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OPINION REVIEW

- 43 Inhaling muscle spray: A rising trend of abuse
Pothawala S, Yong CK, Charles R

ORIGINAL ARTICLE**Retrospective Cohort Study**

- 47 Frequency of hepatic steatosis and its association with the pneumonia severity score on chest computed tomography in adult COVID-19 patients
Tahtabasi M, Hosbul T, Karaman E, Akin Y, Kilicaslan N, Gezer M, Sahiner F

LETTER TO THE EDITOR

- 58 Patient-ventilator asynchrony in Saudi Arabia: Where we stand?
Alqahtani JS

Contents

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Patient-ventilator asynchrony in Saudi Arabia: Where we stand?

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Abstract

Patient-ventilator asynchrony in Saudi Arabia practices is common, and more emphasis on how to mitigate such a clinical problem is needed. This letter is intended to shed the light on the current national evidence of patient-ventilator asynchrony and how to step ahead for better patients' ventilation management.

Key Words: Ventilator; Asynchrony; Critical care; Saudi Arabia; Double triggering; Respiratory

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Core Tip: Our Saudi national findings have questioned the effectiveness of the current education and training approaches on mechanical ventilation subject and its related management such as patient-ventilator asynchrony detection. Therefore, “keep calm and carry on strategy” is no longer effective; hence keep research with training and carry on strategy is indeed what we need to improve patient's outcomes.

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TO THE EDITOR

In acute and chronically ill patients, mechanical ventilation is used to improve oxygenation and reduce the load on respiratory muscles, ultimately preventing acute respiratory failure. The optimum interaction between the patient and the ventilator

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can help avoid unnecessary sedation, anxiety, discomfort, ventilator fighting events, diaphragm dysfunction and disuse atrophy, potentially cognitive changes, continued ventilation support and additional pulmonary complications[1,2]. Patient-ventilator asynchrony (PVA) is described as a lack of agreement between what is delivered from the ventilator and what patient's needs, which about 25% of those patients who ventilated for more than 24 h had a high rate of PVAs throughout the ventilation support. Indeed, when the incidence of PVAs is greater than 10%, the time interval of invasive ventilation support and the chance of developing tracheostomy are significantly increased[3].

The most common asynchronies in mechanical ventilation process are infective triggering, followed by double triggering, with slight variations between day and night[3,4]. For successful management, it is important to recognise the nature and triggers of the asynchrony. Several techniques were used to identify PVAs, including measurements of electrical diaphragm movement and oesophageal pressure. Such techniques are invasive, costly and require cumbersome equipment, which reduce their daily clinical practice usage[3,5,6]. A non-invasive and accurate method – namely, waveform analysis – would more certainly be effective for identifying and minimising PVAs[3]. However, it is no wonder that most critical care practitioners fail to manage interactions between patient and ventilator and even do not recognise common forms of PVAs[6].

Our recent work badged 'Saudi' in this area has included an attempt to use ventilator waveform analysis to detect common PVAs[7]. To assess the competence of intensive care clinicians to recognise different PVAs, Alqahtani *et al*[7] used a validated assessment approach. This tool included three videotapes for the most popular PVAs, such as auto-triggering. Remarkably, in critical care settings detection of PVAs were found low, with about 25% of PVAs being unnoticed by critical care practitioners. Only 10% of the respiratory therapists, nurses and physicians correctly detected all types, while only 22% correctly found two of these asynchronies. When we investigated the impact of previous training in mechanical ventilation on detection of PVAs, there were significant findings between trained and untrained clinicians. Those who were trained on ventilator waveforms analysis detected more asynchronies compared to not trained (identified three types 19% *vs* 3%, $P < 0.001$; identified two types, 30% *vs* 16%, $P = 0.001$). In accordance with the literature, the present research also established prior training as an independent factor of the proper recognition of the PVAs[6,8]. Such factor is not only required in the detection of asynchronies but also in the management of all invasive and non-invasive ventilation modalities[4,9,10]. We did not find any correlation between years of experience and PVAs recognition. It seems that people with expertise may be overconfidence to their information and in effect, discourage them from honing their skills in the detection to PVAs. Double-triggering was commonly detected among clinicians, which about 49% of the clinicians correctly identified, indicating how easy to identify it. The positive effects of female gender were also associated, which we found female gender as an independent and significant factor to better identify two or more PVAs (odd ratio 1.93; 1.07-3.49). Altogether, though, all clinicians showed a poor level of PVA detection. Such findings could be attributed to the lack of adequate training in mechanical ventilation. Adequate education and training are vital in reducing failures and in alleviating otherwise non-invasive and invasive mechanical ventilation complications[10,11]. All things considered, establishing a clinical audit at intensive care level would improve patient care and outcomes.

The clinical and research implications of our findings are crucial. They confirm that the primary and only modifiable factor to help in the proper recognition of PVAs is prior training on ventilator graphics, irrespective of expertise. This will help to advise hospital policymakers as to create PVA identification policies and provide systematic PVA management guidance. To improve the capacity to identify PVAs further, each hospital can perform more regular training and guidance on ventilator graphics for all critical care clinicians who handle patients with mechanical ventilation. In future studies, the experience and application of PVAs should be investigated before and after education and training sessions to assess the short and long-standing impact on outcomes. Our result has questioned the effectiveness of the current education and training approaches on mechanical ventilation subject and its related management such as PVAs detection. Therefore, "keep calm and carry on strategy" is no longer effective; hence keep research with training and carry on strategy is indeed what we need to improve patient's outcomes.

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