12/min., tidal volume 8–10 mL/kg, FiO₂ to obtain a saturation of 90% with a PEEP of 5 cm H₂O and an I:E ratio of 1:2.5–3.0 was initiated. On admission to ICU full medical history from the patient (if possible) or his/her relatives, full clinical examination, plain chest X-ray and ECHO heart, arterial blood gas analysis, serum electrolytes (Na, K, Cl, Mg, Ca), haematocrit and serum albumin were carried out for all patients. Assessment of Glasgow coma scale (GCS) and Acute Physiology and Chronic Health Evaluation (APACHE) score. When the patients have reached satisfactory neurological status, clinical and biochemical parameters with improvement or resolution of the underlying cause of acute respiratory failure. In addition, if the patients showed good tolerance with an acceptable ABG analysis (pH > 7.35, SaO₂ of 88% or more for FiO₂ of 40% or less) after a minimum of 24 hours of ventilation and other criteria according to Raouf (2003) [21]. Patients were randomized equally into two groups to receive either adaptive support ventilation (group I) or with pressure support ventilation (group II). Weaning and extubation were performed by the pulmonary and critical care physicians who were not aware of the study. The initial level of pressure support (above PEEP) was set at 15 cm H₂O in the PSV group. The pressure support level was then evaluated at least every 30 min and titrated to keep the respiratory rate at less than 35 breaths/min and, if possible, gradually decreased to 7 cm H₂O by 2 cm H₂O. In our study, minute volume was decreased to 30% in the ASV mode to achieve lower pressure support levels, as in the PSV group, and to prepare the patient for extubation. They were ventilated with the above final settings for 2 h and then extubated. Otherwise, the trial was stopped and patients were ventilated with assisted volume controlled ventilation mode and considered as weaning failure. On the other hand post-extubation failure occurring within the first 48 h was defined as pH less than 7.35, an increase in arterial carbon dioxide tension more than 15 mmHg from extubation value, respiratory rate (RR) more than 24 breaths/min with accessory muscle use [21]. Tidal volume, PaO₂/PAO₂, respiratory rate, occlusion pressure (P0.1), maximal inspiratory pressure (MIP) and ABG measurements were recorded. Only the values from the

Download English Version:

<https://daneshyari.com/en/article/3400359>

Download Persian Version:

<https://daneshyari.com/article/3400359>

[Daneshyari.com](https://daneshyari.com)