Reducing Intubation Time in Adult Cardiothoracic Surgery Patients: A Review of Data under the Direction of a Board Certified Critical Care Intensivist

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Background
- RGH Cardiothoracic ICU (CTICU) cares for patients post cardiac surgery (CABGs, AVR/MVR/TVR, aneurysm repairs).
- Society of Thoracic Surgeons (STS) guidelines set a goal for extubation within 24 hours of cardiac surgery. In 2015, they found that only 9% of patients were being extubated in less than 8 hours, and that 65% of patients had at least a 2-day ICU stay.
- The introduction of an intensivist to the CTICU set a goal for extubation within 24 hours of cardiac surgery while maintaining a new protocol introduced by intensivist and Medical Director Dr. Rebecca Gooch.

Problem
Prolonged intubation can lead to:
- Increased length of stay in the intensive care unit
- Increased risk of complications
- Increased risk of morbidity and mortality
- Increased cost of stay

Method
- Extubation data was collected from April 2020 to April 2021. Extubation data was collected from April 2021 to April 2022 following the introduction of an intensivist to the CTICU.
- Three major issues that needed to be addressed: Sedation, awakening, and lower risk of mortality.
- Interventions included implementation of new sedation protocols, early extubation times in the ICU, focusing on extubation occurring on the unit.

Extubations under 6 hours/total cases

<table>
<thead>
<tr>
<th></th>
<th>April 2020 – April 2021 without intensivist</th>
<th>April 2021 – April 2022 With intensivist</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>7/36 (19%)</td>
<td>8/29 (28%)</td>
</tr>
<tr>
<td>May</td>
<td>10/46 (21%)</td>
<td>16/45 (36%)</td>
</tr>
<tr>
<td>June</td>
<td>11/49 (22%)</td>
<td>18/63 (29%)</td>
</tr>
<tr>
<td>July</td>
<td>11/49 (22%)</td>
<td>19/60 (32%)</td>
</tr>
<tr>
<td>August</td>
<td>10/42 (23%)</td>
<td>20/73 (28%)</td>
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<tr>
<td>September</td>
<td>12/55 (22%)</td>
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<td>October</td>
<td>12/57 (21%)</td>
<td>15/38 (29%)</td>
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<tr>
<td>November</td>
<td>4/40 (10%)</td>
<td>13/35 (37%)</td>
</tr>
<tr>
<td>December</td>
<td>11/50 (22%)</td>
<td>8/64 (18%)</td>
</tr>
<tr>
<td>January</td>
<td>8/45 (18%)</td>
<td>12/37 (32%)</td>
</tr>
<tr>
<td>February</td>
<td>7/42 (17%)</td>
<td>10/64 (43%)</td>
</tr>
<tr>
<td>March</td>
<td>13/58 (22%)</td>
<td>22/46 (40%)</td>
</tr>
</tbody>
</table>

Interventions
- Collected information from staff to find the most applicable barriers of extubation occurring on the unit.
- Three major issues that needed to be addressed: Sedation, awakening, and lower risk of mortality.
- Intervention 1: Elimination of Morphine and Midazolam as sedative agents.
- Intervention 2: Introduction of Fentanyl combined with Propofol or Precedex.
- Intervention 3: Sedation awakening trials done regularly.
- Intervention 4: Greater attention to vent settings specific to patient BSA.
- Intervention 5: Anesthesiologist to report last paralytic and reversal agent given out of operating room.

Key Results
Data collected on all cardiac surgery patients over 12 months following the introduction of a critical care intensivist:
- Prior to introduction of intensivist: 116/571 patients extubated <6 hrs.
- Overall 14% increase in extubations <6 hours.
- There were two months with a 25% greater increase.
- There were six months with a 15% greater increase.
- There were eight months with 10% greater increase.

Conclusion
- Extubation in under 6 hours on the unit without an intensivist occurred in 116/571 patients (20.3%).
- Extubations in under 6 hours with an intensivist occurred in 181/531 patients (34%).
- Over 12 months, under the guidance of an intensivist, along with the implementation of new sedation protocols, early extubation times in the CTICU have increased leading to decreased length of stay, lower cost of stay and lower risk of mortality.