

## CASO CLÍNICO

# Iatrogenic Soft Palate Cleft During Videolaryngoscopic Intubation: A Case Report

## *Lesão Iatrogénica do Palato Durante Abordagem da Via Aérea com Videolaringoscopia: Caso Clínico*

Denise Noronha<sup>1\*</sup> , Sandra Domingues<sup>1</sup> , Catarina Rodrigues<sup>1</sup> , Ana Paulino<sup>1</sup> , Mercedes Perdigão<sup>1</sup> 

### Afiliação

<sup>1</sup>Centro Hospitalar Universitário Lisboa Norte, Lisboa, Portugal.

### Keywords

Cleft Palate; COVID-19; Intubation, Intratracheal; Laryngoscopy/adverse effects; SARS-CoV-2

### Palavras-chave

COVID-19; Fissura Palatina; Intubação Intratraqueal; Laringoscopia/efeitos adversos; SARS-CoV-2

## ABSTRACT

Endotracheal intubation is an essential skill. Videolaryngoscopy has gained popularity as an alternative intubation device, becoming a rescue tool in difficult airway intubation protocols and often considered as the first approach during COVID-19 pandemic due the increased first attempt intubation success rates. However, the loss of depth perception and the shift of the focus from the patient to the video monitor can lead to an oropharyngeal blind introduction of the endotracheal tube resulting in minor to severe injuries. We report a case of a patient with a severe tonsillar pillar cleft that passed unnoticed, that required palatoplasty and tracheostomy.

## RESUMO

A intubação orotraqueal é uma competência essencial do anestesiologista. A popularidade da videolaringoscopia tem vindo a aumentar, sendo considerado uma alternativa na abordagem da via aérea difícil e a primeira linha durante a pandemia a SARS-CoV-2 pela elevada taxa de sucesso de intubação à primeira tentativa. Contudo, a perda de perceção tridimensional e o desvio da atenção para o monitor leva à introdução cega do tubo orotraqueal, aumentando o risco de lesões. Apresentamos um caso clínico de uma doente com uma lesão iatrogénica do pilar amigdalino que exigiu palatoplastia e traqueostomia.

## INTRODUCTION

Endotracheal intubation is an essential skill, commonly performed in the operating room, intensive care units, emergency department and prehospital settings when airway protection and invasive mechanical ventilation is required. Classic direct laryngoscopy remains the standard technique as it is inexpensive and portable. However, videolaryngoscopy has gained popularity as a useful tool that aids visualization of the vocal cords, especially when facing a difficult airway, reducing the need to airway axis alignment. In order to increase first attempt intubation success rate even by less trained healthcare professionals, shortening the aerosol-generating procedure, it was witnessed an exponential use of this device during COVID-19 pandemic.<sup>1-3</sup>

In 2012 Dr. Ron Walls, an emergency physician, Professor of Emergency Medicine at Harvard Medical School and the editor-in-chief for emergency medicine for *UpToDate*, predicted this tendency, stating that direct laryngoscopy was obsolete and “it is wrong for people to practice direct laryngoscopy in 2012”. His comment was met with harsh criticism due to the higher incidence of traumatic injuries following initial use of videolaryngoscopy, explained mainly by loss of depth perception, shift of the focus from the patient to the video monitor and blind introduction of the endotracheal tube (ETT). Although the majority report minor injury followed by an uneventful recovery, lesions might be life-threatening, demanding a multidisciplinary approach. We report a case of a severe soft palate perforation after an emergent intubation that required palatoplasty and surgical tracheostomy.<sup>2,3</sup>

## CASE REPORT

Eighty one year-old Caucasian woman presented in the emergency department of a secondary health care hospital

Autor Correspondente/Corresponding Author\*:

Denise Noronha

Morada: Rua Mário Cesariny, nº6, 4C, 1600-313 Lisboa, Portugal.

E-mail: denise.d.noronha@gmail.com

with altered mental status, nausea, fever, diarrhea and severe lower back pain. This clinical picture was highly suggestive of nephrolithiasis complicated by shock. The initial approach included early empiric antibiotic therapy, intravenous fluid and vasopressor with norepinephrine support. The patient clinical condition worsened progressing to acute pulmonary edema probably in the context of a sepsis-induced myocardial dysfunction with sparse response to diuretics, requiring emergent intubation and mechanical ventilation. It was reported a difficult airway with a Mallampati Class IV, a limited mouth opening and retrognathism. The airway was successfully secured after using an intubating stylet and an endotracheal cuffed tube size 6.0 mm.

After initial stabilization, the patient was transferred to our hospital and urgent ureteral stent placement performed. In the immediate postoperative period she was admitted in the Intensive Care Unit. Within eighteen hours the septic shock resolved and the renal and myocardial function started to recover, enabling a spontaneous breathing trial. Considering the known history of difficult airway, persistent hemorrhage of the airway and the negative cuff leak test, an Otorrinolaringology consultation was requested. Beside the severe edema of the vocal cords, a soft palate and anterior tonsillar pillar cleft was identified, where the endotracheal tube passed through before reaching the larynx (Figs 1 and 2). Elective surgery was scheduled where a tracheostomy was performed, followed by the surgical excision of the endotracheal tube and palatoplasty. The recovery was uneventful and the patient was discharged on the eight day of hospital stay.



**Figure 1. Endotracheal tube in the soft palate and anterior tonsillar pillar cleft**



**Figure 2. Soft palate after palatoplasty**

## DISCUSSION

The history and type of lesion was highly suggestive of an airway management with a videolaryngoscope. Beside the potential complications related to the lesion, the patient was submitted to an otherwise unnecessary surgery, additional course of antibiotics and a prolonged hospital stay.

Despite the higher incidence of severe injuries, the videolaryngoscopy has become an attractive alternative, especially in the presence of an anatomically difficult airway. It improves visualization of the laryngeal inlet without alignment of the oral, pharyngeal and tracheal axes, and consequently, the intubation success rate.<sup>1,4</sup> The high incidence of traumatic palatal injuries is related to the oversized blade and the shift of the focus from the patient to the videomonitor, while the ETT is maneuvered blindly past throughout the pharynx before coming into view. The risk-benefit must be compared with the available alternative (Table 1), especially considering that the direct laryngoscopy performed by an experienced physician has a similar result.<sup>1,3-5</sup>

Regardless the tool used, the risk of traumatic complications increases with an untrained provider or a flawed intubation technique. Advancing the ETT laterally in a direction perpendicular from the midline may potentially cause impingement of the ETT onto the airway mucosa and increase the risk of tissue perforation, especially if pressure is exerted.<sup>5</sup> Another well documented factor is the excessive upward angulation of the distal segment of the endotracheal tube with a rigid stylet. The STYLETO trial suggests the use of a stylet during the direct laryngoscopy increases the first-attempt intubation success rate in the critically ill patient. This strategy might seem beneficial initially since the tube will

**Table 1. Comparison between direct laryngoscopy and videolaryngoscopy<sup>3-5</sup>**

	Advantages	Disadvantages
Direct laryngoscopy	<ul style="list-style-type: none"> <li>• Economical</li> <li>• Portable</li> </ul>	<ul style="list-style-type: none"> <li>• Significant cervical spine movement</li> <li>• Haemodynamic response to tracheal intubation</li> </ul>
Videolaryngoscopy	<ul style="list-style-type: none"> <li>• Higher success rate</li> <li>• No alignment between eye and airway required</li> <li>• Better when limited neck mobility is present and/or desired</li> <li>• Less haemodynamic response to intubation</li> </ul>	<ul style="list-style-type: none"> <li>• Expensive</li> <li>• Oversized blade</li> <li>• Requires stylet</li> <li>• Loss of depth perception</li> <li>• Focus shifts to the video monitor</li> <li>• Blind introduction of the ETT</li> </ul>

reach the larynx effortlessly, but the operator is more inclined to apply increased upward force on the laryngoscope.<sup>6</sup> The consequent tenting of the tonsillar pillars makes the soft palate more susceptible to perforation by the rigid stylet. In order to accommodate the extreme flexed tube a higher pressure is applied, creating an abrasive lesion.<sup>1,5</sup> Inappropriate muscular block can also contribute by inadequate relaxation of the palatoglossus muscle which pulled taut the tonsillar pillar membrane making it more susceptible to perforation.<sup>5</sup> Signs and symptoms vary and may underestimate the gravity of injury. Most suffer single and mild injuries, evolving soft tissue like tongue and lower lip, and tooth avulsion. Major severity is associated with vessels perforation, emphysema, retropharyngeal abscess and mediastinitis, the latter two associated with a mortality rate of 1% and 50%, respectively.<sup>3,4</sup> Diagnosis of retropharyngeal lesions might be challenging and often require a multidisciplinary approach, direct visualization or a computed tomography scan. An otolaryngology consultant should evaluate the patient and visualize the defect, point of exteriorization and presence of active hemorrhage.<sup>3,4</sup>

Given the low incidence and diversity of the injuries, evidence-based recommendations for their management are still lacking. Usually soft palate and oropharyngeal injuries are self-limited require minimal intervention. Nil-by-mouth and broad-spectrum antibiotics should be considered in larger or contaminated lesions. Dexamethasone can be useful for airway edema prevention. For severe and gaping wounds, surgery may be appropriate often requiring a surgical airway distal to the injury. Above all of this, monitoring should be ensured to exclude any further bleeding, symptomatic changes or respiratory distress.<sup>3,5</sup> Considering the potential complications, prevention is the key. Proposed strategies include: introducing the blade in the midline of the mouth under visual control; insertion of the ETT parallel to it as close as possible to the blade, attempting to reproduce its course. Alternatively, the tip of the ETT could be introduced in the midline with the proximal end oriented towards the right, being then rotated counterclockwise 90° in a horizontal plane bringing it parallel to the blade. The endotracheal tube should be soft-edged, its insertion and advancement visually controlled, and the operator should only look for the monitor after the tube's tip is out of direct vision. Alternatively,

another technique described in the literature advises insertion of the ETT into the oral cavity before introducing the blade. However, the risk of a blind insertion must be considered. Some authors suggest using a soft-edged ETT, which flexible-tip tubes have a hemispherical bevel allowing the tip to glide along the airway surfaces without scraping it. Forceful introduction of the tube should be discouraged. Finally, training and supervision is mandatory to develop the skills for proper use of videolaryngoscopy.<sup>3-5</sup>

**Ethical Disclosures**

**Conflicts of Interest:** The authors have no conflicts of interest to declare.  
**Financing Support:** This work has not received any contribution, grant or scholarship.  
**Confidentiality of Data:** The authors declare that they have followed the protocols of their work center on the publication of data from patients.  
**Patient Consent:** Consent for publication was obtained.  
**Provenance and Peer Review:** Not commissioned; externally peer reviewed.

**Responsabilidades Éticas**

**Conflitos de Interesse:** Os autores declaram a inexistência de conflitos de interesse na realização do presente trabalho.  
**Fontes de Financiamento:** Não existiram fontes externas de financiamento para a realização deste artigo.  
**Confidencialidade dos Dados:** Os autores declaram ter seguido os protocolos da sua instituição acerca da publicação dos dados de doentes.  
**Consentimento:** Consentimento do doente para publicação obtido.  
**Proveniência e Revisão por Pares:** Não comissionado; revisão externa por pares.

Received: 29<sup>th</sup> of November, 2021 | Submissão: 29 de novembro, 2021  
 Accepted: 24<sup>th</sup> of March, 2022 | Aceitação: 24 de março, 2022  
 Published: 7<sup>th</sup> of September, 2022 | Publicado: 07 de setembro, 2022

© Author(s) (or their employer(s)) and SPA Journal 2022. Re-use permitted under CC BY-NC. No commercial re-use.  
 © Autor (es) (ou seu (s) empregador (es)) Revista SPA 2022. Reutilização permitida de acordo com CC BY-NC. Nenhuma reutilização comercial.

**REFERENCES**

1. Cheyne D, Doyle P. Advances in laryngoscopy: rigid indirect laryngoscopy. *Med Rep*. 2010; 2:61. doi: 10.3410/M2-61
2. Wong D, El-Boghdadly K, Owen R. Emergency Airway Management in Patients with COVID-19: A Prospective International Multicenter Cohort Study. *Anesthesiology*. 2021;135:292–303. doi: 10.1097/ALN.0000000000003791.
3. Thorley DS, Simons AR, Mirza O, Malik V. Palatal and retropharyngeal injury secondary to intubation using the GlideScope® video laryngoscope. *Ann R Coll Surg Engl* 2015;97: 67-9. doi: 10.1308/003588415X14181254789727.
4. Pham Q, Lentner M, Hu A. Soft palate injuries during orotracheal intubation with the videolaryngoscope. *Ann Otol Rhinol Laryngol*. 2017;126:132-7. doi: 10.1177/0003489416678008.
5. Malik AM, Frogel JK. Anterior tonsillar pillar perforation during GlideScope video laryngoscopy. *Anesth Analg*. 2007;104:1610-1; discussion 1611. doi: 10.1213/01.ane.0000264321.04403.06.