

## Noninvasive monitoring of PaCO<sub>2</sub> during one-lung ventilation and minimal access surgery in adults: End-tidal versus transcutaneous techniques

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**Background:** Previous studies have suggested that end-tidal CO<sub>2</sub> (ET-CO<sub>2</sub>) may be inaccurate during one-lung ventilation (OLV). This study was performed to compare the accuracy of the noninvasive monitoring of PCO<sub>2</sub> using transcutaneous CO<sub>2</sub> (TC-CO<sub>2</sub>) with ET-CO<sub>2</sub> in patients undergoing video-assisted thoracoscopic surgery (VATS) during OLV. **Materials and Methods:** In adult patients undergoing thoracoscopic surgical procedures, PCO<sub>2</sub> was simultaneously measured with TC-CO<sub>2</sub> and ET-CO<sub>2</sub> devices and compared with PaCO<sub>2</sub>. **Results:** The cohort for the study included 15 patients ranging in age from 19 to 71 years and in weight from 76 to 126 kg. During TLV, the difference between the TC-CO<sub>2</sub> and the PaCO<sub>2</sub> was  $3.0 \pm 1.8$  mmHg and the difference between the ET-CO<sub>2</sub> and PaCO<sub>2</sub> was  $6.2 \pm 4.7$  mmHg ( $P = 0.02$ ). Linear regression analysis of TC-CO<sub>2</sub> vs. PaCO<sub>2</sub> resulted in an  $r^2 = 0.6280$  and a slope =  $0.7650 \pm 0.1428$ , while linear regression analysis of ET-CO<sub>2</sub> vs. PaCO<sub>2</sub> resulted in an  $r^2 = 0.05528$  and a slope =  $0.1986 \pm 0.1883$ . During OLV, the difference between the TC-CO<sub>2</sub> and PaCO<sub>2</sub> was  $3.5 \pm 1.7$  mmHg and the ET-CO<sub>2</sub> to PaCO<sub>2</sub> difference was  $9.6 \pm 3.6$  mmHg ( $P = 0.03$  vs. ET-CO<sub>2</sub> to PaCO<sub>2</sub> difference during TLV; and  $P < 0.0001$  vs. TC-CO<sub>2</sub> to PaCO<sub>2</sub> difference during OLV). In 13 of the 15 patients, the TC-CO<sub>2</sub> value was closer to the actual PaCO<sub>2</sub> than the ET-CO<sub>2</sub> value ( $P = 0.0001$ ). Linear regression analysis of TC-CO<sub>2</sub> vs. PaCO<sub>2</sub> resulted in an  $r^2 = 0.7827$  and a slope =  $0.8142 \pm 0.07965$ , while linear regression analysis of ET-CO<sub>2</sub> vs. PaCO<sub>2</sub> resulted in an  $r^2 = 0.2989$  and a slope =  $0.3026 \pm 0.08605$ . **Conclusions:** During OLV, TC-CO<sub>2</sub> monitoring provides a better estimate of PaCO<sub>2</sub> than ET-CO<sub>2</sub> in patients undergoing VATS.