Measure Abbreviation: NMB 02

Data Collection Method: This measure is calculated based on data extracted from the electronic medical record combined with administrative data sources such as professional fee and discharge diagnoses data. This measure is explicitly not based on provider self-attestation.

Description: Administration of neostigmine, Sugammadex, and/or edrophonium before extubation for cases with nondepolarizing neuromuscular blockade

Measure Time Period: Anesthesia Start to Earliest Extubation

Measure Type: Process

Measure Summary: The neuromuscular blocker reversal measure tells you the percentage of your patients that receive a reversal agent after you have given a non-depolarizing neuromuscular blocker. The purpose of this quality measure is to help reduce the number of patients who have residual neuromuscular blockade after extubation. To account for cases where a dose of muscle relaxant was given early in the case, and then not re-dosed, this measure does not require that neostigmine to be given if a non-depolarizer was not administered for 3 hours before extubation for adults and 2 hours for pediatric patients.

Rationale: Postoperative residual neuromuscular blockade can lead to significant complications. Several studies have found associations between the use of neuromuscular blockade agents (NMBA) and residual neuromuscular blockade in the recovery room. Adverse postoperative respiratory outcomes are even more frequent when patients receive NMBA and reversal agents are not used. A mainstay of residual blockade prevention continues to be monitoring to allow for detection, and use of reversal agents like neostigmine and sugammadex. Due to variability in duration of muscle relaxants, even in defasciculating doses, we recommend that TOF is monitored when any non-depolarizing neuromuscular blockers are administered.

Inclusions:

All patients that have received either by bolus or infusion a non-depolarizing neuromuscular blocker (NMB) AND were extubated post-operatively. The following NMBs were included:

- Atracurium
- Cisatracurium
- Pancuronium
- Rocuronium
- Vecuronium

Exclusions:

- ASA 5 and 6 cases.
NMB 02 Measure Specification (Page 2 of 4)

- Patients that were not extubated in the immediate post-operative period.
- Patients not given NMBs.
- Cardiac surgery without pump (CPT: 00560)
- Cardiac surgery with pump and <1 year old (CPT: 00561)
- Cardiac surgery with pump and > 1 year old (CPT: 00562)
- Cardiac surgery with hypothermic arrest (CPT: 00563)
- CABG with pump (CPT: 00567)
- Heart Transplant (CPT: 00580)
- Cases where patients (age > 12) received defasciculating doses of
  - Vecuronium ≤ 1mg
  - Cisatracurium ≤ 2mg
  - Rocuronium ≤ 10 mg
- Any cardiac case with an intraoperative note mapped to one of the following MPOG Concepts:
  - 50399 Cardiopulmonary bypass -- aortic clamp on/off note
  - 50409 Cardiopulmonary bypass terminated
  - 50410 Cardiopulmonary bypass initiated (full)
  - 50416 Cardiopulmonary bypass -- crossclamp and circulatory arrest time totals
  - 50417 Cardiopulmonary bypass -- Access cannula removed note
  - 50714 Cardiopulmonary bypass - Bypass start / stop event
- Cases performed by cardiac surgical service: MPOG concept 80005.

MPOG Concept IDs Required:

<table>
<thead>
<tr>
<th>Neuromuscular Blocker Medications</th>
<th>Reversal Agent MPOG Concept IDs</th>
<th>Extubation MPOG Concept IDs</th>
<th>Train of Four MPOG Concept IDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>10043 Atracurium</td>
<td>10170 Edrophonium</td>
<td>50127 Intubation</td>
<td>3485 Train-of-four (Accelero...</td>
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<tr>
<td></td>
<td></td>
<td>Extubated Awake or Deep</td>
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</tr>
<tr>
<td>10129 Cisatracurium</td>
<td>10315 Neostigmine</td>
<td>50202 Emergence-Patient</td>
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<td>Extubated</td>
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<td>10344 Pancuronium</td>
<td>10739 Sugammadex</td>
<td>50145 Airway – Laryngeal</td>
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<td></td>
<td></td>
<td>mask airway removed (deep</td>
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<tr>
<td></td>
<td></td>
<td>or awake)</td>
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</tr>
<tr>
<td>10393 Rocuronium</td>
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</tr>
<tr>
<td>10446 Vecuronium</td>
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</tbody>
</table>

Data Diagnostics Affected:
- Percentage of Cases with a Non-Depolarizing NMB Administration
Percentage of Cases with an Extubation Note
Percentage of Cases with Neuromuscular Blocker Reversal Agents Administered
Percentage of Medications with a Meaningful Medication Mapping
Percentage of Cases with any Staff Tracking
Percentage of Anesthesia Provider Sign-Ins that are Timed

Phenotypes Used:
- AsaNotes
- Asa5or6
- Cardiac
- ExtubationTimes

Success:
- Documentation of neostigmine, Sugammadex, and/or edrophonium before earliest extubation.
  OR
- A period of greater than 3 hours exists between last dose of non-depolarizing medication and extubation for patients ≥ 12 years old.
  OR
- A period of greater than 2 hours exists between last dose of non-depolarizing medication and extubation for patients <12 years old.
  OR
- An acceleromyography ratio of ≥ 0.9 documented after last dose of NMB and before earliest extubation.

Threshold: 90%.

Responsible Provider: The provider(s) signed in at time of earliest extubation.

Risk Adjustment (for outcome measures):
Not applicable.

References: