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CLINICAL OUTCOME OF PATIENTS ON MECHANICAL VENTILATION IN INTENSIVE CARE UNIT

EVOLUÇÃO CLÍNICA DOS PACIENTES EM USO DE VENTILAÇÃO MECÂNICA EM UNIDADE DE TERAPIA INTENSIVA

EVOLUCIÓN CLÍNICA DE LOS PACIENTES EM USO DE VENTILACIÓN MECÁNICA EN UNIDAD DE TERAPIA INTENSIVA

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ABSTRACT

Objective: to analyze the clinical outcome of patients on mechanical ventilation (MV) in the intensive care unit. **Method:** this was a descriptive, quantitative exploratory study, performed in the ICU of a hospital in Fortaleza, Ceará, Brazil, with 94 patients. Data were collected from January to March 2012 and reported in tables and graphics. The research project was approved by the Research Ethics Committee, CAEE no. 0419.0.000.042-11. **Results:** 53.19% of the patients were male, with predominant age group of 77-98 years old; 61.70% used only the endotracheal tube, and sedation, analgesia or both. After weaning, 27.66% required more than one type of non-invasive support. The mean ICU stay was 26.5 days and 60.64% died. **Conclusion:** the knowledge on the profile of ICU patients on MV is relevant, guiding assistance by the multidisciplinary team. **Descriptors:** Clinical Outcome; Mechanical Ventilation; Intensive Care Unit.

RESUMO

Objetivo: analisar a evolução clínica dos pacientes em uso de ventilação mecânica (VM) internados em Unidade de terapia intensiva. **Método:** estudo exploratório descritivo, quantitativo, realizado na UTI de um hospital em Fortaleza-Ceará-Brasil, com 94 pacientes. Os dados foram coletados de janeiro a março de 2012 e expostos em tabelas e gráfico. O projeto de pesquisa foi aprovado pelo Comitê de Ética em Pesquisa, CAEE nº 0419.0.000.042-11. **Resultados:** 53,19% dos pacientes eram do sexo masculino, com faixa etária predominante de 77 a 98 anos; 61,70% utilizaram somente o tubo orotraqueal, além de sedação, analgesia ou ambas. Após o desmame, 27,66% necessitaram de mais de um tipo de suporte não invasivo. A média de permanência na UTI foi de 26,5 dias e 60,64% evoluíram para óbito. **Conclusão:** o conhecimento do perfil dos pacientes internados em UTI sob VM é relevante, nortando a assistência pela equipe multiprofissional. **Descritores:** Evolução Clínica; Ventilação Mecânica; Unidade de Terapia Intensiva.

RESUMEN

Objetivo: analizar la evolución clínica de los pacientes en uso de ventilación mecánica (VM) internados en unidad de cuidados intensivos. **Método:** estudio exploratorio descriptivo, cuantitativo, realizado en la UTI de un Hospital de Fortaleza- Ceará - Brasil, con 94 pacientes. Los datos fueron recogidos de enero a marzo de 2012 y reportados en tablas y gráficas. El proyecto de investigación fue aprobado por el Comité de Ética en Investigación, CAEE nº 0419.0.000.042.11. **Resultados:** 53,19% de los pacientes eran del sexo masculino, con edades predominantes de 77 a 98 años; 61,70% utilizaron solamente el tubo orotraqueal, además de sedación, analgesia o ambas. Después del destete 27,66% necesitaron además de otro tipo de soporte no invasivo. La media de permanencia en la UCI fue de 26,5 días y 60,64% fueron muertos. **Conclusión:** el conocimiento del perfil de los pacientes internados en UTI bajo VM es relevante, guiando la asistencia por el equipo multiprofesional. **Descriptores:** Evolución Clínica; Ventilación Mecánica; Unidad de Terapia Intensiva.

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INTRODUCTION

The patient hospitalized in intensive care unit (ICU) has changes in various organs and systems, which may interfere with their severity of the situation, hindering their recovery and/or rehabilitation. They are therefore in constant observation and generally using equipment to maintain the health of their body and preservation of their life.

Constituting a unit for receiving severe patients who need permanent medical assistance and nursing, ICU provides support and intensive care, providing continuous monitoring, 24 hour surveillance, and specific equipment and technologies for the diagnosis and therapeutic treatment.¹

Nurses who work in ICU, along with critically ill patients, must have knowledge regarding the possible hemodynamic changes in these patients, as well as the therapeutic modalities and essential nursing care to them, in order to offer quality care, providing more chances of recovery.

Several procedures are performed in the ICU, which aim to clinical improvement of the patient, often requiring the replacement of the physiological functions of the patient or assistance to them, as in the case of patients with failure to promote gas exchange, who are undergoing orotracheal intubation (OTI) or tracheostomy for the use of ventilatory support.

Mechanical ventilation (MV) is a breakthrough in intensive care, and can be defined as an artificial way to ventilate patients who are unable to breathe spontaneously, reducing the work of breathing.² Invasive ventilation is essential for patients with impaired respiratory function that disables them to perform gas exchange and provide oxygen to the occurrence of cellular reactions.

The need for ventilatory support is caused by disability, temporary or not, of the respiratory system to perform its functions, in order to meet the needs of the patient. This inability may stem from the respiratory system itself, as well as from central nervous system or cardiovascular system.³

Intubated patients are unable to meet all or part of respiratory demands, which can lead to disorders related to acid-base balance and complications in their picture. Thus, MV is presented as an important tool used for the recovery of critically ill patients admitted to the ICU.

Such patients, when they come with significantly altered respiratory function, require invasive ventilatory support, mostly through OTI in order to reverse the respiratory condition. From the moment that they are intubated, they require a more targeted nursing care to their needs affected, as are patients who require specific care.

Given the highly specialized and complex care that the nurse develops in an ICU, the systematization and the organization of their work and, therefore, of the nursing team work, are essential to quality care, with efficiency and efficacy.⁴⁻⁵

The lack of knowledge regarding any procedure and technique throughout the hospital sector can incur losses for the patient. In the ICU, the patient, for their critical condition, becomes more vulnerable to any failure, no matter how small. Therefore, it is essential that the nursing staff, as well as the entire multidisciplinary team, is constantly updated about the therapy used in ICUs, in an attempt to contribute to the good outcome of this patient.

It is noteworthy that the professionals who compose the active ICU nursing staff are constantly assisting the patients using MV, either by predetermined or indefinite time.⁶ Thus, it is necessary to observe the changes related to their respiratory condition, to prevent clinical events.

Considering that the critical patient in the ICU, in most cases, is in the use of invasive ventilatory support, it is essential to monitor their outcome, observing aspects relating to medical diagnosis, neurological disorders, use of enteral support, renal disorders, among other aspects. Thus, the present study is relevant because it will raise data on the outcome of patients using MV, demonstrating the importance of this resource in ICU, and will also contribute to the development of protocols aimed at prevention of complications related to respiratory function and expand professionals' knowledge about the profile of this patient. Moreover, it should be underscored that the patient who is in artificial mechanical ventilation needs a more focused look to their affected needs, whereas at the same time as this device can contribute to the improvement of their picture, it can, on the other hand, cause complications.

OBJECTIVES

- To evaluate the clinical outcome of patients on mechanical ventilation in intensive care unit;

- To describe the clinical and demographic characteristics of patients on mechanical ventilation;
- To know the time of use of the endotracheal tube associating with the use of tracheostomy tube;
- To identify the outcome of patients in the unit, based on the variables: transfer or death.

METHOD

Descriptive exploratory study, with a quantitative approach, performed in the ICU of a municipal hospital, located in Fortaleza, Ceará. The population was represented by patients admitted to the ICU in 2009, who underwent invasive ventilation through endotracheal tube (ETT) or tracheostomy tube (TOT). Inclusion criteria were established: patients admitted to the ICU during the aforementioned period and who used invasive ventilatory support during their ICU stay; and exclusion: illegibility or gaps in the information contained in the nursing report. We chose for year 2009 due to the completion of books of this period, which are filed in the unit.

In this period, 156 patients were admitted to the ICU, 95 (60.89%) used invasive mechanical ventilation and 62 (39.11%) did not. Of the patients who used the support, one was excluded from the study due to the absence of essential data for collection, so the sample is made up of 94 patients.

Data were collected from January to March 2012 from a data collection script containing socio-demographic data and data related to the medical history of the patient using MV. Such information has been raised based on the nursing report, which is a record book containing all the referred information, specified by patients, with records performed daily, through a socio-demographic and clinical data sheet pasted on each record sheet.

It is noteworthy that the record book is a compilation of all the instruments of the nursing report of 2009, which were used during the shift report by all nurses inserted into the unit.

Data were organized in a spreadsheet developed in Microsoft Excel program and submitted to statistical analysis, focusing on the absolute and relative frequency, and exposed in tables and graphs.

The project was approved by the Research Ethics Committee of São José Hospital for Infectious Diseases, with CAEE 0419.0.000.042-11. All ethical principles were followed, with guaranteed anonymity as to the identity of the participants.

RESULTS

More than half of the patients were male (53.19%). The predominant age group was 77-98 years of age, with 39 patients (41.49%), followed by 60-76 years old (31.91%); the average age was 69.5 years old.

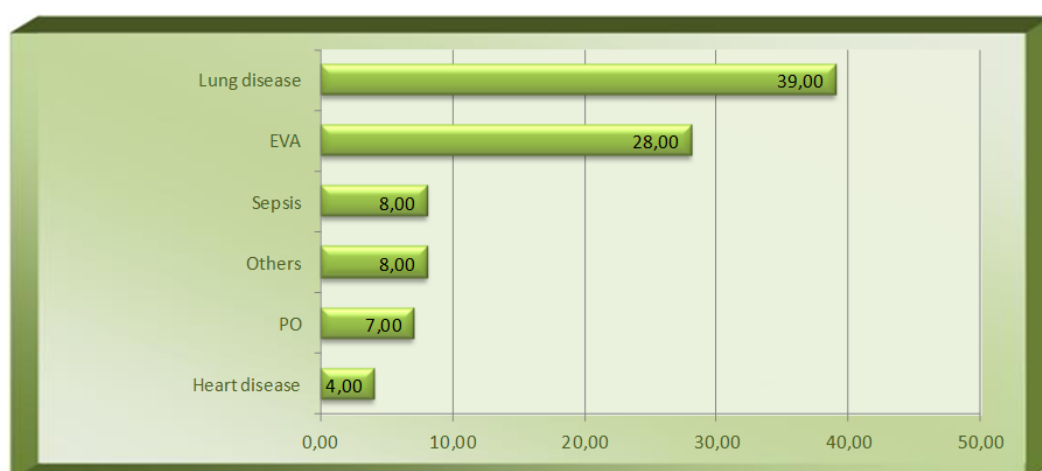


Figure 1. Distribution of patients according to medical diagnosis. Fortaleza, 2012.

The prevalent diagnosis was represented by respiratory diseases, with 39 patients (41.48%). Then, in order of occurrence, there were: cerebrovascular accident (CVA), with 28 patients (29.80%); sepsis, with eight (8.51%); immediate postoperative period, with seven (7.25%); and heart disease with four (4.25%).

Importantly, other diagnoses were identified in eight patients (8.51%), including: meningoencephalitis, cutaneous anthrax

injury, traumatic brain injury and reversed cardiorespiratory arrest.

Most patients used during ICU stay some kind of sedation, analgesia, or a combination of sedation and analgesia. However, there was predominance of the simultaneous use of two medications, with 46 patients (48.94%), followed by patients who used only analgesia, with 27 (28.71%).

As for the prosthesis used for maintenance

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in MV, 58 patients (62.70%) used only ETT. We observed 31 patients (32.98%) who used the ETT and subsequently the TOT. Only five (5.32%) were initially submitted to tracheostomy to use the ventilatory support.

Table 1. Distribution of patients according to the use of non-invasive ventilatory support and support for food. Fortaleza, 2012.

Variables	n	%
Non-invasive support		
Did not use	48	51,07
More than one support	26	27,66
Venturi mask	13	13,83
Catheter	06	6,38
Spontaneous	01	1,06
Support for food		
Nasogastric tube	87	92,55
Total parenteral nutrition	04	4,26
Nasoenteral tube	03	3,19
Total	94	100

Regarding the use of non-invasive ventilation support after weaning from the ventilator, 48 patients (51.07%) did not use it because died or were transferred to another institution; 26 (27.66%) required more than one type of non-invasive support; 13 (13.83%) used only the Venturi mask; six (6.38%) nasal catheter; and one remained directly without oxygen support after weaning from invasive ventilation support.

In terms of nutrition, 87 (92.55%) received

nutritional support through the nasogastric tube (NGT). It is noteworthy that four patients (4.26%) required nutritional support through total parenteral nutrition (TPN) and three (3.19%) by nasoenteral tube (NET).

Almost all patients used long-term vesical catheter (SVD) and antibiotics (ATB), with the percentage of 98.9% and 98.6%, respectively.

Table 2. Distribution of patients according to length of stay in ICU and the clinical outcome. Fortaleza, 2012.

Variables	n	%
Time (days)		
1 to 10	25	26.60
11 to 30	39	41.49
31 to 60	22	23.40
61 to 90	06	6.38
+ than 90	02	2.13
Outcome		
Death	57	60.64
Transfer to the inpatient unit	26	27.66
Transfer to another institution	11	11.70
Total	94	100

We noted that there was prevalence of the period 11-30 days in the ICU, with 39 patients (41.49%); 25 (26.60%) remained from one to 10 days; and 22 (23.40%) from 31 to 60 days. It is noteworthy that the average length in ICU was 26.5 days.

Another aspect focused on the study and shown in this table relates to the clinical outcome. The results showed that 57 (60.64%) died, 26 (27.66%) were transferred to the inpatient unit of the institution and 11 (11.70%) required transfer to another hospital.

DISCUSSION

The analysis of the results provided the construction of the clinical and demographic profile of ICU patients undergoing invasive mechanical ventilation, which may contribute to the improvement of care for these patients and develop protocols, seeking to enhance the evolution of critical patients.

In terms of age, there was predominance in the study of patients enrolled in the range 77-98 years old, followed by the range of 60 to 76 years old, with an average age of 69.5 years old. Previous research, investigating the profile and severity of patients admitted to the ICU, found that the majority had a mean age of 60.5 years old, with most patients over 60 years of age.⁷

As to gender, it was observed predominance of male patients. Studies with ICU patients have shown a prevalence of male patients.⁸⁻⁹

With regard to medical diagnosis, it was noted prevalence of lung diseases, followed by cerebrovascular accident (CVA). This finding may be associated with the mean age of the patients, considered age range of

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elderly, which makes them more vulnerable to developing respiratory infections as a result of changes in immune status, and cardiac abnormalities or comorbidities that predispose to cerebrovascular diseases.

Research performed with patients in intensive therapy obtained acute respiratory failure as a main diagnosis responsible for hospitalization, representing 53.85% of the cases, resembling, in a sense, the findings of this study, as the lung diseases may lead patients to an acute state of the picture, indicating the MV.¹⁰

It is worth emphasizing that some diseases were grouped and placed in the group of lung diseases, including pneumonia and chronic obstructive pulmonary disease (COPD). Both are conditions that affect the respiratory tract of the patient and may lead to serious complications in an acute manner generating a respiratory failure and, consequently, the need for hospitalization in ICU.

Pneumonia is among the leading infections in ICU patients, accounting for high mortality. Chronic diseases, especially heart and lung, depressed level of consciousness, enteral nutrition, diabetes, smoking and immunosuppressive therapy, are predisposing factors for infection.¹¹

Ischemic stroke corresponds to the sudden loss of function due to interruption of blood supply to a region of the brain. In general, this event arises from long-term cerebrovascular disease.¹²

It was observed in general that most patients used, during ICU stay, some kind of sedation, analgesia or a combination of sedation and analgesia, as they were in use of invasive ventilatory support, so, the use of these drugs becomes necessary in order to maintain synchrony between patient and the mechanical ventilator.

However, given that the analgesia and sedation are dynamic situations that are performed in gradation, it is essential that continuous monitoring of the patient is held, which is based on scales.¹³

With regard to the prosthesis used to maintain MV, most patients used only ETT. It was also seen patients who used the tube and, subsequently, the tracheostomy tube.

Currently, the MV or invasive mechanical ventilation is among the methods most used in intensive care, since it aims at maintaining oxygenation and/or ventilation of patients with acute or chronic respiratory failure, artificially, until they are able to recover.¹⁴⁻¹⁵

Tracheostomy is among the most commonly performed surgical procedures in critically ill

patients in the ICU, and is indicated for those patients who require prolonged invasive ventilation, in handling of difficult weaning patients from ventilation support or to facilitate airway hygiene, offering greater safety and comfort for the patient, allowing the removal of the tracheal tube and the decrease of sedation during MV.¹⁶

Given the influence of nutritional status on clinical outcomes in patients hospitalized in the ICU, there is a need of patients with ETT or TOT use nutritional support, since they are in deficit in the swallowing function. So, it was observed that almost all patients used some kind of way to nutrition other than oral, and 92.55% received nutritional support through the NGT, while 3.19% used NET and 4.26 % required TPN.

Besides the fact that patients are unable to swallow due to the ventilation support, it should be emphasized that ICU patients often have nutritional depletion, associated with metabolic response to stress, which promotes intense catabolism and mobilization of proteins to repair damaged tissues and provide power.¹⁷

Another important point focused in the study was the use of non-invasive ventilation after weaning from the mechanical ventilator. We identified that more than half of the patients did not receive such support, either because evolution to death or because they were transferred to another ICU institution. On the other hand, among the other patients, 27.66% used more than one type, comprising the Venturi mask and nasal catheter, and one patient remained directly without oxygen support after weaning from invasive ventilation.

Regarding the length of stay in ICU, among the patients described in the study, the predominant period was of 11 to 30 days, corresponding to 41.49%, with an average stay of patients in the ICU of 26.5 days.

On the clinical outcomes of patients, the study shows that most died (60.64%), which can be justified by the majority consisting of elderly, usually suffering from comorbidities, which is a risk factor for the disease base.

Although some studies have shown that there is more prevalence of mortality among elderly patients, admitted to ICU, a study in 2010 evaluated mortality versus prolonged length of stay in ICU and identified a higher risk of death in patients aged from 40 to 60 years old.¹⁸

CONCLUSION

The ICU is a complex unit with continuous monitoring system that receives critical patients or some with hemodynamic instability in order to promote continuous monitoring and specialized care for the clinical improvement of patients.

This fact causes them to undergo a number of invasive procedures using various apparatuses for the maintenance of life with the aim of a good recovery. Therefore, this study seeks to recognize the clinical outcomes of patients on ventilatory support in the ICU.

It was found, among patients, predominance of male, aged from 77 to 98 years old, which contributed to a relevant index of hospital days and to a higher death record. This fact is related to the fact that the elderly represent a population who most falls ill and is more susceptible to risks and complications due to the basis disease, which does not contribute to a satisfactory clinical outcome.

Lung diseases predominated as medical diagnosis responsible for the admission of patients in ICU, which, consequently, indicated the use of ventilation support, followed by stroke and sepsis. There were also patients on IPO that had potential for complications and heart diseases.

Most patients required the use of drugs of the group of analgesics and sedatives, as they were in invasive ventilation and such medications are crucial in patients using this respiratory device.

Outcomes of the patient in relation to respiratory prosthesis were monitored, and we identified that most only used the ETT. However, some patients evolved to tracheostomy tube, because of the prolonged need for ventilatory support.

With respect to oxygen support used after weaning from VM, most patients did not use any noninvasive support, since some died, and some were transferred to another ICU. Among the patients who used the noninvasive support, the Venturi mask and nasal catheter are mentioned as supports.

Since the patient using ETT and TOT is unable to swallow, almost all patients enrolled in the study used some kind of support for enteral nutrition, mainly represented by the NGT.

Knowing the profile of ICU patients on MV is relevant, in order to provide a discussion on the most prominent aspects of these customers, guiding assistance provided by the multidisciplinary team. It is suggested to carry

out further studies on this theme, with larger populations, in order to have greater clinical significance and greater generalization.

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