

GOOD PRACTICES IN ENDOTRACHEAL ASPIRATION IN AN INTENSIVE CARE UNIT: OBSERVATIONAL STUDY

BOAS PRÁTICAS NA ASPIRAÇÃO ENDOTRAQUEAL EM UMA UNIDADE DE TERAPIA INTENSIVA: ESTUDO OBSERVACIONAL

BUENAS PRÁCTICAS EN ASPIRACIÓN ENDOTRAQUEAL EN UNA UNIDAD DE CUIDADOS INTENSIVOS: ESTUDIO OBSERVACIONAL

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Objective: to describe the good practices performed by the multiprofessional team during lower airway aspiration in adult patients admitted to the Intensive Care Unit. **Method:** quantitative, observational, descriptive and prospective study, guided by the STROBE tool, conducted in an adult intensive care unit, between May and August 2022. The sample consisted of 25 observations and data collection through checklist, including nursing, physiotherapy and medicine professionals. The data were processed in the Statistical Package for the Social Sciences, and the absolute and relative frequencies were calculated. **Results:** most aspirations were performed by the nursing team, 20 (80%) professionals did not regulate the inspired fraction of oxygen before and after the procedure, 06 (60%) professionals did not clamp the tube during its insertion. The use of mask (100%), cloak (92%) and glove (100%) were the best practices with greater adherence among participants. **Conclusion:** there is the need to encourage training addressing good practices during endotracheal aspiration.

Descriptors: Intensive Care Units. Critical Care. Suction. Airway Handling. Good Practice Recommendation.

Objetivo: descrever as boas práticas realizadas pela equipe multiprofissional durante a aspiração de vias aéreas inferiores em pacientes adultos, internados na Unidade de Terapia Intensiva. *Método:* estudo quantitativo, observacional, descritivo e prospectivo, norteado pela ferramenta STROBE, realizado em uma Unidade de Terapia Intensiva adulto, entre maio e agosto de 2022. *A amostra foi composta por 25 observações e a coleta de dados*

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através de checklist, incluídos os profissionais de enfermagem, fisioterapia e medicina. Os dados foram processados no Statistical Package for the Social Sciences, sendo calculadas as frequências absolutas e relativas. Resultados: a maioria das aspirações foram realizadas pela equipe de enfermagem, 20 (80%) profissionais não regularam a fração inspirada de oxigênio antes e após o procedimento, 06 (60%) profissionais não clampearam a sonda durante a sua inserção. O uso de máscara (100%), capote (92%) e luva (100%) foram as boas práticas com maior aderência entre os participantes. Conclusão: reforça-se a necessidade de incentivar os treinamentos abordando as boas práticas durante a aspiração endotraqueal.

Descritores: Unidades de Terapia Intensiva. Cuidados Críticos. Sucção. Manuseio das Vias Aéreas. Recomendação de Boas Práticas.

Objetivo: describir las buenas prácticas realizadas por el equipo multiprofesional durante la aspiración de vías aéreas inferiores en pacientes adultos, ingresados en la Unidad de Cuidados Intensivos. Método: estudio cuantitativo, observacional, descriptivo y prospectivo, guiado por la herramienta STROBE, realizado en una unidad de cuidados intensivos adulta, entre mayo y agosto de 2022. La muestra fue compuesta por 25 observaciones y la recogida de datos a través de checklist, incluidos los profesionales de enfermería, fisioterapia y medicina. Los datos fueron procesados en el Statistical Package for the Social Sciences, siendo calculadas las frecuencias absolutas y relativas. Resultados: la mayoría de las aspiraciones fueron realizadas por el equipo de enfermería, 20 (80%) profesionales no regularon la fracción inspirada de oxígeno antes y después del procedimiento, 06 (60%) profesionales no clampearon la sonda durante su inserción. El uso de máscara (100%), capucha (92%) y guante (100%) fueron las mejores prácticas con mayor adherencia entre los participantes. Conclusión: se refuerza la necesidad de incentivar los entrenamientos abordando las buenas prácticas durante la aspiración endotraqueal.

Descriptorios: Unidades de Terapia Intensiva. Cuidados Críticos. Sucção. Manejo de las Vías Aéreas. Recomendación de Buenas Práticas.

Introduction

In Intensive Care Units (ICU), patients with respiratory failure use invasive ventilatory support through an artificial airway, such as endotracheal tube (ETT) or tracheostomy cannula. Upper and lower airway aspiration (AWA) is a procedure indicated for those with ineffective elimination of pulmonary secretions^(1,2).

AWA is a procedure that aims to maintain permeability in both the upper respiratory tract (URT) and the lower, as well as to prevent bronchoaspiration and promote comfort through the mechanical removal of accumulated secretions, allowing adequate ventilation and oxygenation^(3,4).

For the AWA of the lower respiratory tract (LRT), there are two methods to perform: the open aspiration system (OAS) and the closed aspiration system (CAS). The first requires patient disconnection from the mechanical ventilator (MV), use of sterile technique and single-use suction tube. In the second, the patient remains connected to the MV and the aspiration occurs by the use of a suction tube by a closed system,

surrounded by a transparent, numbered plastic case, where it remains sterile, allowing its multiple use, endowed with a lateral injector for washing^(1,5).

Studies comparing the OAS and CAS reported no changes in the incidence of ventilation-associated pneumonia (VAP), mortality, length of stay in the ICU, MV time, partial oxygen pressure (PaO₂) and partial pressure of carbon gas (PaCO₂), mean blood pressure (MBP), heart rate (HR) and secretion removal. It is suggested the use of a closed suction system for adults when the parameters of the inspired fraction of oxygen (FIO₂) or positive end-expiratory pressure (PEEP) are elevated, or at risk of acute pulmonary injury^(1,5,6).

The need for endotracheal aspiration should be assessed if oxygen saturation (SpO₂) is below 90%; if there is visible discharge from the orotracheal tube (OTT) or tracheostomy (TCT); if pulmonary auscultation has adventitious noise; agitation; respiratory effort or competition with the MV; as well as reduction of tidal volume;

serrated wave in the flow curve and volume in the MV^(2,6).

Due to the complexity of the procedure, this technique can cause adverse events such as tachycardia, tachypnea, increased blood pressure, reduced partial oxygen saturation (SpO₂) and blood gas values, pain, increased intracranial pressure, changes in cerebral blood flow, discomfort, atelectasis, bronchospasm, tracheal mucosal injury, infection and anxiety^(3,7,8).

In this sense, adherence to good practices during tracheal aspiration can ensure that care is offered with quality and safety, reducing the risks inherent in health care, in order to identify criteria that signal the need for the procedure, monitoring complications during and after its execution. Biosafety care is also important, considering the risk to the patient and the professional^(2,8).

Thus, the objective of this study was to describe the good practices performed by the multiprofessional team during lower airway aspiration in adult patients admitted to the Intensive Care Unit.

Method

This is a quantitative, observational, descriptive and prospective study, guided by the tool Strengthening the Reporting of Observational Studies in Epidemiology (STROBE), conducted in the ICU of a university hospital in the city of Rio de Janeiro, from May to August 2022.

The sector has nine beds separated by partitions, providing continuous observation of the patients, and an isolation bed with glass window and camera for observation through a monitor positioned in the nursing station, which is centrally located, where the researcher made the collection, because she could see all the beds and make the record in the observation instrument.

The sample was by convenience, composed of 25 observations of tracheal aspirations, with no time determined for each observation, as it depended on the period of performance of each procedure. The study included all opportunities

for lower respiratory tract (LRT) aspiration, performed by the health team composed of nursing, physiotherapy and medicine professionals, in patients using mechanical ventilation, ambient air or macronebulization, either by OTT or TCT, using open or closed aspiration system, and aspirations performed only in URT were excluded.

Data collection was performed through non-participant observation. Checklist instrument was used, developed by the researcher, based on the best practices described in scientific literature for lower airway aspiration, such as the American Association of Respiratory Care (AARC) and Centers for Disease Control and Prevention (CDC), containing 23 check items.

The instrument contained the categories before, during and after the aspiration procedure, as well as the following variables: hand hygiene, orientation of the procedure to the patient, bedside position, FiO₂ adjustment before and after aspiration, use of protective glasses, mask, cloak, glove, suction time, patient reassessment, system washing.

All participants were approached before data collection, reporting the objectives of the research and delivering the Informed Consent Form (ICF). The LRT aspiration opportunities were observed and marked in the observation instrument (checklist), during the daytime period.

The data were processed in the Statistical Package for the Social Sciences (SPSS), version 21.0, and the absolute and relative frequencies were calculated.

The research is part of a larger project, entitled: "Analysis of care practices in intensive care units", approved by the Research Ethics Committee, Opinion n. 4,747,146.

Results

Of the 25 aspiration opportunities observed, 13 (52%) were performed by the nursing team, six (46%) by nurses and seven (54%) by nursing technicians; 11 (44%) by physiotherapists and 1 (4%) by doctors. The average time of training and performance of these professionals in the ICU

was 11 years (SD = 8.51); 14 (56%) professionals reported never having participated in training on

airway aspiration. The variables present in the checklist are shown in table 1:

Table 1 – Distribution of variables contained in the checklist in the endotracheal aspiration procedure. Rio de Janeiro, Rio de Janeiro, Brazil – 2022. (N=25)

Variables	Yes		No	
	N	%	N	%
Hand hygiene before the procedure	14	56	11	44
Patient guidance on the procedure	13	52	12	48
Head position (30-45°)	18	72	07	28
FiO₂ adjustment before the procedure	05	20	20	80
Use of protective glasses	00	00	25	100
Use of mask	25	100	00	00
Use of coat	23	92	02	08
Use of appropriate gloves	25	100	00	00
Aspiration within a maximum of 15 seconds	17	68	08	32
Re-evaluation of the patient after tracheal aspiration	16	64	09	36
FiO₂ adjustment after the procedure	05	20	20	80
System washing after aspiration	06	24	19	76

Source: Created by the authors.

Ten (40%) open and 15 (60%) closed aspirations were performed. During observation in open system aspiration, 06 (60%) professionals did not clamp the tube during its insertion, 05 (50%) removed the tube in circular movements, 9 (90%) connected the patient to the MV or macronebulization in the aspiration intervals and 10 (100%) used surgical glove and performed the procedure respecting the aseptic technique.

In closed aspiration, one (6.6%) professional verified the marking of the system following that of the orotracheal tube and one (6.6%) performed

the washing by the lateral injector. During observation, 12 (48%) professionals aspirated more than once the same patient and, of these, 08 (66.6%) respected the interval greater than 30 seconds between one aspiration and another. It is noteworthy that no professional exceeded the number of three insertions.

In 16 (64%) observations, there was re-evaluation of the patient after aspiration, being 08 (50%) through saturation, 04 (25%) through the flow curve, 02 (12.5%) by visible discharge in the tube and auscultation, respectively.

Discussion

In this research, most of the aspiration opportunities were performed by the nursing. The multidisciplinary team, composed of nurses, physiotherapists and physicians, is responsible for performing lower AWA, considering that all these professionals are responsible for the maintenance of the airway⁽²⁾.

Within the nursing team, the AWA in severe patients in intensive care unit, submitted to an artificial airway, should be performed privately by the nurse, except in emergency situations and in chronic patients, provided that duly assessed and prescribed by the nurse⁽⁹⁾.

Communication with the patient about the procedure to be performed was noted in just over half of the observations. Even if the patient is sedated, in a coma or unable to speak for being in advanced airway, it is essential to communicate about the procedures to be performed to reduce anxiety and abandonment, in addition to making care more humanized⁽¹⁰⁾. In a study on nurses' adherence to endotracheal aspiration guidelines, 80% did not explain the aspiration procedure to patients⁽⁷⁾.

All participants respected the aseptic technique, through the use of surgical glove and sterile tube during the procedure, which results in a lower risk of carrying microorganisms to the lower airways, contributing to the prevention of VAP⁽¹¹⁾.

In the item hand hygiene, it is necessary to reinforce the recommended moments, since this practice plays a central role in the control of healthcare-associated infections (HAI) and is a low-cost and easily accessible strategy. Although adherence was not total, as recommended, there was greater adherence after the procedure, and it can be inferred that this practice is still performed more to protect the professional than the patient⁽¹²⁾. Studies show that, even with the supply of sinks and liquid soap in the physical space of the ICU, in addition to 70% alcohol dispenser in the beds, the incorporation of this practice is difficult^(4,13).

The non-adherence of professionals to the use of PPE that protect the ocular mucosa meets other studies, which report the goggles as the one with less adherence by health professionals, which may be associated with overconfidence in the execution of this task, by the years of exercise in the function^(7,14).

The function of PPE is to prevent situations that endanger the safety and health of workers in accidents that could be caused in the workplace⁽¹⁵⁾. Failure to use it during the AWA procedure carries risks to the professional because it is a procedure that can generate aerosols and flying particles. Goggles should be used whenever there is exposure to blood, body secretions and excretions^(16,17).

In an observational study conducted in China, most nurses (70%) did not perform pre- and post-oxygenation, which is in line with the present study⁽⁷⁾. Systematic review study showed that pre- and post-oxygenation resulted in increased SpO₂ and PaO₂. Hyperoxygenation should be performed during aspiration in all adult individuals in MV to maintain saturation at adequate levels, especially in victims of trauma, heart disease and patients with chronic obstructive pulmonary disease (COPD)⁽¹⁸⁾.

In this research, most professionals performed aspiration in no more than 15 seconds. The aspiration time in the mentioned period minimizes the risk of lesion of the tracheal mucosa, hypoxia and hemodynamic changes, because the air content of the lungs is reduced, because, along with the secretions, air is also aspirated. If necessary, the procedure may be repeated, respecting the time between aspirations^(4,7,18).

Washing the suction system is a good practice that must be strengthened among professionals. To maintain the integrity of the system, after aspiration, it is recommended to wash with distilled water, a method that keeps the circuit clean, avoiding impregnation of secretions⁽²⁾.

During closed system aspiration, the marking of the tube to be inserted for better depth recognition should be checked, following the

marking of the OTT or TCT in order to avoid injury to the tracheal mucosa. This practice showed little adherence of the participants of this research^(1,2).

In open system aspiration, clamping of the tube during insertion and removal in circular movements are necessary procedures to prevent hypoxemia and lesions in the tracheal mucosa. Most participants in this study connected the patient to the MV or macronebulization in the aspiration intervals, which generates less risk of ventilatory and hemodynamic instability for the patient^(7,18).

If there is a need to aspirate to the upper airways, the suction sequence to be adopted should be tube, nose and mouth. This order is justified by the use of the same tube to aspirate from the less to more contaminated area, maintaining the aseptic technique. The alternative of aspirating mouth and nose with clean technique and later changing the tube and glove to aspirate the endotracheal tube with sterile technique can be performed. This sequence is due to the fact that the movement of the trachea during aspiration can displace the ballonet and allow microbronchoaspirations⁽¹⁹⁾.

Among the professionals who performed the aspiration more than once, most respected the interval greater than 30 seconds between one aspiration and another, which is the minimum time established for the return of ventilation and saturation to acceptable levels and with the lowest number of repetitions of tube insertions, not exceeding three^(2,18,20).

There was low adherence to the procedure recorded in the medical records, indicating characteristics of the secretions and the complications during the procedure. The registry represents a means of communication among health team professionals, assisting in the continuity of care and assistance to be provided⁽²¹⁾.

The criteria used by the study professionals for reassessment of the patient after aspiration included the recommended in the literature. Thus, it is necessary to perform pulmonary auscultation, to verify oxygen saturation, skin

color, frequency and respiratory pattern, hemodynamic parameters, peak inspiratory pressure and plateau pressure, tidal volume, charts of pressure, flow and volume⁽²⁰⁾.

In the present study, most professionals reevaluated patients through saturation, MV flow curve and visualization of visible secretion in the tube and pulmonary auscultation. In another study, pulmonary auscultation remained little used in the evaluation after the procedure⁽²⁾.

One of the main limitations was the accomplishment in a single scenario, and studies with larger comprehensiveness are necessary in order to improve the assistance practice to the patients hospitalized in the health units and that need this intervention.

Conclusion

The practices that had greater adherence of the professionals were the use of masks and gloves. The use of protective glasses and FiO₂ adjustment before and after the procedure need to be strengthened between teams, because their performance is failure.

The results showed the need for training addressing this theme and the consequences of the study can be evaluated in the future, in order to present these to the research participants. Thus, this study may contribute to the planning of actions to encourage good practices in the units.

Collaborations:

1 – 1 – conception and planning of the project: Mayara Souza Monnerat, Vanessa Galdino de Paula, Camila Tenuto Messias da Fonseca;

2 – analysis and interpretation of data: Mayara Souza Monnerat, Vanessa Galdino de Paula, Camila Tenuto Messias da Fonseca;

3 – writing and/or critical review: Mayara Souza Monnerat, Vanessa Galdino de Paula, Camila Tenuto Messias da Fonseca, Luana Ferreira de Almeida, Luciana Guimarães Assad;

4 – approval of the final version: Mayara Souza Monnerat, Vanessa Galdino de Paula, Camila

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Competing interests

There are no competing interests.

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