

# Respiratory monitoring

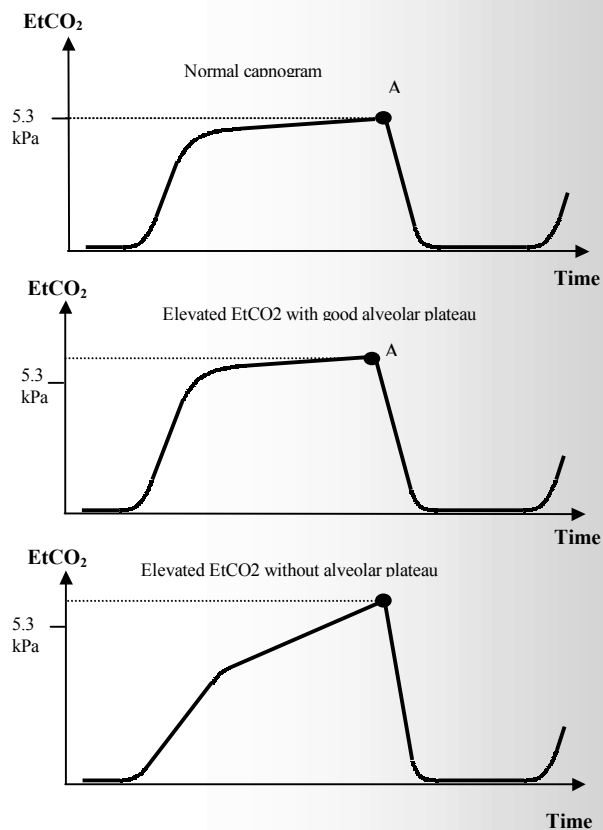
## Vital signs from capnography and pulseoximetry

What are the vital parameters in respiratory monitoring? Measuring oxygen saturation is a standard procedure for many respiratory disorders. A good saturation is an important parameter but does not say everything about the respiration. If oxygen is administered, the patient can have a normal saturation but the alveolar ventilation is not enough to exhale the CO<sub>2</sub> produced by the body. High concentration of CO<sub>2</sub> during exhalation is a strong indication of insufficient respiration. The EtCO<sub>2</sub> value together with the SpO<sub>2</sub> gives a good picture of the quality of respiration: the uptake of oxygen, but also the ability to breath out the CO<sub>2</sub>.

While simple spot checks for the presence of CO<sub>2</sub> in exhaled air are available using colorimetric CO<sub>2</sub> indicators and capnometers, these devices provide only intermittent and limited information about the origins and time course of the underlying pathophysiological processes<sup>1</sup>. Capnography, in contrast, continuously tracks trends in EtCO<sub>2</sub> to reliably identify the onset and progression of such abnormalities. The capnogram gives a picture of how the respiratory disorder and can look like the the on the right.

The difference between EtCO<sub>2</sub> (alveolar) and PaCO<sub>2</sub> (arterial) is normally 0,2 to 0,6 kPa. However, conditions that alter the ventilation-perfusion ratio also affects this difference between EtCO<sub>2</sub> and PaCO<sub>2</sub>. Clinicians can use this to make treatment decisions and then track resulting changes to assess the effectiveness of their interventions.

While EtCO<sub>2</sub> levels in very ill patients should be interpreted with caution, trends in EtCO<sub>2</sub> correlate with changes in PaCO<sub>2</sub> for most patients and can provide an online early warning system. In many cases, capnography can significantly diminish costs and risks of patient monitoring by limiting the routine use of invasive and expensive arterial blood gas assays by non-invasively identifying significant changes in PaCO<sub>2</sub> that then can be confirmed and quantified by arterial blood gas analysis<sup>1</sup>.



## References

<sup>1</sup> Christensen MA, Bloom J, Sutton KR. Comparing arterial and end-tidal carbon dioxide values in hyperventilated neurosurgical patients. American Journal of Critical Care. 1995;4(2):116-121.