Category :**Respiratory: mechanical ventilation**

A187 - ***Relationship among the electrical activity of the diaphragm, respiratory muscle ultrasound and indices of neuroventilatory coupling***

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Introduction:

The electrical activity of the diaphragm (Edi), the main inspiratory muscle, reflects the neural control of respiration. There is limited knowledge of the correlation between Edi, the pressure generated during inspiration (ΔPes) and the ultrasonographic extent of its thickening (TFdi). The main aim of the current study was to assess the correlation between Edi, ΔPes and TFdi.

Methods:

Patients >18 years were enrolled if they were undergoing weaning in NAVA and with a catheter for ΔPes measurement.

A stepwise NAVA level reduction was performed (-25%, -50%, -75% from baseline). During each step, an arterial sample was taken for gas analysis, neuroventilatory coupling parameters were recorded and respiratory muscle ultrasound was performed.

Comparison of data was performed with one- or two-way ANOVA and linear mixed models were built to assess the relationship between variables. Two-tailed, $p<0.05$ was considered statistically significant

Results:

We enrolled 16 patients (10 males, age 64±17 years, BMI 24±5 kg/m^2), after an average of 8±3 days from ICU admission. At enrolment, the PaO_2/FIO_2 ratio was 300±91 mmHg, patients were ventilated with PEEP 7.7±2.2 cmH_2O and FIO_2 0.35±0.1. Baseline NAVA level was 1.1±0.7 cmH2O/uV, and Edi was 12.3±8.5 uV.

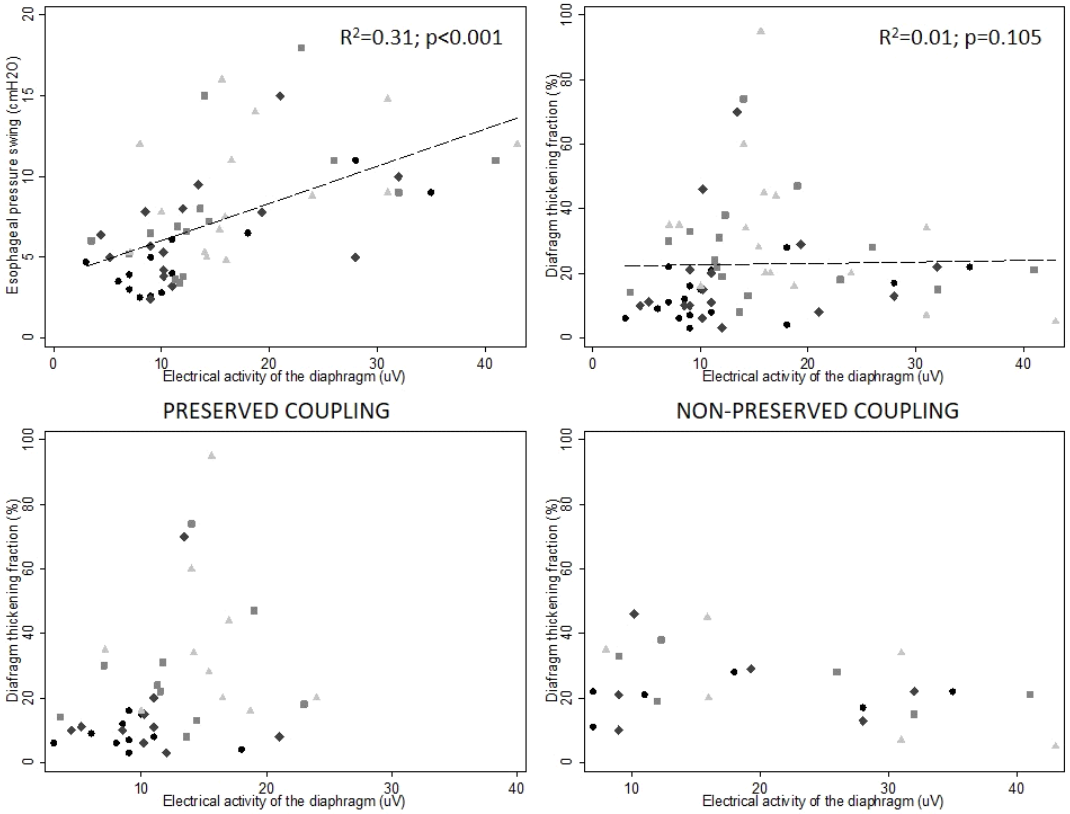
We found a significant correlation between Edi and ΔPes ($R^2=0.32$, $p<0.001$), while no significant correlation was found between Edi and TFdi ($R^2=0.01$, $p=0.105$). After analysis of individual patient data, we found two different behaviours of the Edi-TFdi relationship: a group in which the two variables were linearly correlated (preserved coupling), and one in which such coupling was not preserved (Figure 1).

A higher rapid shallow breathing index, a higher Edi, a lower respiratory system compliance, and a lower neuroventilatory and neuromechanical efficiency were found in patients with non-preserved coupling.

Conclusion:

Edi is not always associated with TFdi; several physiological parameters were associated with the presence of a preserved or non-preserved coupling

Image :



Correlation between the Edi and the esophageal pressure swing (upper left), the diaphragm thickening fraction (upper right) and relationship in patients with preserved (lower left) and non-preserved (lower right) coupling