Case report – Distal tracheal injury after orotracheal intubation

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ABSTRACT

Distal tracheal lesions resulting from orotracheal intubation are rare and more severe complications, which mainly affect females. Its cause is not specified, but it is believed to be related to direct laceration of the trachea. Thus, its diagnosis is based on the clinical symptoms observed in the patient and, for confirmation, bronchoscopy is used. Its treatment depends on the size of the lesion, for the choice of the surgical or conservative method, and should occur early. However, the site of the injury also influences the choice and effectiveness of treatment, i.e., in cases of distal tracheal injury, conservative treatment becomes impaired due to the impossibility of positioning the cuff of the orotracheal tube after the injury. Thus, the present case report aims to report and discuss the treatment of a case of distal tracheal injury after orotracheal intubation. In addition, the scarcity of journals that address this subject shows the importance of further studies focused on the treatment of distal lesions, due to the greater complexity of this case.

Keywords: Intratracheal Intubation, Trachea, Trauma.

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INTRODUCTION

Tracheal lesions are rare and serious complications resulting from orotracheal intubation (OTI), estimated to occur in 0.005% in intubations with simple lumen and 0.05% in intubations with double lumen. (FENIL et al., 2018; SCHNEIDER et al., 2007). It occurs predominantly in females, about 85.7%, related to the presence of a smaller airway. In addition, the form of treatment chosen was surgical in 61% of the cases and resulting in a mortality of 22% (FENIL et al., 2018; MINÃMBRES et al., 2009).

From this, it can be seen that traumatic tracheal injury does not have a specific cause that is proven in the literature, the main origin of this pathology would be the direct laceration of the trachea generated by the end of the orotracheal tube when it is inserted. The presence of some risk factors may be related to tracheomalacia, stenosis, size and stiffness of the orotracheal tube, in addition to the professional's knowledge of the intubation technique (FENILI, et al., 2018).

Thus, its diagnosis is based on clinical suspicion, through signs and symptoms, such as respiratory failure, subcutaneous emphysema, hemoptysis, and pneumothorax. To confirm the diagnosis, bronchoscopy is used, which will reveal the location and size of the lesion. Finally, the treatment of choice in most cases has been urgent surgical repair, although some authors advocate conservative treatment, always taking into account the injury and the patient's condition (MIÑAMBRES; BURÓN; BALLESTEROS; LLORCA; MUÑOZ; GONZÁLEZ-CASTRO, 2009). This study aims to report and discuss a case of distal tracheal injury after orotracheal intubation, emphasizing the site and treatment of this type of injury.

CASE REPORT

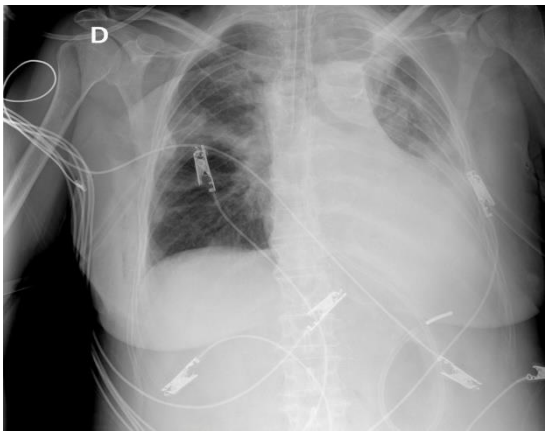
Female patient, 65 years old (DN 04/22/1957), previously with Chronic Obstructive Pulmonary Disease Gold C, Arterial hypertension, Type 2 diabetes mellitus, Ischemic stroke for 20 years without sequelae, PAOD with previous angioplasty for 3 years, non-dialysis chronic kidney disease (CKD EPI 55.2), totally independent previously.

The patient sought the emergency room (ER) due to dyspnea for 5 days, with sudden worsening for 12 hours after the use of a cleaning product. Taken to the ER by family members due to a lowered level of consciousness 10 minutes ago. Orotracheal intubation was performed and vasoactive drug was required, maximum dose of 0.3mcg/kg/min. The patient was transferred to the ICU, where, in less than 24 hours, she developed bilateral subcutaneous emphysema and neck associated with worsening ventilation and increased ventilatory parameters.

A chest x-ray was performed, which showed pneumomediastinum, and the thoracic surgery team chose to perform bilateral chest drainage and fiberoptic scopy. Fiberoptic scopy showed a tracheal lesion immediately anterior to the carina of approximately 4.0 (four) cm. Selective right-

sided OTI was chosen in the first 24 hours located immediately below the tracheal injury, with the objective of clinical stability and continuous sedation (with Midazolam and Fentanyl) and the use of a continuous neuromuscular blocker. Antibiotic therapy (Ampicillin and Sulbactam) was also introduced to cover the germs of the tracheobronchial tree.

Figure 1-Raio-X of tórax



Selective chest x-ray located in the right source bronchus with pneumomediastinum associated with left pulmonary atelectasis

Figure 2- Fibrobronchoscopy

Fiberoptic bronchoscopy with pneumomediastinum compatible with the site of the visualized lesion

Due to the impossibility, after 24 hours of selective IOT, the cuff was repositioned, keeping it at the site of the injury, continuing the conservative treatment. The patient evolved with a difficulty in adjusting ventilatory parameters on the mechanical ventilator, at this point the team thought about performing an intubation with a Carlens tube, but due to the site of the injury, this treatment is impossible. In addition, surgical treatment was also considered, but due to the patient's instability and the use of high-dose vasoactive drugs, making it impossible to remove them due to the risk of CRA,

it was not possible to perform surgical treatment. As a result of persistent hypoxia, the patient progresses with worsening shock, characterizing refractory shock, making it impossible to treat at the moment.

In the next five days, the conservative approach was maintained with attempts at hemodynamic stability, the patient did not respond to the measurements and maintained refractory shock. On the fifth day of hospitalization, the patient developed significant bradycardia, in addition to QRS enlargement, with partial improvement after the use of adrenaline and atropine. However, at 8:55 p.m., the patient progressed with new bradycardia and, soon after, cardiorespiratory arrest (CA) in asystole, without response to clinical measures and massage, progressing to death at 9:07 p.m.

DISCUSSION

Tracheal injury is a rare condition that requires treatment as early as possible so as to offer a better condition for the patient. In the case reported here, it is clear that the lesion occurred in the distal part of the trachea, anterior to the carina, which makes treatment difficult, since it is not possible to insert a cuff from the orotracheal tube below the lesion, which would be the most indicated form.

Regarding the treatment indicated for cases of tracheal injury, when a laceration of less than 2cm is observed, the patient presents few symptoms, which do not evolve over time and practically without loss of air to breathing, the choice of treatment is conservative. In addition, when the patient has a laceration greater than 4cm, with lesions involving carina or esophagus, it is necessary to perform a surgical procedure. And in those in which the laceration is between 2 and 4 cm, there is still no consensus on how to act, and it is up to the physician to choose the most appropriate technique (FIORELLI et al., 2017).

Concomitantly, there are reports about considering treatment through minimally invasive surgeries, seeking to have a lower patient morbidity rate. In lacerations located in the distal trachea, the best option for entry would be through a right thoracotomy. Thus, a study showed that a procedure option for a tracheal injury with more than 5cm in the distal part was a video-assisted endotracheal suture through a cervical incision (COSTA JÚNIOR et al., 2012)

Thus, at the moment after traumatic injury to the trachea, it should be ensured that the airway remains patent, avoiding increased patient morbidity. Thus, the development of other pathologies may occur, such as pneumomediastinum, which needs to be repaired at the site where air leakage is occurring, and subcutaneous emphysema, which can affect various parts of the body (PEREIRA et al., 2011). As a result, these two pathologies were visualized in the patient, thus increasing her risk of morbidity.

In addition, authors argue that patients who have, in addition to tracheal injury, pneumomediastinum, cutaneous emphysema and who need mechanical ventilation, it would be better to undergo treatment with a surgical procedure. The surgical option for distal tracheal involvement would be right thoracotomy (COSTA JÚNIOR et al., 2012; CARBOGNANO et al., 2004).

In parallel to this, another study addressed the report of a patient with a lesion in the distal third of the trachea of approximately 3 (three) cm in size, where a surgical approach was performed, by means of a thoracoscopy and after a right posterolateral thoracotomy. And at the end, the trachea was dissected to suture the tracheal lesion, completely closing it (FENILI et al., 2018). Thus, it is verified that the patient in the present study could have benefited from the surgical treatment when compared to the conservative treatment.

In this sense, in relation to the aforementioned patient, a conservative treatment was chosen, seeking to position the cuff of the orotracheal tube below the lesion, but due to the lesion being in the precarina, in the distal trachea, it was not possible to position the cuff properly. Thus, this patient became unviable, and later evolved to a CA, progressing to death. Despite this, surgical correction should also be performed in the presence of signs of mediastinitis or any sign of ventilatory instability (MEDINA et al., 2009). Therefore, it is verified that it would have an indication for surgical treatment, however it was contraindicated due to hemodynamic instability.

Finally, when correlating with the literature, it is observed that lesions up to 4 cm do not exist a consensus on the best treatment to be performed, and it is up to the physician to make this choice, which was conservative treatment. However, due to the location of the lesion and its respective impossibility of properly positioning the cuff together with ventilatory instability, when correlating with studies, the best treatment to be performed would be surgery. However, due to the hemodynamic instability that the patient presented, it was considered by the surgical team that it was not possible to perform surgical treatment and that the procedure would increase mortality. However, the non-performance of surgery generated friction between the ICU and surgical teams, as the ICU team considered that if they did not operate, the outcome would be death, which, in the end, was what happened.

CONCLUSION

The present study aims to increase the discussion about clinical or surgical treatment in cases of distal tracheal injury after orotracheal intubation and to correlate the treatment performed with the literature. In the case reported here, conservative treatment was chosen due to hemodynamic and ventilatory instability, which makes it impossible to remove the patient, thus preventing surgical treatment by the surgical team. However, an unfavorable outcome was observed, but studies show that in the case of distal involvement together with respiratory instability, a better option could be

surgical treatment, i.e., it is believed that perhaps if surgical treatment occurred early, before instability or even in hemodynamically unstable patients, the patient could have a better outcome. However, there are still few studies that focus on the site of tracheal injury with its respective treatment, thus highlighting the need for further studies on the subject, aiming at the most effective treatment.

REFERENCES

1. Costa Júnior, A. da S., et al. (2012). A video-assisted endotracheal suture technique for correction of distal tracheal laceration after intubation. *The Annals of Thoracic Surgery*. Disponível em: <https://www.annalsthoracicsurgery.org/action/showPdf?pii=S0003-4975%2811%2902701-9>. Acesso em: 06/12/2022.

2. Fenili, R., Avila, A. C., & Takei, C. A. (2018). Laceração traqueal por alçaponamento de ar - relato de caso. *Revista Arquivos Catarinenses de Medicina*. Disponível em: <https://revista.acm.org.br/index.php/arquivos/article/view/429/285>. Acesso em: 29/11/2022.

3. Fiorelli, A., et al. (2017). Endoscopic treatment with fibrin glue of post-intubation tracheal laceration. *Journal of Visualized Surgery*, 3(102). Disponível em: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5638563/>. Acesso em: 30/11/2022.

4. Miñambres, E., Burón, J., Ballesteros, M. A., Llorca, J., Muñoz, P., & González-Castro, A. (2009). Tracheal rupture after endotracheal intubation: A literature systematic review. *European Journal of Cardio-Thoracic Surgery*, 35(6), 1056-1062. Oxford University Press (OUP). Disponível em: <http://dx.doi.org/10.1016/j.ejcts.2009.01.053>. Acesso em: 29/11/2022.

5. Pereira, B. M. T., Cassin, W. S., & Fiorelli, R. K. A. (2011). Trauma de laringe e traqueia. In G. P. Fraga, G. S. Pereira, & L. R. Lopes (Eds.), *Atualidades em clínica cirúrgica - Intergastro e Trauma* (cap. 6, pp. 65-87). Atheneu Rio. Disponível em: <https://www.researchgate.net/profile/Bruno-Pereira-55/publication/235754223_Trauma_de_laringe_e_traqueia/links/02bfe51327d3ed1424000000/Trauma-de-laringe-e-traqueia.pdf>. Acesso em: 30/11/2022.

6. Medina, C. R., et al. (2009). Laceração traqueal pós-intubação: análise de três casos e revisão de literatura. *Jornal Brasileiro de Pneumologia*, 35(8). Disponível em: <https://doi.org/10.1590/S1806-37132009000800014>. Acesso em: 08/12/2022.