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Letter to the Editor

Enteral feeding and non-invasive ventilation during the COVID-19 crisis: A new snorkeling mask specially-fit to provide both concomitantly



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Dear Editor,

We read with great interest the recent article by Barazzoni et al. pointing out that patients with COVID-19 pneumonia are at high risk for malnutrition, which represents per se a significant risk factor for higher morbidity and mortality [1]. Reeves et al. also reported that patients in acute respiratory failure often had inadequate oral intake, particularly those requiring long periods of time on non-invasive ventilation (NIV) [2]. During the COVID-19 pandemics, as intensive care units (ICUs) were overwhelmed by a surge of critically ill patients in acute respiratory failure, the risk of shortage of special equipment dedicated to oxygen delivery and mechanical ventilation support prompted the search for new solutions [3]. In this setting, Renato Favero created the « Charlotte valve », a 3D printed piece of bioplastic made of polylactic acid and patented by the Italian company “Isinnova S.R.L”. The valve enables the transformation of a cheap snorkeling mask, sold by a large sport brand (EasyBreath, by SUBEA; Decathlon France S.A.S., Ville-neuve d’Ascq – France), into a new total face mask allowing the provision of continuous NIV to a greater number of patients.

The recent ESPEN expert statements and practical guidance for nutritional management of individuals with SARS-CoV-2 infection [1] pointed out that airway complications may occur with longer median NIV duration in patients treated concomitantly with enteral feeding, and thus the recommendation to start enteral feeding could be impaired by the fact that placement of nasal gastric tube (NGT) for nutrition may result in 1) air leakage that may compromise the effectiveness of NIV; 2) stomach dilatation that may affect diaphragmatic function and affect NIV outcome. To overcome these issues, we modified the double-branch Charlotte valve with the help of “ELANPLAST”

engineers. The new 3D printed valve allows the connection of a simple-branch circuit on one side and the passage of NGT on the other side (Fig. 1). Thus, NIV could be carried on for long periods of time concomitantly to continuous enteral feeding, without any additional air leaks. As already mentioned, such air leaks may promote excessive insufflations rising the risk of gastric distention and aspiration of gastric contents, patient-ventilator asynchrony, poor patient’s tolerance, and finally enteral feeding discontinuation or NIV failure [4,5].

Three consecutive days of continuous snorkeling mask-delivered NIV have been achieved in the first two patients without any adverse events. The subjects were two severely malnourished chronic obstructive pulmonary disease patients in acute on chronic hypercapnic respiratory failure. Both survived hospital discharge, tolerated well the new interface, and could be fed appropriately – rates up to 85 ml/h – while on ventilatory support. Of course these encouraging preliminary results must be confirmed by a clinical trial in a larger population.



Fig. 1. The new snorkeling mask specially equipped with a 3D printed valve (the orange plastic device) that enables the connection of the simple-branch circuit of the ventilator on the right side and the air-proof passage of a nasogastric feeding tube on the other side. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

Conflict of interest

All authors have read the manuscript and declare no potential competing interest, no prior publication or concurrent submission and no copyright constraints.

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