

Clinical Bulletin

IMPORTANT INFORMATION – PLEASE READ AND KEEP



MIRUS and COPD / Covid-19

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MIRUS, volatile anaesthetics and COPD

In the growing Sars-Covid-19 pandemic, we expect an increase in virally induced pneumonia, which leads to respiratory insufficiency, which in turn requires mechanical respiratory support. In these patients, adequate sedation parallel to ventilation is absolutely necessary. **Inhalative sedation** is particularly suitable for this purpose, as it has **excellent controllability** compared to intravenous sedation with propofol, midazolam, etc., a **low metabolic rate** and is therefore **largely independent of restrictions in liver and kidney function**. For a list of publications see below.

Especially **COPD patients** benefit from the bronchodilatory effect of volatile anaesthetics. The reduction of airway resistance often allows for less aggressive ventilation strategies, resulting in a lower incidence of VALI (ventilation-induced lung injury). For a list of publications see below.

Due to their physicochemical properties, the currently used volatile anaesthetics (halogenated ether derivatives) have bactericidal and probably also virucidal properties. Even if it is currently unclear due to a lack of studies whether this results in a direct advantage in infected patients, at least the application of volatile anaesthetics is not contraindicated in the case of pneumonia induced by viruses or bacteria. Whether longer-term ventilation with volatile anaesthetics may even result in clinically measurable benefits will have to be shown in future investigations under laboratory and clinical conditions.

In any case, it can currently be stated that there is no medical contraindication for the use of volatile anaesthetics in Covid-19 patients requiring ventilation. On the contrary, due to its positive effects on the bronchial system, **inhalation sedation is the method of choice**, especially for patients who are difficult to ventilate.

Note: Due to the increase of the effective dead space and the CO₂-retaining properties of the carbon material, the paCO₂ must be monitored. The end-tidal CO₂ value (**etCO₂ MIRUS**) measured in real time by MIRUS correlates closely with the arterial value and is helpful in adequately setting the ventilation parameters.

In case of very low tidal volumes in severe ARDS, inhalation sedation may not be used due to the CO₂ problem.

Study situation

Isoflurane enables an excellent sedation quality (Eifinger et al., 2013) in all sedation levels with excellent controllability (Kompardt et al. 2008, Soukup et al., 2009). The metabolism rate of isoflurane is low. It is predestined for long-term applications. Active metabolites are not formed, there is no enzyme induction and no withdrawal delirium occurs (Mesnilet et al., 2011). Besides short wake-up times (Jung et al., 2008; Sackey et al., 2004) and lack of respiratory depression (Meiser and Laubenthal 2005), further advantages of isoflurane through cardioprotective (Kehl et al., 2004; Schlack et al., 2006) and neuroprotective effects are described (Head and Patel, 2007; Newberg et al., 1983).

The bronchodilatory effect of isoflurane has been known for decades and has been used to treat refractory conditions of bronchial asthma and asthmaticus (Bierman et al., 1986;

Johnston et al., 1990; Thomson et al., 2002). Isoflurane has a bronchodilatory effect when bronchomotor tone is increased. The pulmonary vessels are dilated and pulmonary vascular resistance decreases. Hypoxic pulmonary vasoconstriction is attenuated by about 20% by 1.5 vol% isoflurane (Larsen, 2018).

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