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CE - LETTER TO THE EDITOR

COVID-19: a clinical and organizational crisis

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Dear Editor,

We constantly read with interest the current scientific debate around COVID-19 emergency management. Beside specific new therapeutic options, this emergency has drawn the attention of the medical scientific community in reconsidering our current knowledge regarding the physiopathology of acute respiratory distress syndrome (ARDS), sepsis and the choice of antiviral drugs and antibiotics (in case of superimposed bacterial pneumonia). Noteworthy, clinical presentation of COVID-19 pneumonia and the associated respiratory failure is different from the classic ARDS [1, 2]. Consequently, the debate around the role and the possible effects of non-invasive ventilation, mechanical ventilation, prone position and the use of PEEP is still ongoing [1–3]. Understandably, mechanical ventilation modes and the weaning process represents fundamental aspects of intensive care management of these patients; however, the recent improvements in our understanding of the COVID-19 pathogenesis have move our attention also to several other complications related to this infection (i.e., thrombosis, myocarditis and neuropsychiatric disorders) [4–6].

Nevertheless, this pandemic emergency had forced us to face specific new challenges. Besides general medical management, a major aspect of the crisis was to reconsider the general organization of our hospital and the personnel shift [7]. Our health care system had to deal with the need for new intensive care units in order to cope with the increasing number of patients positive for COVID-19. In addition, the COVID-19 pneumonia is characterized by the need for prolonged ventilatory support and a slow and challenging weaning process. This fundamental and peculiar aspect has to take into account in reconsidering the organization of our hospital. Consequently, after creating new intensive care units to receive the unstable and severe patients, we consider it vital to create new sub-intensive and respiratory intensive care units, where intensivists, pneumologists and respiratory therapists can work as a team during the weaning process. This organization can help to discharge in advance patients from intensive care unit as soon as the weaning process has begun and clinical parameters are stable. This consent to faster availability of intensive care beds. Even more, this organization allows to reserve the highest level of treatment support for the most severe critical care patients and, at the same time, to create a unique and specialized setting where patients can be followed during the delicate weaning process [8]. In this specific setting, tracheostomy may play a central role. As already stated, characteristics of COVID-19 pneumonia management are represented by lengthy mechanical ventilation and difficult weaning; two main indications for tracheostomy. With the increasing demand for mechanical ventilator and intensive care beds, tracheostomy should be considered as soon as the most severe phase of the clinical course of pneumonia has been overcome. In fact, the several and well-known advantages in performing a tracheostomy in the general management of critical patients becomes even more important nowadays. Above all, the reduction in sedation, improved patient comfort and airway safety (reduced risk of tube dislocation and accidental extubation) play a crucial role during the weaning process as well as during nursing care. Furthermore, tracheostomy presents beneficial effects on the respiratory system. In comparison with endotracheal tube, the tracheostomy cannula presents a larger inner diameter and a minor length leading to a decrease in dead space, airway resistance and to a reduction in the work of breathing [9]. Even more, tracheostomy optimizes synchrony with the ventilator; another important aspect during the weaning process. Of

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Table 1 Checklist

Pre-procedure		
Indication/prognosis	Local protocol	
Timing	Local protocol	
Location	Negative pressure room	Isolation room
Technique	Surgical	Percutaneous
Equipment	Protective equipment	HEPA filter
	Closed line suction	Clamp
	Non-fenestrated cuffed cannula (proper size)	Sealed port for bronchoscopy
Team	Dedicated airway team (intensivists consultant, ENT surgeon, ICU nurse)	
Procedure		
Vital parameter	Stable for supine position and apnoea time	
Preoxygenation/peroxygenation	Local protocol	
Hypnosis/paralysis	Proper hypnosis and paralysis to avoid complications (cough)	
Teamwork	Designate role, distribute workload	
Effective communication	Share plan, anticipate and plan	
Clamp orotracheal tube/stop ventilation	Open the circuit (e.g. insert bronchoscopy)	Deflate the cuff/reposition of the tube
	Tracheal incision	Creation of tracheal window
Insert tracheostomy cannula	Inflate the cuff,	Circuit connection
	Restore ventilation	Capnography check
Remove orotracheal tube	With clamp	
Secure the cannula	Local protocol	
Decontamination	Location	Protective equipment
Post-procedure		
Check cuff pressure	With manometer, local protocol	
Equipment	Closed line suction	HEPA filter
	Sealed port for bronchoscopy procedure	Clamp
Deflate cuff/fenestrate cannula	Confirm COVID negative	

course, the operators have to keep in mind that the exposure during the tracheostomy procedure is high. Consequently, the decision and the timing of performing a tracheostomy should be taken with awareness of these risks. Preserve the quality of patient care level has to be outweighed with the fundamental aspect of warrant healthcare safety. In these lights, any precaution to reduce aerosol contamination has to be strictly followed during the procedure [10]. The use of personal Protective Equipment (PPE), HEPA filter, closed line suction, non-fenestrated cuffed cannula and sealed port for bronchoscopy represent critical aspect, however, other consideration has to be pondered. No evidence is now available regarding the different impact of open surgical tracheostomy versus percutaneous dilation tracheostomy in terms of aerosol generation, consequently, local expertise, resources and patients' characteristics should guide the choice between the two techniques [11]. Similarly, the choice of the optimal location to perform tracheostomy has to follow the same criteria. Tracheostomy should be performed in a negative pressure room, preferably in an isolated room of ICU in order to reduce transportation and consequent lower contamination risk. Another critical point is represented by the creation of a dedicated airway team. In fact, important aspects for reducing aerosol generation and increase safety are represented by effective communication and coordinated teamwork between the intensivists, surgeon and nurse; consequently, the institution of an "Airway-team" should be considered in any hospital. During the procedure, particular attention has to be put on several technical aspects:

- Be sure that the patient is stable enough to tolerate apnoeic time and supine position, otherwise, reconsider timing of the procedure;
- Preoxygenation–peroxygenation;
- Ascertain a proper hypnosis and paralysis in order to avoid movement and cough;
- Avoid inappropriate ventilation circuit disconnection;
- Clamp the tube and stop the ventilation any time there is the need of open the circuit/deflate the cuff/reposition of the tube/tracheal incision/creation of tracheal window;
- Decontamination.

During post-procedural phase, consider periodic cuff control of the cannula with a manometer in order to reduce the

incidence of tracheal lesion. Even more, consider deflating the cuff and use fenestrated cannula only when the patient is considered COVID negative. A checklist for the evaluation of all these critical aspects is proposed in Table 1.

In conclusion, this pandemic represents a clinical and organizational crisis. Not to be underestimated, in addition to the high requirement of intensivists working on COVID positive patients, intensivists continue also to manage the general emergency call. Consequently, we strongly believe that any procedure or medical strategy that help clinicians in facilitating the general clinical course of COVID patients have to be followed. In this light, early tracheostomy and the creation of sub-intensive and respiratory intensive care units can play an important role not to be underestimated.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

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