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Enabling speech in ICU patients during mechanical ventilation

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Dear Editor,
 Inability to speak during mechanical ventilation (MV) increases psycho-emotional distress during ICU treatment [1]. Although relevant for all ICU patients, this problem becomes more prominent in patients with a prolonged weaning period. One way to enable speech in tracheotomised patients during the weaning period is to alternate MV with time-limited trials of cuff-deflated spontaneous breathing in combination a speaking valve. However, not all patients tolerate such interruptions of MV [2]. Although not commonly used, MV

with deflated cuff in tracheotomised patients may be an alternative approach, and has been provided safely and comfortably in selected groups of non-ICU patients [3]. Its use has been associated with improved swallowing and the possibility to speak [4]. However, in daily clinical ICU practise the use of MV under such conditions is limited by multiple ventilator alarms, as a result of air leakage. Furthermore, optimisation of speech is hampered by loss of airflow during open airway MV. We describe our experiences to improve speech in tracheotomised ICU patients during cuff-deflated MV, in combination with a high flow non-invasive ventilator and a one-way tracheostomy speaking valve.

In 2013, 24 patients in our mixed medical-surgical ICU were tracheotomised, using a percutaneous dilatation technique. Five patients were able to wean and speak with progressive periods of spontaneous breathing trials. Five patients were weaned from MV without the ability to speak, one patient died within 2 days after the tracheotomy, and one patient had persistent insufficient air leakage around the cannula, despite reduction in cannula size. Table 1 summarizes the characteristics of the remaining 12 patients. Within 24 h

after the tracheotomy procedure air leakage was present after deflation of the cuff. Invasive pressure support ventilation was replaced by a BiPAP mode with a non-invasive ventilator (BiPAP Vision[®], Philips, Best, the Netherlands) at equal ventilator settings. A minimum PEEP level of 8 cmH₂O was maintained in order to prevent rebreathing of CO₂. Furthermore, an increasing level of PEEP has been associated with a prolonged duration and improved quality of speech [5]. In case all expiratory flow passed through the oropharyngeal route, a Passy Muir[®] speaking valve (Passy Muir Inc., Irvine, USA) was installed in the circuit to enhance speech (Fig. 1). All 12 patients were able to speak in the first day after switching to the BiPAP setting, enabling effective communication with relatives and medical personnel. Quality and duration of speech improved over time. Effective weaning from MV was achieved in all patients by progressive intervals of CPAP. During CPAP the ability to speak was similar to that in the BiPAP mode. Median time from the beginning of speech to the end of MV was 12 ± 6 days.

We conclude that in a selected group of difficult-to-wean tracheotomised ICU patients the ability to

Table 1 Patient characteristics

	Gender	Age (years)	APACHE II	Reason for admittance	Ability to speak (days of MV)
1	Male	39	27	Abdominal sepsis	6
2	Male	70	29	Abdominal sepsis	17
3	Male	84	NA	MODS after cardiac surgery	17
4	Female	56	38	Abdominal sepsis	17
5	Female	66	46	Pneumosepsis	18
6	Male	77	30	Respiratory failure	10
7	Male	78	23	Pancreatitis	20
8	Female	54	30	Sepsis (necrotising fasciitis)	9
9	Male	63	27	Gastrointestinal bleeding	5
10	Male	71	21	Respiratory failure	3
11	Male	72	14	Abdominal sepsis	6
12	Male	64	22	Respiratory failure	10

APACHE acute physiology and chronic health evaluation, MV mechanical ventilation, MODS multiple organ dysfunction syndrome, NA not applicable



Fig. 1 Ventilator setting; Passy Muir® one-way speaking valve in red circle

speech may effectively be restored by cuff-deflated non-invasive BiPAP ventilation in combination with a one-way speaking valve. We encourage intensive care personnel to develop similar weaning protocols, in an effort to improve well-being of ICU patients.

Conflicts of interest On behalf of all the authors, the corresponding author states that there is no conflict of interest.

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