

COMPARISON BETWEEN TRACHEAL INTUBATION OF FAST AND DELAYED SEQUENCE IN AIRWAY MANAGEMENT IN THE COVID-19 PANDEMIC

Rafael da Silva Lemos

Universidade Tiradentes, Aracaju

<http://lattes.cnpq.br/2972344057553679>

Ayla Gabriella Silva Ribeiro

Universidade Tiradentes, Aracaju

<http://lattes.cnpq.br/8251096578944264>

Bruno José Santos Lima

Universidade Tiradentes, Aracaju

<http://lattes.cnpq.br/6158584238563073>

Giovanna Medeiros Resende

Universidade Tiradentes, Aracaju

<http://lattes.cnpq.br/5226593423361991>

Lucas Gomes Dantas

Universidade Tiradentes, Aracaju

<http://lattes.cnpq.br/9342855843470017>

Pedro Henrique Santos de Jesus

Universidade Tiradentes, Aracaju

<http://lattes.cnpq.br/5242673138289884>

Paulo de Tarso Alves Matias

Faculdade Integrada Tiradentes, Maceió

<http://lattes.cnpq.br/2013707915762488>

Andrey Melo Campos

Universidade Tiradentes, Aracaju

<http://lattes.cnpq.br/9850036908382252>

All content in this magazine is licensed under a Creative Commons Attribution License. Attribution-Non-Commercial-Non-Derivatives 4.0 International (CC BY-NC-ND 4.0).



Ana Carolina Matiotti Mendonça
Universidade Tiradentes, Aracaju
<http://lattes.cnpq.br/9741824627647669>

Gustavo Alves Aguiar
Universidade Tiradentes, Aracaju
<http://lattes.cnpq.br/9996675569219609>

Cássia Fernanda dos Santos Rosa
Universidade Tiradentes, Aracaju
<http://lattes.cnpq.br/4928504021723078>

Mário Augusto Ferreira Cruz
Universidade Tiradentes, Aracaju
<https://orcid.org/0000-0002-9362-0131>

Abstract: Introduction: In general, the treatment of Severe Acute Respiratory Syndrome (SARS) is directed to the underlying pathology and, mainly, to ventilatory support. This can be provided through tracheal intubation, whose techniques are divided into delayed or rapid sequence. In rapid sequence, the main objective of the technique is to position the endotracheal tube as quickly as possible after the patient loses consciousness, reducing the risk of aspiration of gastric contents. Despite this, in a subset of patients, the rapid sequence technique does not allow adequate preoxygenation and does not prevent desaturation and its complications. Due to the different pros and cons of each type of intubation sequence, the present study aims to compare them in the context of the patient infected with COVID-19. **Methodology:** This work was based on a bibliographic review of national and international scientific literature in journals indexed in Google Scholar databases, including the National Library of Medicine (MEDLINE) and Scientific Electronic Library Online (SciELO) from the year 2020, 2560 results were found. Of these, those whose approach addressed aspects of rapid and delayed sequence intubation, as well as, its proposition in patients with COVID-19, were chosen. **Results:** The advantage of Delayed Sequence Intubation is the hemodynamic improvement after reaching the Dissociative State and pre-oxygenation, allowing a new evaluation and, in some cases, the absence of intubation, interrupting the procedure. On the other hand, this technique is not without complications. The most feared is the presence of apnea after 45 seconds of Ketamine administration. The rapid sequence has documented safety and efficacy and reduces the number of complications caused by conventional intubation when performed by a trained professional who carefully evaluates the patient. Thus, it is an

appropriate sequence for patients who need emergency intubation, such as those with SARS. The main cons are related to drug side effects and difficulty with managing complicated airways. **CONCLUSIONS:** The rapid sequence continues to be a well-indicated option in emergency cases, such as SARS due to COVID-19, and has shown good results in national and international studies. The delayed sequence has been preferred in those cases in which a difficult airway is identified, as these cases may take longer to intubate and the technique avoids drug-induced respiratory depression, reducing the risk of severe hypoxemia.

Keywords: COVID-19, Tracheal Intubation, Airway Management.

INTRODUCTION

Respiratory function plays an important role in the homeostatic control of the human organism through hematosis. Physiologically, the respiratory center responds to increased arterial CO₂ pressure and reduced arterial O₂ pressure, promoting an order of inspiration and expiration for ventilation of these gases and adequate tissue perfusion. Some clinical conditions, however, are sources that compromise this process through some mechanisms, such as: reduced lung compliance, increased ventilatory demand, difficulty in generating a pressure gradient between the environment and the pleural space, and reduced muscle strength.

Among these clinical conditions, COVID-19 stands out, a highly transmissible respiratory disease caused by SARS-CoV-2 and determinant of the biggest pandemic of the last decade. In its spectrum of clinical presentations, there is a dry or productive cough, fever, dyspnea, snoring and/or crackles on auscultation, pleural effusion and changes in chest radiography and/or tomography. Severe cases are characterized by an intense

and severe pulmonary inflammatory process, especially in patients belonging to risk groups.

These severe cases can progress to respiratory failure, a syndrome characterized by the body's inability to perform gas exchange correctly. When there is an inflammatory lesion of the epithelial-alveolar barrier with the endothelium, a protein-rich alveolar edema is formed that presents as bilateral pulmonary radiological infiltrate, PaO₂/FiO₂ ratio < 200 and PCP < 18 mmHg and characterizes Acute Respiratory Distress Syndrome. (ARDS).

In general, the treatment of ARDS is directed to the underlying pathology and, mainly, to ventilatory support. This can be provided through tracheal intubation, whose techniques are divided into delayed sequence (ISA) or rapid sequence (ISR).

In rapid sequence, the main objective of the technique is to position the endotracheal tube as quickly as possible after the patient loses consciousness, reducing the risk of aspiration of gastric contents. The clinician must remember the greater possibility of aspiration in all patients who are not fasting, in trauma, in the morbidly obese, in pregnant, elderly, ascitic patients, with gastroesophageal reflux. Ideal conditions for performing the rapid sequence technique include analgesia, hypnosis, neuromuscular blockade, and the autonomic response to laryngoscopy. Given the current scenario, with the COVID-19 pandemic, it can be admitted that during the ISR procedure, the risk of error occurs when drugs are administered. In this way, the creation of barriers and strategies to intercept possible errors are visible.

Despite this, in a subset of patients, the rapid sequence technique does not allow adequate preoxygenation and does not prevent desaturation and its complications. In 2011, Scott D. Weingart published a solution to this problem, calling it Delayed Sequence Intubation, as patients had *dellirium*

due to hypoxemia. In that publication, he recommended the use of Ketamine, or Dexmedetomidine, to make the patient comfortable accepting oxygen inhalation devices.

The procedure is similar to Rapid Sequence Intubation which consists of 7 steps: Preparation, Pre-oxygenation, Pre-treatment, Paralysis, Positioning and Post-intubation, but due to the *dellirium* or patient refusal to allow the second step (Preoxygenation), there is a controlled and systematic delay to perform dissociative sedation.

Due to the different pros and cons of each type of intubation sequence, the present study aims to compare them in the context of the patient infected with COVID-19

METHODOLOGY

This work was based on a bibliographic review of national and international scientific literature on the descriptors defined by the Decs BVS: "Airway management", "Tracheal intubation" and "COVID-19" in journals indexed in Google Scholar databases, including the National Library of Medicine (MEDLINE) and Scientific Electronic Library Online (SciELO) from the year 2020, with 2560 results found. Of these, those whose approach addressed aspects of rapid and delayed sequence intubation, as well as its proposition in patients with COVID-19, were chosen.

DISCUSSION

In studies carried out in Wuhan (China), the first place to face the disease with intensity, different points of view are observed. A first study of 202 critically ill COVID-19 patients who required emergency intubation concludes that rapid sequence success was 89% on the first attempt. Despite this, it is reported that 80% of patients developed or worsened hypoxia during rapid sequence. Another analysis

of 18 cases of patients in a severe condition for the virus showed excellent results in the rapid sequence. Even among these studies, other authors recommended preferentially rapid sequence intubation if pre-oxygenation is effective. Regarding the delayed sequence, there is a report of indication for cases whose patients have previously identified difficult airways.

The goal of preoxygenation is lung denitrogenation to provide a safe time before desaturation during intubation. For many patients, application of a reservoir-valve oxygen mask, or non-rebreathing mask at 15 L/min O₂, or yet non-invasive mechanical ventilation with minimum parameters and 100% O₂ for 3 minutes after reaching 95% saturation, or eight vital respiratory capacities, is enough to prevent saturation from falling between 3 to 8 minutes. However, some patients are unable to increase saturation by conventional means, especially those with COVID-19. For these patients, a more advanced method of achieving oxygenation and preventing an unfavorable outcome is vital. The advantage of Delayed Sequence Intubation is the hemodynamic improvement after reaching the Dissociative State and pre-oxygenation, allowing a new evaluation and, in some cases, the lack of intubation, interrupting the procedure.

On the other hand, this technique is not without complications. The most feared is the presence of apnea after 45 seconds of Ketamine administration. Despite being rare, it can be avoided with slower dilution and administration, respecting at least 30 seconds. Depending on the dose, it also has hypersalivation, tachycardia, hypertension and laryngospasm. In addition, the worst complications are caused by the wrong decision to postpone intubation of the COVID-19 carrier when there is a real need.

In the case of the rapid sequence, with

the administration of certain agents of rapid latency and duration, there is a greater exemption from the need for ventilation under a mask, allowing the patient to be placed in a respiratory prosthesis in a quick way with minimal risk of contagion - a determining factor for the health team ahead of the pandemic. Nevertheless, the rapid sequence has documented safety and efficacy and reduces the number of complications caused by conventional intubation when performed by a trained professional who carefully evaluates the patient. Thus, it is an appropriate sequence for patients who need emergency intubation, such as those with SARS. These, in addition to rarely being fasting, have gastric emptying delayed by hypoxemia and, thus, a high risk of aspiration.

In contrast, the fast sequence is also not without risks. The main cons are related to drug side effects and difficulty with managing complicated airways. Therefore, anticipation and due care with complications resulting from a difficult airway and adverse effects of the medications used is part of the procedure.

CONCLUSIONS

Anatomical knowledge of the airways is essential for successful tracheal intubation. Access to the airways without previous anatomical knowledge can have serious consequences. Comparing the rapid and delayed sequences of intubation, it appears that both play an important role in the patient's prognosis, depending on their indication and their adequate performance.

By a bias, the rapid sequence continues to be a well-indicated option in emergency cases, such as SARS due to COVID-19, and has shown good results in national and international studies. Its main risks are related to the adverse effects of the drugs used and the possibility of a difficult airway, for which the care team must be prepared.

Alternatively, the delayed sequence has been preferred in those cases where a difficult airway is identified, as these cases may take longer to intubate and the technique avoids drug-induced respiratory depression, decreasing the risk of severe hypoxemia. It is also recommended in situations where adequate pre-oxygenation is not possible, such as in agitated patients.

REFERENCES

1. BAJWA, Sukhminder Jit Singh; KURDI, Madhuri; STROUMPOULIS, Konstantinos. Manejo de via aérea difícil em tempos de COVID. **Indian Journal of Anesthesia**, v. 64, n. Suplemento 2, pág. S116, 2020.
2. BARBOSA, Luciano Timbó et al. Utilização da Intubação de Sequência Atrasada na Síndrome Respiratória Aguda Grave (SRAG) causada pelo novo Coronavírus. **Brazilian Journal of Health Review**, v. 4, n. 5, p. 22641-22654, 2021.
3. CAVALCANTE, Vitória Soares Pinho; DUTRA, Luz Marina Alfonso. Protocolo para Intubação Orotraqueal (IOT) segura na pandemia da COVID-19, no cenário do Sistema Único de Saúde. **Health Residencies Journal-HRJ**, v. 1, n. 2, p. 62-70, 2020.
4. MATSUMOTO, Toshio; CARVALHO, Werther Brunow de. Tracheal intubation. **Jornal de Pediatria**, v. 83, p. S83-S90, 2007.
5. MENG, Lingzhong et al. Intubação e ventilação em meio ao surto de COVID-19: a experiência de Wuhan. **Anestesiologia**, v. 132, n. 6, pág. 1317-1332, 2020.
6. MORO, Eduardo Toshiyuki; MÓDOLO, Norma Sueli Pinheiro. Indução anestésica com a técnica de sequência rápida. **Revista Brasileira de Anestesiologia**, v. 54, n. 4, p. 595-606, 2004.
7. SUKYS, Graziela A.; SCHVARTSMAN, Cláudio; REIS, Amélia G. Avaliação da sequência rápida de intubação em pronto-socorro pediátrico. **Jornal de Pediatria**, v. 87, n. 4, p. 343-349, 2011.
8. WANG, Jiafang et al. Intubação traqueal em pacientes com COVID-19 grave e crítico: análise de 18 casos. **Nan fang yi ke da xue xue bao= Journal of Southern Medical University**, v. 40, n. 3, pág. 337-341, 2020.
9. YAO, Wenlong et al. Intubação traqueal de emergência em 202 pacientes com COVID-19 em Wuhan, China: lições aprendidas e recomendações de especialistas internacionais. **Jornal britânico de anestesia**, v. 125, n. 1, pág. e28-e37, 2020.
10. ZUO, Mingzhang et ai. Recomendações de especialistas para intubação traqueal em pacientes críticos com doença do novo coronavírus 2019. **Chinese medical sciences Journal**, v. 35, n. 2, pág. 105-109, 2020.