pressure (Pes) measure in patients undergoing invasive volume-controlled mechanical ventilation (VCV) in the intensive care unit 1 (ICU) and the operating room 2.

OBJECTIVES. Aim of present study was to compare Pes measures after Ebc during VCV, pressure support (PSV), and PSV+Sigh with those obtained with conventional inflating at volume of 4 ml as manufacturer-recommended (V4).

METHODS. In 11 adult patients admitted in ICU, after esophageal balloon catheter was inserted, Ebc was performed to obtain optimal filling volume (Vbest) and to correct for pressure generated by esophageal wall and balloon during VCV, PSV and PSV+Sigh, applied in random order. The expiratory and inspiratory calibrated Pes values (Pescal), those obtained at Vbest (PesVbest) and at V4 (PesV4) were recorded.

RESULTS. PesV4 and PesVbest were higher than Pescal at end-expiration (13.1 ± 3.2 cmH2O vs 8.4 ± 3.1 cmH2O, $P<0.0001$; 11.1 ± 4.6 cmH2O vs 8.4 ± 3.1 cmH2O, $P=0.0427$) and end-inspiration (15.6 ± 3.1 cmH2O vs 11.7 ± 3.3 cmH2O, $P<0.0001$; 14.3 ± 5.1 cmH2O vs 11.7 ± 3.3 cmH2O, $P=0.0427$), respectively, during VCV. During PSV, expiratory and inspiratory PesV4 was greater than Pescal (14.1 ± 4 cmH2O vs 9.6 ± 3.9 cmH2O, $P=0.0020$; 17.2 ± 4 cmH2O vs 13.8 ± 4.4 cmH2O, $P=0.0020$). During Sigh, expiratory and inspiratory Pescal was lower compared to PesVbest (9.3 ± 3.9 cmH2O vs 14.9 ± 5 cmH2O, $P=0.0002$; 16.9 ± 4 cmH2O vs 22.4 ± 5.2 cmH2O, $P=0.0002$) and PesV4 (9.3 ± 3.9 cmH2O vs 13.4 ± 3.7 cmH2O, $P=0.0060$; 16.9 ± 4 cmH2O vs 20.1 ± 3.5 cmH2O, $P=0.0232$), respectively.

Vbest for Sigh was greater compared to that computed at VCV (5 ± 1.6 cmH2O vs 2.4 ± 1.9 cmH2O, $P=0.0086$) and PSV (5 ± 1.6 cmH2O vs 2.5 ± 1.8 cmH2O, $P=0.0168$), respectively. Esophageal wall pressure at Vbest increased moving from VCV and PSV to Sigh (2.6 ± 2.9 cmH2O vs 5.6 ± 2.7 cmH2O, $P= 0.0086$; 2.6 ± 2.6 cmH2O vs vs 5.6 ± 2.7 cmH2O, $P= 0.0168$), whereas no modifications were noted at V4 over the trials. Esophageal wall pressure was higher at V4 in VCV (5 ± 1.2 cmH2O vs 2.6 ± 2.9 cmH2O, $P=0.0371$) and PSV (5.1 ± 1 cmH2O vs 2.6 ± 2.6 cmH2O, $P=0.0195$) compared to Vbest.

CONCLUSION. Ebc improved Pes assessment during VCV, PSV and sigh. Average Vbest at VCV and PSV never achieved V4 and Vbest at Sigh. Balloon filling volume and esophageal wall artifacts were the only factors that negatively affected conventional Pes assessment in our series.

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001185

Initial assessment of the Percutaneous Electrical Phrenic Nerve Stimulation (PEPNS) System in patients on mechanical ventilation

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INTRODUCTION. Ventilator-Induced Diaphragm Dysfunction (VIDD) is considered a major determinant of the ability to successfully wean patients from mechanical ventilation (1). Maintaining diaphragm work using electrical stimulation during mechanical ventilation (MV) has been proposed to attenuate VIDD (2).

OBJECTIVES. This first-in-human study assessed the safety and feasibility of temporary Percutaneous Electrical Phrenic Nerve Stimulation (PEPNS) on user-specified inspiratory breaths while on MV. Primary endpoints included the ability to synchronize electrical stimulation with inspiration to mobilize the diaphragm and to maintain work of breathing (WOB) within defined limits. Secondary endpoints included the percentage of patients with successful pdSTIM multipolar lead placement via ultrasound guidance and serious device/procedure-related adverse events.

METHODS. This prospective, multi-center, single-arm trial enrolled ICU patients on MV. PEPNS was used for 6 two-hour sessions at eight-hour intervals over 48 hours. Electrical stimulation was used to activate the diaphragm in synchrony with inspiration while on MV. Data collected included lead deployment success, nerve integrity, ventilation parameters, blood gasses, vital signs, WOB, electrical stimulation parameters, stimulation-breath synchrony and diaphragm thickness measured by ultrasound at 0, 24 and 48 hours.

RESULTS. Twelve patients were enrolled with 2 initial pilot patients having leads inserted on the left side only. Lead insertion was successful in 21 of 22 attempts (95.5%). An analysis of 36,059 stimulated breaths from the 10 non-pilot patients in whom the pdSTIM leads were placed bilaterally demonstrated phrenic nerve stimulation had a mean inspiratory lag of 23.66 msec ($p<0.001$ vs. null hypothesis of <88msec). WOB was maintained between 0.2 and 2.0 joules/L for 96.77% of the time, exceeding the 80% target. No serious device/procedure-related adverse events were reported. Diaphragm thickness increased for both stimulated and unstimulated diaphragm hemispheres.

CONCLUSION. Our results demonstrate the ability to safely and successfully place PEPNS leads in MV patients and the feasibility of using this approach to synchronize electrical stimulation with inspiration while also maintaining WOB between defined limits.

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001196

Predictors of successful weaning from high-flow nasal oxygen therapy in patients with acute respiratory failure: a retrospective monocenter study

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INTRODUCTION. Several trials have reported promising clinical effects of high flow nasal oxygen therapy (HFOT) as compared to standard oxygen therapy or noninvasive ventilation in various settings. However, factors associated with successful HFOT weaning have never been assessed. As HFOT continuation might lead to unnecessarily prolonged ICU stay, we aimed at identifying predictors of successful HFOT weaning.

METHODS. This is a retrospective monocenter study over a 2-year period including all patients treated with HFOT for acute respiratory failure. Patients who died or were intubated without prior HFOT weaning attempt, those who were treated with noninvasive ventilation at the time of HFOT weaning, and those who received HFOT as a preventive treatment during the post-extubation period were excluded. HFOT weaning was driven by the attending physician. HFOT weaning failure was defined as a respiratory failure requiring HFOT resumption, noninvasive ventilation initiation, intubation, or death within the first 48 hours after HFOT weaning. Demographic data, ventilatory settings, and vital parameters under HFOT were collected before each weaning attempt. The pulse oximetry to fraction of inspired oxygen ratio (SpO2/FiO2) and the ROX index (SpO2/FiO2 to respiratory rate) were calculated under HFOT before each weaning attempt (1).