Diaphragmatic Ultrasound in Acute Hypoxic-Hypercapnic Respiratory Failure: a pilot feasibility study

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Argomento: Insufficienza respiratoria acuta e ventilazione meccanica

INTRODUCTION: Non Invasive Mechanical Ventilation (NIV) is a well-established therapy in Hypoxic–Hypercapnic Acute Respiratory Failure (HHARF). [1] Diaphragmatic Ultrasound (DU) could be an useful tool in monitoring patients (pts) at risk of NIV failure.

OBJECTIVES: The first aim was to evaluate diaphragm ultrasound (DU) feasibility in HHARF requiring NIV over two 2 hours period from admission. The secondary aim was any relationship between diaphragmatic function (diaphragmatic excursion –DE-, thickness and thickening), arterial blood gases (ABGs) and NIV duration (Nd).

METHODS: Forty-two consecutive HHARF pts requiring NIV were screened in the Emergency Department (ED). Twenty pts were enrolled. DU and ABGs were performed on admission before starting NIV (T0), after one (T1) and two hours (T2) of NIV. Pts were divided in two groups: a) responders (NIVr) with normal pH values and b) non-responders (NIVnr) with persistent respiratory acidosis.

RESULTS: In 1 of the patient, the study was interrupted because of a poor DU window. DE was 1,91 (1,16-2,79) cm for NIVr and 0,83 (0,52-1,74) cm for NIVnr at T0 ($p < 0,015$). At T1 DE was 2,14 (1,72-2,93) cm for NIVr vs 1,01 (0,63-1,34) cm for NIVnr respectively ($p < 0,0005$). Finally, at T2 DE remained higher in NIVr group if compared to the NIVnr group, 1,99 (1,57-2,69) cm vs 1,22 (0,74-1,57) cm ($p < 0,005$). Nd was 4 (2,25-6,25) days in NIVnr group and 1,5 (1-2) days in NIVr group ($p < 0,01$).

CONCLUSION: In our experience, DU was a feasible tool in HHARF pts requiring NIV in the ED. In particular DE, seems to play a leading role in monitoring our pts population.

REFERENCES

1. Rochwerg B, Brochard L, Elliott MW, et al (2017) Official ERS/ATS clinical practice guidelines: Noninvasive ventilation for acute respiratory failure. Eur Respir J. doi: 10.1183/13993003.02426-2016