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## Letter to the Editor

# Tailored Routine Sugammadex Reversal is More Cost-Effective Than Neostigmine: A Narrative Review

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### To the Editor

Neuromuscular blockade (NMB) is administered in most major surgeries as it facilitates endotracheal intubation and optimises surgical conditions. Sugammadex or neostigmine are commonly used for NMB reversal. Factors influencing the choice of reversal agent include depth of NMB, speed of action, risk of adverse effects and relative costs [1]. Sugammadex has been shown to confer a faster and more complete reversal of NMB in comparison to neostigmine potentially reducing the risk of incomplete NMB reversal, thereby decreasing postoperative pulmonary complications (PPCs). We would like to discuss three recent publications investigating the use of sugammadex and the incidence of PPCs.

Wang *et al.* presented a meta-analysis of randomized controlled trials (RCTs) reviewing the incidence of PPCs with a train of four guided sugammadex reversal of rocuronium paralysis in comparison to neostigmine [1]. Ledowski *et al.* performed a prospective, double-blind RCT on the incidence of PPCs following a train of four guided reversal of rocuronium induced neuromuscular block in high-risk patients with sugammadex compared to neostigmine [2]. Jian *et al.* performed an impact analysis of the clinical and budgetary impact of introducing

sugammadex for the routine reversal of moderate or deep neuromuscular blockade induced by both rocuronium and vecuronium on a hypothetical cohort [3].

The first 2 studies compare the incidence of PPCs associated with neostigmine or sugammadex reversal of NMB. In a mixed risk cohort, sugammadex use was associated with a reduced risk of postoperative respiratory failure (14 studies; OR: 0.60, 95% CI: 0.38–0.97,  $p = 0.04$ ) but equal risk of respiratory infection, atelectasis or pneumothorax in comparison to neostigmine. The number needed to treat (NNT) to prevent one case of PPC was relatively high (NNT 29.9) in this cohort [1]. The second study, conducted in Australia, investigated the use of sugammadex versus neostigmine in high-risk patients. Sugammadex use was associated with a significant reduction in radiologically confirmed pneumonia (2.4%) in comparison to neostigmine (9.6%,  $P=0.046$ ) [2]. The third study assessed the overall theoretical health care cost of routine sugammadex reversal in comparison to neostigmine for all patients, including those at low risk of PPCs. They incorporated both drug costs and the cost of managing PPCs. Using a conservative incidence of PPCs (4.8%) and odds ratio of PPCs following sugammadex use of 0.71, this analysis demonstrated that routine sugammadex could produce a saving of 10.9% total health care cost per case [3]. This saving does not take

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into consideration operating theatre usage time and recovery unit length of stay and so the actual savings and efficiency is likely understated.

These three publications support the argument that sugammadex reversal reduces the incidence of PPCs, particularly in a high-risk cohort, and is overall more cost-effective than conventional reversal when balanced against the potential costs of managing PPCs across the whole patient journey.

#### **Conflicts of Interest**

None.

#### **Funding**

None.

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