

Non-invasive measurement of work of breathing and extubation outcome in critically ill patients

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Argomento: Insufficienza respiratoria acuta e ventilazione meccanica

INTRODUCTION

Identifying candidates for successful extubation is important in clinical practice. The decision is made by considering several parameters simultaneously among which the most important are oxygenation, spontaneous tidal volume and respiratory rate, rapid shallow breathing index (RSBI) in addition to clinical observation. Some of these parameters are surrogates for work of breathing (WOB), because WOB is difficult to measure non-invasively at bedside. The proportional assist ventilation plus (PAV+) technique, however, allows continuous calculation of work of breathing during spontaneous breathing.

OBJECTIVES

To non-invasively measure WOB through the PAV+ technique immediately prior extubation and to compare it with the extubation outcome.

METHODS

We recorded physiological parameters and PAV-derived WOB immediately prior extubation in 63 patients considered ready to be extubated by their attending physicians. WOB was measured through a brief PAV+ trial (30 min) with minimal assistance (i.e. 15%). We defined WOB LOW (< 0.3 Joule/liter), NORMAL (0.3-0.7 Joule/liter) and HIGH (> 0.7 Joule/liter).

RESULTS

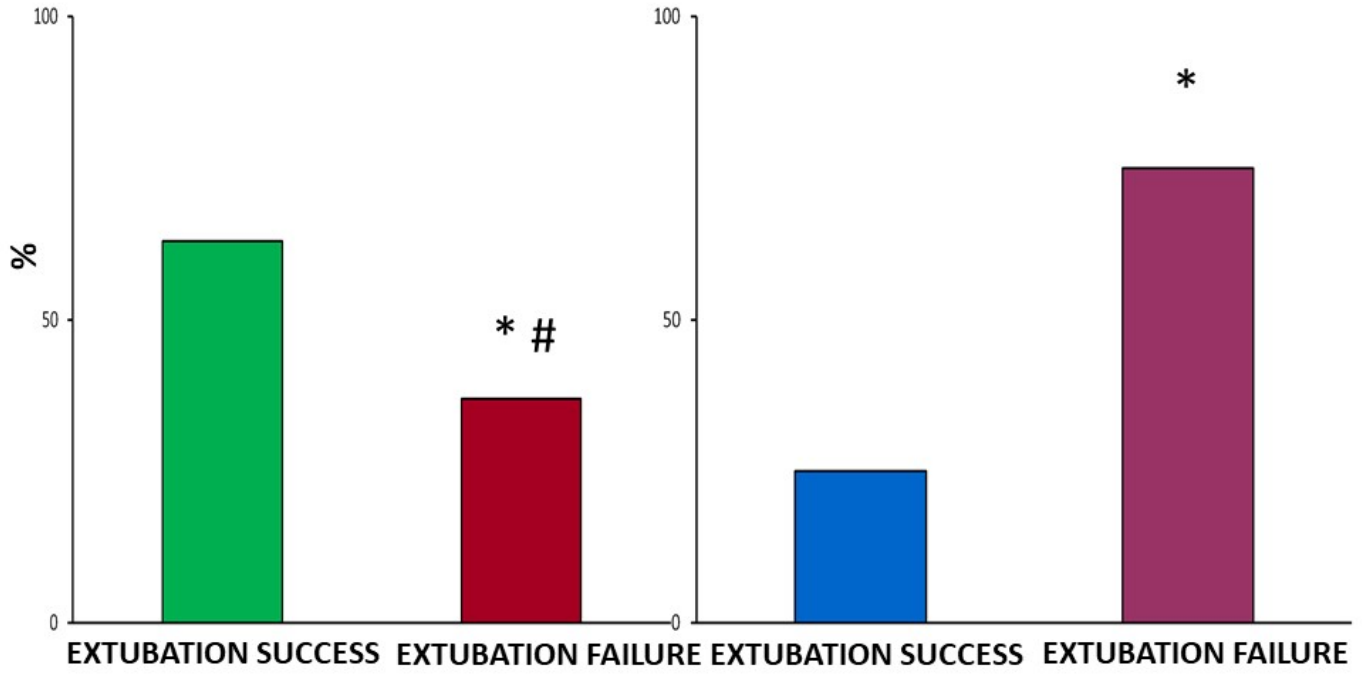
Among the studied patients, WOB was high in 16 (25.4 %), normal in 45 (71.4%), low in 2 (3.2 %). Figure 1 shows the impact of the WOB class on the extubation outcome

CONCLUSIONS

In patients with high WOB before extubation, the rate of extubation success rate was significantly lower (28 %) than in patients with normal WOB (68 %). This suggests that non-invasive WOB measurement (as allowed by the PAV+ technique) could usefully support the decision making process to predict the outcome of extubation.

NORMAL WOB

HIGH WOB



* $p \leq 0.05$ vs extubation success

$p \leq 0.05$ vs extubation failure in High WOB