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Title: Predictors of failure of noninvasive ventilation (NIV) in acute respiratory failure due to chronic obstructive pulmonary disease

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Body: NIV in acute respiratory failure due to COPD is indiscutible but clinical and arterial blood gas parameters to initiate and maintain NIV are controversial. Aims: Evaluate efficacy and identify predictors of NIV failure, defined as need of intubation or death during hospitalization, in acute exacerbation of COPD. Methods: Observational study. Analyzed clinical and functional data of 41 patients (55 episodes of NIV) with Philips Respironics V60®. Results: 85% male, mean age 72,2Y ($\pm 11,4$), BMI 28,8 ($\pm 4,8$) Kg/m², FEV1 40,9 ($\pm 14,8$) %pred. Previous long term oxygen therapy in 70,9% and domiciliary NIV in 43,6%. NIV success in 85,5% (group 1) and failure in 14,5% (group 2). Pneumonia in 40,4% of success and 37,5% of failure group. Co-morbid conditions in 75% in both groups. Patients were significantly older in failure group ($84,6 \pm 4,4$ vs $70,1 \pm 10,8$ yrs, $p < 0,05$). There was no significantly difference in BMI and stable functional parameters between groups. Mean pretreatment pH 7,32 (minimum 7,07) in success and 7,31 in failure group ($p > 0,05$). There was no significantly difference between groups in pH, PaO₂/FiO₂ ratio, PaCO₂ and vital signs at baseline or two hours after starting NIV. Average time to correction of acidemia of $15,1 \pm 12,2$ hrs. Mean duration of NIV $5,9 \pm 4,5$ days. Average hospital stay $10,8 \pm 7,6$ days; 31% started domiciliary NIV. None of the patients underwent invasive mechanical ventilation. Overall mortality was 14,5% (8 patients). Conclusions: In our group, age is the only factor associated with NIV failure, with mean age of death of 84,6 yrs. NIV has been successfully applied in acute exacerbations of COPD with critical values of pH and hypercapnia.