Remifentanil in difficult extubation and asthma in ICU

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Abstract

Introduction: Remifentanil is an ultra short-acting synthetic opioid with rapid onset time and short duration of action [1]. It is a useful analgesic agent during induction and maintenance of anaesthesia and often used for sedation and analgesia in an intensive care setting [1]. We used remifentanil to achieve extubation in a patient with a history of multiple failed extubations due to acute desaturation secondary to bronchospasm, laryngospasm, haemodynamic instability and anxiety.

Case Report: The patient had a history of “difficult” asthma associated with vocal cord dysfunction and suffered from anxiety. The aim was that remifentanil would facilitate extubation by suppressing the cough reflex triggered by the endotracheal tube and by alleviating the patient’s anxiety hence reducing bronchospasm and laryngospasm.

Conclusion: We would like to share our positive experience in using remifentanil as an adjunct in difficult extubation in ICU and to encourage further discussion in regards to its use in ICU.

Keywords: Remifentanil, difficult extubation, intensive care, asthma.
intubation in less than 10 minutes. Over the course of the next few days there were multiple further attempts at extubation. However, on weaning of the sedation the patient became unstable with a loud biphasic wheeze and subsequent profound desaturation. Despite maximal medical therapy for asthma the patient remained intubated.

To facilitate extubation, the sedation regimen was changed from fentanyl and propofol infusions to remifentanil and midazolam infusions. Remifentanil was infused at 0.04-0.1 mcg.kg⁻¹.min⁻¹ was given and midazolam 0.5- 2 mg.hr⁻¹. Using this combination it was possible to have the patient awake and calm with a RASS (Richmond agitation sedation scale) of 0. The patient was cooperative and keen to try further extubation attempt.

The patient was successfully extubated onto high flow oxygen via nasal cannulae (Optiflow, Fisher Paykaletc). Remifentanil and midazolam infusions were subsequently weaned off over the next 24 hours and the patient was shifted to the ward 48 hours thereafter.

Discussion
This case report demonstrates the successful use of remifentanil and midazolam in the extubation of a patient with a history of failed extubations owing to difficult asthma. The cause of failed extubations clinically in this patient was a combination of laryngospasm, bronchospasm and anxiety leading to increased work of breathing and hypoxaemia. We hypothesized that remifentanil assisted extubation would potentially succeed because of its properties: short-acting synthetic opioid with rapid onset time and short duration of action.

In fact, the Difficult Airway Society (DAS) guidelines for the management of tracheal extubation [3] proposed a ‘remifentanil extubation technique’ for ‘at risk’ extubations. This recommendation was intended for a certain group of patients (neurosurgical, maxillofacial, plastics and those with significant cardiac or cerebrovascular disease) in whom the presence of a tracheal tube may trigger undesirable responses such as coughing, agitation and haemodynamic instability during emergence from anaesthesia. The authors suggested that the infusion of the ultra short-acting opioid remifentanil attenuates these undesirable responses and may be used to provide the beneficial combination of a tube-tolerant patient who is fully awake and obeys commands.

Target-controlled remifentanil infusion (Remi-TCI) has been used successfully in spontaneously breathing patients undergoing flexible fibreoptic bronchoscopy (FFB) in an ICU setting [4]. The incidence of laryngospasm associated with midazolam-remifentanil anaesthesia was lower than that with halothane and fentanyl in paediatric patients undergoing eye surgery in a prospective clinical trial study [5]. Similarly, high dose remifentanil was effective in preventing coughing and laryngospasm in non-paralyzed patients for advanced bronchoscopic procedures [2].

Conclusion
In conclusion, we recommend the consideration of remifentanil-assisted extubation in patients with a history of difficult and failed extubations in the ICU setting.

References