

AIRWAY MANAGEMENT IN CHILDREN WITH CONTRACTIONS RESULTING FROM BURNS TO THE FACE AND NECK

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Abstract: Introduction: Burns are tissue injuries resulting from thermal, chemical, electrical or radioactive trauma. Most burns occur in children between birth and the fourth year of life, a period of child development. Burn patients must follow the initial trauma management protocol, with assessment of airways, breathing, circulation, neurological disorders and body exposure. Initial management is not the only concern in these cases, as there are burn complications, such as functional injuries and contractures, not only after treatment, but also during care. This work is justified by the need to search the literature for the best techniques to access the airways of children with contractions resulting from facial burns and burns in the neck region. **Goal:** To carry out a review on airway management in children with contractions resulting from burns to the face and neck, searching for data in the literature between the years 2008-2023. **Methodology:** Literature review of original articles that report on airway management in burn patients, carried out in the period 2008-2023. The search was carried out in electronic databases: Google Scholar, Scielo, Virtual Health Library, PubMed and the Digital Library of Theses and Dissertations. **Results:** Six articles were selected, cataloged and analyzed, based on the fusion of information collected in each article studied. **Conclusions:** Comprehensive patient assessment, including medical history and airway examination, are vital aspects for successful airway management in patients with neck burn contracture, as well as individualization of the anesthetic plan, considering the severity of the contracture and the experience of the anesthesiologist to ensure the safety and effectiveness of the procedure. The range of techniques discussed, from fiberoptic nasal intubation to infraorbital and mental nerve blocks, highlights the need for flexible and adaptable approaches. Therefore, the use of an innovative approach as part of

the anesthetic strategy is not only efficient, but also safe, providing a valuable alternative in the context where traditional approaches could be more challenging and could put the patient's life at risk.

Keywords: Anesthesiology; Complications; Traumas.

INTRODUCTION

Burns are tissue injuries resulting from thermal, chemical, electrical or radioactive trauma. It is a fact that burn patients need targeted and immediate care, depending on some factors, such as location, extent and depth to determine the prognosis. Therefore, the more complex the burn, the greater its lethal potential and the more difficult the treatment will be (BRUXEL, 2012).

Most burns occur in children between birth and the fourth year of life, a period of child development. The most favorable environment for this type of accident to occur is the home, as it is the place where children have the most access and spend most of their time. They generally affect several areas of the body, especially the trunk, upper limbs and head, as well as the lower limbs, hand, neck, abdomen, foot, genitals and airways. Burns are rarely limited to just one region of children's bodies (ALVES, 2011).

Burn patients must follow the initial trauma management protocol, with initial assessment of the airways, breathing, circulation, neurological disorders and body exposure (BRUXEL, 2012). However, initial management is not the only concern in these cases, as there are complications of burns, such as functional injuries and contractures, not only after treatment, but also during care (SANTA DE MORAES, 2014).

This work is justified by the need to search the literature for the best techniques to access the airways of children with contractions resulting from burns to the face and neck region.

GOALS

General Objective: To carry out a review on airway management in children with contractions resulting from burns to the face and neck, searching for data in the literature between the years 2008-2023.

Specific Objective: To analyze, through reading the articles, which are the best techniques for accessing the airways of burned children, seeking to reduce the risk to these patients' lives.

METHODOLOGY

The method used in the study was a literature review. The materials used to carry out the work were searched in the electronic databases Google Scholar, Scielo, Virtual Health Library, PubMed and the Digital Library of Theses and Dissertations. To collect the information, the inclusion criteria were the originality of the articles, carried out with human beings, published between the years 2008-2023, which addressed the management of burn patients, while the exclusion criteria were any articles that were not carried out with human beings, that did not comply with the publication time (2008 to 2023), or that did not address the topic addressed in this study. The selected articles were published between 2008 and 2023, in the English language.

The searches were carried out on January 15th and 22nd, 2024, using the following descriptors: "airway management", "child", "burns" and "airway management burns child".

The search was carried out by two authors, independently, taking into consideration, the title and reading of the abstracts when selecting articles. Then, another author, with the aim of collecting the elements of the selected works, gathered the information in a table containing the title, database/magazine, author, year of publication, objective and

conclusion of each article that met the inclusion criteria. The data were analyzed, compared and discussed, seeking the main information on the management of the topic portrayed in the present study.

RESULTS

Using the descriptors “airway management”, “child”, “burns” and “airway management burns child”, 11,807 publications possibly eligible for inclusion in this review were selected. Then, articles that met the inclusion criteria were selected by reading the title and summary of the works. After evaluating the articles according to the inclusion criteria, 06 titles were selected that were considered eligible for the next stage of this review, which consisted of the complete reading of these articles. At this stage, the literature review was carried out independently by a researcher. Of these works, 01 article was selected from Google Scholar and 05 articles from PubMed.

Various intubation techniques are discussed, highlighting the need for a personalized approach based on the severity of the contracture and the anesthesiologist's experience, using the technique most appropriate to the patient's case. Various techniques such as fiberoptic nasal intubation with the patient awake, the use of an intubable laryngeal mask airway, direct laryngoscopy and video laryngoscopy are mentioned as viable options, highlighting the importance of having a plan B and rescue strategies in case of failure. of the initial technique (Unal, Hazir, 2023; Srinivasan, et al., 2021; Caruso, Janik, Sarvesh, Chaudhary, 2015; Fuzaylov, 2012; Xue, Liao, et al., 2008).

Therefore, the introduction section to the management of difficult airways addresses the importance of personalized approaches, highlighting the difficulties in awake intubation, especially in patients with scar contraction in the neck, making it vital to

carefully evaluate ventilation with a face mask before deciding on the intubation technique, considering risk factors such as atlanto-occipital extension and the Mallampatti classification, which are routine measures to predict difficulties (Xue, Liao, et al., 2008). With this, different airway management techniques are discussed, including pre-curved endotracheal tubes, laryngeal mask airway, Combitube, laryngeal tube, emergency tracheotomy or cricothyroidotomy. Furthermore, in the literature, the preference for total intravenous anesthesia (TIVA) and inhalational anesthesia with sevoflurane is mentioned, with considerations regarding the lower risk associated with sevoflurane (Unal, Hazir, 2023; Srinivasan, et al., 2021).

In this vein, there is a discussion about supraglottic airways, highlighting their usefulness in initial ventilation, rescue ventilation and as a conduit for intubation, with the choice of the supraglottic airway depending on the specific characteristics of the patient. Thus, flexible intubation with a fiberscope is considered the gold standard in difficult airway situations, but video laryngoscopy is recommended as the preferred technique in children with difficult airways (Srinivasan, et al., 2021).

In the article by Sarvesh, Chaudhary, et al., the case of a 35-year-old woman with mouth and anterior chest contractures due to acid burn is reported. In view of this context, infraorbital and mental nerve blocks were successfully used as a safe and effective alternative, as this technique offers advantages, such as the preservation of airway protective reflexes and the absence of the need for muscle relaxants, especially beneficial in peripheral centers with limited resources.

In this context, the importance of individualized anesthetic planning is highlighted, considering the specific characteristics of the patient. In another

Title	Magazine	Author	Year	Goal	Conclusion
Airway management of recovered pediatric patients with severe head and neck burns: a review	Pediatric Anesthesia	Caruso, Janik, Fuzaylov	2012	Review of the literature on airway management in children recovering from severe head and neck burns.	Children recovering from severe head and neck burns present unique challenges in airway management, including microstomia, granulomas, subglottic stenosis, tracheomalacia, obstruction of the nostrils, and fixation of the neck in a flexed position. Airway management must be planned in advance, taking these challenges into account. Tracheal intubation may be difficult or impossible, and tracheostomy may be necessary.
Airway Management in Pediatric Patients with Burn Contractures of the Face and Neck	Journal of Burn Care & Research	Unal, Hazir	2023	Review of the literature on airway management in children with burn scars on the face and neck.	Burn scars on the face and neck can cause airway deformities, making tracheal intubation difficult or impossible. Airway management must be planned in advance, taking into consideration, the severity of the deformities. Tracheal intubation can be performed successfully in children with burn scars on the face and neck, but it is important to have a backup plan in case of failure.
Clinical experience of airway management and tracheal intubation under general anesthesia in patients with scar contracture of the neck	Chinese Medical Journal	Xue, Liao, Li, Xu, Yang, Liu, Liu, Luo, Zhang	2008	Retrospective study on airway management and tracheal intubation under general anesthesia in patients with post-burn neck contracture.	They concluded that tracheal intubation can be challenging in patients with post-burn contracture, requiring advanced planning and techniques.
Clinical experience of airway management and tracheal intubation under general anesthesia in patients with scar contracture of the neck	Chinese Medical Journal	Xue, Liao, Li, Xu, Yang, Liu, Liu, Luo, Zhang	2008	Retrospective study on airway management and tracheal intubation under general anesthesia in patients with post-burn neck contracture.	They concluded that tracheal intubation can be challenging in patients with post-burn contracture, requiring advanced planning and techniques.
Difficult airway management following severe gasoline burn injury: a case report	AANA Journal	Great House, Stuart, White	2012	Case report on airway management in an adult patient with severe burns to the face and neck.	The patient had difficulty breathing and was in serious condition. Tracheal intubation was successfully performed using fiberoptic intubation.
Airway management in patients with burn contractures of the neck	Indian Journal of Burns	Srinivasan, et al.	2021	Review of the literature on airway management in patients with neck burn contracture.	Neck burn contractures can cause airway deformities, making tracheal intubation difficult or impossible. Airway management must be planned in advance, taking into consideration, the severity of the deformities. Tracheal intubation can be performed successfully in patients with neck burn contracture, but it is important to have an alternative plan in case of failure.

Table 1: Selected articles.

case, anesthetic techniques, including airway management with the child awake or after induction of anesthesia, are discussed, with emphasis on the preference for awake management in children, especially if a difficult airway is anticipated (Unal, Hazir, 2023; Srinivasan, et al., 2021).

Furthermore, the articles discuss premedication, emphasizing its role in reducing secretions and maintaining heart rate during procedures, highlighting the use of agents such as atropine and glycopyrrolate to prevent excessive salivation and bradycardia, contributing to a more controlled environment during airway management. In this sense, pre-oxygenation and oxygen supplementation during intubation are considered essential to ensure an adequate oxygen reserve, however, in these cases, mask ventilation can be challenging due to scars and facial deformities, which prevent optimal use. greater oxygenation (Unal, Hazir, 2023).

CONCLUSIONS

Airway management in patients with Neck Burn Contracture (PBC) represents a complex and multifaceted challenge for anesthesiologists. The comprehensive literature review and case report provide an in-depth understanding of the strategies and techniques available to overcome the difficulties presented by this condition. Therefore, comprehensive patient assessment, including medical history, physical examination and airway examination, are vital aspects for successful airway management in patients with PBC, as well as individualization of the anesthetic plan, considering the severity of the contracture. and the experience of the anesthesiologist to ensure the safety and effectiveness of the procedure (Srinivasan, et al., 2021).

The range of techniques discussed, from fiberoptic nasal intubation to infraorbital and mental nerve blocks, highlights the need for flexible and adaptable approaches. Therefore, the use of an innovative approach as part of the anesthetic strategy is not only efficient, but also safe, providing a valuable alternative in a context where traditional approaches could be more challenging and may put the patient's life at risk (Sarvesh, Chaudhary, 2015).

REFERENCES

BRUXEL, Carla Luisa et al. Manejo clínico do paciente queimado. **Acta méd. (Porto Alegre)**, p.[5]-[5], 2012.

ALVES, Letícia Toschi Dias Dassie et al. Centro de tratamento de queimados: perfil epidemiológico de crianças internadas em um hospital escola. **Revista brasileira de queimaduras**, v. 10, n. 1, p. 10-14, 2011.

SANTA DE MORAES, Priscila et al. Perfil das internações de crianças em um centro de tratamento para queimados. **Revista Eletrônica de Enfermagem**, v. 16, n. 3, p. 598-603, 2014.

CARUSO, T.J., Janik, L.S. and Fuzaylov, G. (2012), Airway management of recovered pediatric patients with severe head and neck burns: a review. **Pediatric Anesthesia**, 22: 462-468.

UNAL, B., & Hazir, S. (2023). Airway Management in Pediatric Patients with Burn Contractures of the Face and Neck. **Journal of Burn Care & Research**, 44(2), 294-299.

SARVESH, K., & Chaudhary, S. (2015). Difficult Airway Management in a Patient with Post-burn Contracture Neck. **Journal of Burn Care & Research**, 36(5), 720-723.

XUE, H., Liao, Y., Li, Y., Xu, X., Yang, Y., Liu, Z., Liu, Y., Luo, Y., & Zhang, X. (2008). Clinical experience of airway management and tracheal intubation under general anesthesia in patients with scar contracture of the neck. **Chinese Medical Journal**, 121(10), 1103-1107.

GREATHOUSE, J., Stuart, P., & White, J. (2012). Difficult airway management following severe gasoline burn injury: a case report. **AANA Journal**, 80(4), 299-302.

SRINIVASAN, R., et al. (2021). Airway management in patients with burn contractures of the neck. **Indian Journal of Burns**, 30(1), 27-32.