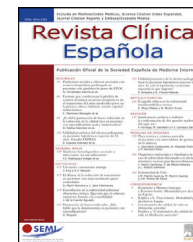




Revista Clínica Española

www.elsevier.es/rce



CORRESPONDENCE

Necrotizing tracheobronchitis with endotracheal tube obstruction in COVID-19 patients[☆]

Traqueobronquitis necrosante con obstrucción del tubo endotraqueal en pacientes COVID-19

Dear Director,

COVID-19 is an infection caused by the SARS-CoV-2 virus that can cause severe or fatal complications in high-risk patients. Though rare, we have observed several cases of necrotizing tracheobronchitis, which causes airway obstruction, with necrotic and hemorrhagic debris that obstruct the trachea and bronchi.

This problem has already been described in infections caused by the H1N1 flu virus, bacterial infections, and diseases such as rheumatoid arthritis or ulcerative colitis. It is associated with the formation of bronchial blood clots, bronchial hypersecretion, and presence of bacterial lung infection.^{1,2} Said clots provoke severe obstruction of the bronchial lumen, leading to an increase in airway pressure and making ventilation impossible. In many cases, it is necessary to exchange the endotracheal tube urgently.

This complication, which we believe may influence a patient's prognosis, entails an increase in risk of contagion by healthcare personnel; it is one of the procedures classified as of greatest risk for viral transmission from patients to healthcare personnel, along with bronchoscopy, aerosol therapy, nebulization, and aspiration of secretions. The aim of our study is to analyze the prognosis of patients with COVID-19 who have undergone an episode of endotracheal tube obstruction that made exchanging it necessary.

During the period from February to April 2020, 26 patients were hospitalized in our ICU: 22 (84.7%) required invasive mechanical ventilation (Table 1). Of those, 16 (72.7%) presented with at least one episode of endotracheal tube obstruction that required an exchange. What's more, none of these incidents occurred before the seventh day

mechanical ventilation, with a mean day of onset of 10.5 days. Some patients even required a tube exchange on more than one occasion. The mean number of exchanges was 1.46.

If we compare patients who had endotracheal tube obstruction and tube exchange (which we will group together in the first group) with those who did not need it (the second group), we can observe that there are significant differences in the days they required mechanical ventilation (21.6 vs. 17.5 days). Therefore, a greater number of patients in the first group required a tracheotomy before proceeding to be weaned off of mechanical ventilation (81.2% vs. 18.7%).

Eleven patients developed respiratory superinfection as a complication during hospitalization, eight of which (72.7%) were among those who presented with endotracheal tube obstruction.

In regard to treatment received, it should be noted that 100% of patients who did not present with obstruction received treatment with azithromycin, in contrast to the first group, in which only 56.2% did.

Lastly, five patients died: Three (60%) in the first group, a greater proportion than in the second group, which did not have obstruction.

Our experience with patients diagnosed with pneumonia due to COVID-19 is that they present with an elevated frequency of necrotizing tracheobronchitis after the first week of mechanical ventilation, causing a sudden obstruction of the endotracheal tube that requires its immediate exchange due to hypoxemia and the inability to ventilate the patients.

In this disease, an increase in the immune response is described, with a generalized migration of proinflammatory cytokines and an increase in fibrin deposits observed in the pulmonary area due to deregulation between the coagulation and fibrinolytic systems.³ This entails a problem that can affect biosecurity when it comes to management by healthcare personnel, as it requires immediate intervention. In other infections, upon histopathological examination of the trachea and bronchial samples, mononuclear cell infiltration has been seen in the mucosa and submucosa with desquamation of the bronchial epithelium accompanied by congestion, hemorrhage, and necrosis in the tracheo-bronchial area.^{4,5}

It is necessary to study the protective association of the use of azithromycin in this problem associated with COVID-19—a drug has also been used in other clinical entities—due to its anti-inflammatory and immunomodulating effect.^{6,7}

[☆] Please cite this article as: Pérez Acosta G, Santana-Cabrera L. Traqueobronquitis necrosante con obstrucción del tubo endotraqueal en pacientes COVID-19. Rev Clin Esp. 2020. <https://doi.org/10.1016/j.rce.2020.05.002>

Table 1 Differences between patients with COVID-19 according to whether they presented with endotracheal tube obstruction due to necrotizing tracheobronchitis.

	Total N=22	Endotracheal obstruction N=16 (72.7%)	No endotracheal obstruction N=6 (27.2%)
Mean age (years)	65.2	63.9	68.7
Males (%)	13 (59.1%)	9 (56.2%)	4 (66.7%)
Duration of mechanical ventilation (days)	20.5	21.6	17.5
Tracheotomy	16 (72.7%)	13 (81.2%)	3 (18.8%)
Mean number of days on which endotracheal tube obstruction occurred		10.5 days	
Mean number of occasions in which endotracheal tube exchange was required		1.5 times	
Development of respiratory superinfections	11(50%)	8 (72.7%)	3 (17.3%)
Use of azithromycin	15 (68.2%)	9 (60%)	6(40%)
Stay in the ICU (days)	22.5	23.8	19
Death	5 (22.72%)	3 (60%)	2(40%)

ICU: intensive care unit.

References

- Chang J, Kim TO, Yoon JY, Kho BG, Shin HJ, Kwon YS, et al. Necrotizing tracheobronchitis causing airway obstruction complicated by pandemic 2009 H1N1 influenza: a case report. *Medicine (Baltimore)*. 2020;99:e18647.
- Okada Y, Okada A, Narumiya H, Iiduka R, Katsura K. Bloody bronchial cast formation due to alveolar hemorrhage associated with H1N1 influenza infection. *Intern Med*. 2017;56:2747–51.
- Whyte CS, Morrow GB, Mitchell JL, Chowdary P, Mutch NJ. Fibrinolytic abnormalities in acute respiratory distress syndrome (ARDS) and versatility of thrombolytic drugs to treat COVID-19. *J Thromb Haemost*. 2020, doi:10.1111/jth.14872.
- Manna SS, Shaw J, Tibby SM, Durward A. Treatment of plastic bronchitis in acute chest syndrome of sickle cell disease with intratracheal rhDNase. *Arch Dis Child*. 2003;88:626–7.
- Takahashi S, Nakamura M. Necrotizing tracheobronchitis caused by influenza and *Staphylococcus aureus* co-infection. *Infection*. 2018;46:737–9.
- Krempaska K, Barnowski S, Gavini J, Hobi N, Ebener S, Simillion C, et al. Azithromycin has enhanced effects on lung fibroblasts from idiopathic pulmonary fibrosis (IPF) patients compared to controls [corrected]. *Respir Res*. 2020;21:25 [Erratum in: *Respir Res*. 2020;21:29].
- Schultz KD, Oermann CM. Treatment of cast bronchitis with low-dose oral azithromycin. *Pediatr Pulmonol*. 2003;35:139–43.

G. Pérez Acosta, L. Santana-Cabrera*

Servicio de Medicina Intensiva, Complejo Hospitalario Universitario Insular-Materno Infantil, Las Palmas de Gran Canaria, Las Palmas, Spain

* Corresponding author.

E-mail address: lsancabx@gobiernodecanarias.org

(L. Santana-Cabrera).