

Comparison of the Arterial PaCO₂ Values and ETCO₂ Values Measured with Sidestream Capnography in Patients with a Prediagnosis of COPD Exacerbation

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Background Aim of this study is to investigate whether end-tidal carbon dioxide (ETCO₂) values can be used instead of partial pressure of carbon dioxide (PaCO₂) values in guiding treatment, and determining treatment benefits in patients that received a pre-diagnosis of chronic obstructive pulmonary disease (COPD) exacerbation at the emergency department.

Methods This observational prospective study was conducted with patients who presented to the emergency department with the complaint of shortness of breath and were diagnosed with COPD exacerbation. ETCO₂ was measured with the sidestream method during blood gas analysis in patients with indications for this analysis. Measurements were repeated at hour 1 after treatment.

Results The study included a total of 121 cases. There was a positive correlation between the PaCO₂ and ETCO₂ values measured before and after treatment ($r = 0.736$, $p < 0.01$ and $r = 0.883$, $p < 0.01$, respectively). High ETCO₂ values were accompanied by high PaCO₂ values. When the measurements before and after treatment were evaluated using the Bland–Altman method, most of the result were within the limits of agreement (-4.9 and $+31.4/- 2.6$ and $+9.4$), with mean differences being calculated as 13.2 and 8.4, respectively.

Conclusions Although ETCO₂ and PaCO₂ were statistically consistent according to the results of our study, due to the high averages of differences between these two parameters, the ETCO₂ value has limited clinical use in COPD cases compared to PaCO₂. However, high ETCO₂ values may indicate that noninvasive mechanical ventilation should be included in the treatment of COPD cases without waiting for the results of blood gas analysis, and they can also be when needed for inpatient treatment.