Cost-Effective Use of Sugammadex

Neostigmine and sugammadex (*Bridion*) are the currently available neuromuscular blockade reversal agents. Both have a place in therapy, but sugammadex is much more expensive than neostigmine. Use this checklist to improve the cost-effective use of sugammadex.

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| Use sugammadex in appropriate patients. | Generally, use neostigmine plus glycopyrrolate (reduces adverse effects of neostigmine [e.g., bradycardia, secretions]) to reverse neuromuscular blockade.\(^1\)  
  o Exception: neostigmine does NOT effectively reverse deep blockade.\(^9,13\)  
  o Neostigmine has a long history of safe use and is less expensive (i.e., ~$110 or $200 depending on the dose [sugammadex] versus ~$25 [neostigmine plus glycopyrrolate]).\(^11,a\)  
  o Sugammadex only reverses rocuronium or vecuronium.\(^6\)  
  o Routine use of sugammadex does NOT seem to lead to faster discharge from the PACU.\(^4\)  
  o Data are mixed on risk of pulmonary complications. One study suggests that patients receiving sugammadex may have fewer major pulmonary complications (e.g., pneumonia, respiratory failure) compared to those receiving neostigmine for noncardiac surgery [Evidence Level B-3].\(^16\) More data are needed to confirm this.\(^16\)  
  o Save sugammadex to reverse rocuronium- or vecuronium-induced blockade in certain situations, such as:  
    o to reverse moderate blockade in patients at high risk for pulmonary complications from incomplete reversal (e.g., unplanned postoperative mechanical ventilation in patients with COPD or OSA).\(^10,12\)  
    o when it is necessary to reverse deep blockade such as with neurosurgery or thoracic surgery.\(^12\) In these situations, there is inadequate time to allow blockade to lessen to a moderate level when neostigmine could then be used for reversal.  
  o Generally, avoid sugammadex use in patients with a GFR <30 mL/min/1.73 m\(^2\), as it is eliminated by the kidneys and safety data are lacking.\(^5,6\)  
  o If possible, avoid sugammadex use in females of childbearing age who take oral contraceptives. Sugammadex can lower progesterone levels and may reduce oral contraceptive effectiveness.\(^1,5,6\)  
    o If sugammadex is used in a patient who took an oral contraceptive that day, counsel the patient to use an alternate, nonhormonal method of contraception for seven days after receiving sugammadex.\(^1,5,6\) |
| Use objective monitoring techniques to determine depth of neuromuscular blockade. | Generally, ensure your facility has protocols to monitor depth of neuromuscular blockade to help guide/monitor sugammadex dosing.  
  o Experts recommend objective train-of-four ratio (TOFR) monitoring whenever nondepolarizing neuromuscular blockers are used with a goal of ≥0.9 (90%) defining complete reversal.\(^5,9,13\)  
    o Subjective assessments (e.g., visual or tactile assessments) are prone to error and results can vary among practitioners conducting them.\(^15\) |
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| Use **appropriate doses** of sugammadex.                             | □ To reverse MODERATE neuromuscular blockade: sugammadex 2 mg/kg  
  o AVOID using half-dose sugammadex (e.g., 1 mg/kg) plus neostigmine as this may lead to unwanted adverse effects (e.g., weakness).  
  □ To reverse DEEP neuromuscular blockade: sugammadex 4 mg/kg  
  □ Rarely you may see sugammadex 16 mg/kg used for emergent reversal (within ~3 minutes) if rocuronium was used, for rapid sequence intubation or in the operating room, and intubation fails. |
| Use an **appropriate dosing weight** for sugammadex                  | □ For most patients, use total body weight to dose sugammadex.  
  □ In patients with a BMI ≥40 kg/m², consider using adjusted body weight to dose sugammadex.  
    o Use of adjusted body weight to dose sugammadex 4 mg/kg was non-inferior to use of total body weight to reverse deep neuromuscular blockade with rocuronium in morbidly obese patients [Evidence Level B-1].  
    o Avoid using ideal body weight to dose sugammadex in patients who are obese. Dosing based on ideal body weight leads to slower neuromuscular blockade reversal and increases the risk for recurarization (an increase in neuromuscular blockade after a period of recovery). |
| Use the most **cost-effective vial size**.                          | □ Sugammadex prices are ~$110 (200 mg/2 mL) and ~$200 (500 mg/5 mL).  
  □ Follow hospital protocols for rounding down doses to limit waste (sugammadex is available in single-dose vials). For example, the facility P&T committee may approve rounding down ≤10% in certain situations. For example, for a 110 kg patient receiving sugammadex 2 mg/kg (220 mg), using 10% less or one 200 mg vial instead is often considered an acceptable difference in dose.  
  □ Reserve use of sugammadex 500 mg/5 mL vials for doses >200 mg. |
| Securely store sugammadex.                                           | □ Follow your facility policy for storing sugammadex. Consider the following strategies to minimize inappropriate use and allow for data collection to monitor use:  
  o Store sugammadex in locked, lidded pockets within ADCs.  
  o Use pop-ups within the ADC to remind staff of appropriate indications for use.  
  o Require documentation (e.g., indication, requesting prescriber) to remove sugammadex from the ADC.  
  o Consider using a blind count to identify discrepancies in a timely manner. |
| Monitor use of sugammadex.                                           | □ Consider the use of inappropriate use could include:  
  o Reversal of rocuronium after successful rapid sequence intubation: It is NOT necessary to reverse rocuronium after successful intubation. Instead, follow post-intubation sedation protocols to ensure patients receive adequate sedation and analgesia until rocuronium wears off. |

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### Abbreviations

ADC = automated dispensing cabinet; BMI = body mass index; COPD = chronic obstructive pulmonary disease; GFR = glomerular filtration rate; OSA = obstructive sleep apnea; P & T = Pharmacy and Therapeutics; PACU = postanesthesia care unit.

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Levels of Evidence
In accordance with our goal of providing Evidence-Based information, we are citing the LEVEL OF EVIDENCE for the clinical recommendations we publish.

<table>
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<tr>
<th>Level</th>
<th>Definition</th>
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| A     | Good-quality patient-oriented evidence.* | 1. High-quality randomized controlled trial (RCT)  
2. Systematic review (SR)/Meta-analysis of RCTs with consistent findings  
3. All-or-none study |
| B     | Inconsistent or limited-quality patient-oriented evidence.* | 1. Lower-quality RCT  
2. SR/Meta-analysis with low-quality clinical trials or of studies with inconsistent findings  
3. Cohort study  
4. Case control study |
| C     | Consensus; usual practice; expert opinion; disease-oriented evidence (e.g., physiologic or surrogate endpoints); case series for studies of diagnosis, treatment, prevention, or screening. | |

*Outcomes that matter to patients (e.g., morbidity, mortality, symptom improvement, quality of life).


References


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