

# PREVENTION OF COMPLICATIONS OF ARTIFICIAL LUNG VENTILATION IN THE INTENSIVE CARE UNIT

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## Abstract

Mechanical ventilation is an important medical intervention in the context of critical illness. This intervention is associated with the risk of serious but potentially preventable complications. In this article, we describe ventilator-related complications and discuss the role of prevention and treatment in improving the care of patients with these complications.

**Keywords** Prolonged tracheal intubation; complications; tracheal stenosis; fiberoptic tracheobronchoscopy.

## INTRODUCTION

Artificial ventilation with positive inspiratory pressure does not belong to physiologic methods of respiratory support. Pulmonary vein occlusion is accompanied by a number of complications, the probability of occurrence of which is directly proportional to its duration, which makes it necessary to follow the protocol of this procedure. Currently, the advantages of ventilator support with small respiratory volumes (6-10 ml/kg) have been proven[1]. In the intensive care unit, 20 patients were individually selected under control of respiratory mechanics, pulse-oximetry and blood gas analysis, and 20 patients were ventilated as usual. In case of high airway resistance, it is advisable to select the optimal value of peak inspiratory flow, the shape of the flow curve, the

duration of the plateau phase or to switch to pressure-controlled ventilation. In the case of prolonged periods of ventilation for more than a day to use intubation tubes with low-pressure cuffs and devices with wide functionality, equipped with a graphical monitor of respiratory function[3].

Of great importance are measures aimed at preventing ventilator-associated pneumonia, primarily the use of filters of the breathing circuit, minimizing procedures associated with depressurization of the breathing circuit and deflation of the cuff of the intubation tube. In order to reduce the likelihood of contamination of the respiratory tract with microflora from the gastrointestinal tract, the head end of the bed is raised by 15-30 °, monitor the pH of gastric

secretion, avoiding the unjustified prescription of antacid and suppressing secretion of drugs, measures to stimulate the intestine, if possible, prescribe early enteral nutrition with special nutritional mixtures, taking into account the energy and metabolic needs of the patient. Antibacterial therapy is carried out taking into account the results of bacteriologic study of bronchial secretion[5]. Of great importance is the performance of diagnostic and sanitation bronchoscopy. In order to improve the passage of sputum carry out inhalation of broncho- and mucolytics through a nebulizer, synchronized with the respiratory cycle, vibromassage and physiotherapeutic procedures. Aspiration of secretions is carried out with disposable catheters or with the help of "closed loop" systems. All procedures associated with the disconnection of the respiratory circuit, performed in sterile gloves[4].

With prolonged ventilation, especially in cases of severe forms of respiratory failure, a positive effect has a positive effect kinetic therapy - ventilation in the position on the side and on the stomach. Weaning from the ventilator requires careful monitoring of respiratory function of the patient[8]. With assisted breathing, it is advisable to move as early as possible to non-invasive mask ventilation. Inhaled antimicrobial therapy as an adjunct to systemic therapy is recommended for patients with this pathology caused by gram-negative bacilli sensitive only to aminoglycosides or polymyxins[14]. Additional inhaled antimicrobial therapy may also be considered in patients not responding to systemic therapy alone, regardless of concerns about the emergence of microbial drug resistance. This recommendation aims to improve survival rates and places less emphasis on treatment costs.[6].

The recommended duration of antimicrobial therapy for patients is seven days. However, shorter or longer courses of therapy may be determined by the rate of improvement as reflected by clinical, radiologic, and laboratory parameters. In addition, it is recommended that antimicrobial therapy be de-escalated rather than

fixed, meaning that patients can be switched from a broad-spectrum antimicrobial therapy regimen to a regimen targeting the involved pathogen once the culture results and sensitivity patterns have been determined. . This may involve changing antimicrobial agent or switching from combination therapy to monotherapy. [7]

Clinical criteria and procalcitonin (PCT) levels can be used to determine discontinuation of antimicrobial therapy, although it is unclear whether PCT is indeed a significantly useful indicator. [9]

It is important to note that immunocompromised patients due to a predisposition to opportunistic infections will require a different treatment approach; however, some management principles will be the same. [10]

Early weaning from ventilator without complications was noted in 20 patients: 13 patients on day 3-4 and the rest up to day 10; in the normal group, 70% were weaned on day 7-8 and the rest were weaned after more than 10 days with complications[15]. One of the modes of mechanical ventilation, known as intrapulmonary percussion ventilation (IPVL), theoretically has life-saving properties in patients with refractory acute respiratory distress syndrome (ARDS) requiring respiratory assistance[11]. Unfortunately, there are limited publications in the current scientific literature regarding the practical application of IPVL to improve gas exchange function. Moreover, there is no discussion among practicing specialists about the benefits and harms of the IPVL method itself, which makes it difficult to form a clear clinical paradigm[13].

## **CONCLUSIONS**

Thus, we tried to summarize the available data from randomized clinical trials performed in accordance with the requirements of Evidence-Based Medicine (EBM) and Good CLinical Practice (GCP) related to the concept of CPVL use, indications and contraindications for its prescription. Equally interesting is the discussion of the risks and benefits of IPVL in different groups of patients, as well as the actual clinical possibilities

of such ventilation in the practice of respiratory medicine.

For a better description of the advantages of this or that ventilation method, below we will briefly review the main ventilation aids used in critical situations when conventional ventilation is not possible.

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