Early Extubation in the Cardiac Surgery Patient

Our Vision 2012: Every Peacehealth Patient Will Receive Safe, Evidence Based, Compassionate Care; Every Time, Every Touch.
Overview

➢ Culture of Early Extubation

➢ Protocols

➢ Data

➢ Barriers
Creating a Culture of Early Extubation

- Early extubation has been the norm since 1994
- RN and RT training emphasizes the expectation of early extubation
- Continual communication between RN and RT regarding patient extubation readiness
Culture of Early Extubation continued...

- 1:1 RN to patient ratio until patient is extubated. 1:4 RT to ventilator ratio
- One RT managing the post-operative ventilator course
- RTs round frequently to ensure weaning begins as soon as patient meets criteria
Protocols

- ICU ventilator and sedation/analgesia orders for short term ventilation
- Cardiac surgery extubation protocol
- Post extubation cardiac surgery protocol
ICU Ventilator Sedation/Analgesia
Orders for Short Term Ventilation

Medications:

- **Fentanyl** 25-50mcg IV every 10 minutes
  PRN pain until extubated
- **Midazolam** 0.5 –2mgs IV every 30 minutes
  PRN for anxiety until extubated
- **Other sedation** ____________
RT Cardiac Surgery Ventilator Weaning and Extubation Protocol

**Ventilator Setup and Adjustment:**

- **Mode = CMV**
- **Set tidal volume = 8 ml/kg IBW**
- **Adjust RR to approximate Ve used in OR**
  - Pt may initially require slightly higher Ve then in OR
  - Initial EtCO2 for normal lungs 30 – 40
Extubation Protocol continued...

- Set PEEP to 8 cmH₂O if not contraindicated

- Set FiO₂ same as OR settings and titrate using oxygenation table after initial ABG

**Oxygenation Table: Goal SpO₂ > 90%**

<table>
<thead>
<tr>
<th>FiO₂</th>
<th>.40</th>
<th>.50</th>
<th>.50</th>
<th>.60</th>
<th>.70</th>
<th>.80</th>
<th>.90</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEEP</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>10</td>
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Ventilator Management:

In keeping with a lung protective strategy...

**Plateau Pressure Goal** < 30 cmH$_2$O

If Pst ≥ 30 cmH$_2$O:

- Decrease Vt 1 mL/kg IBW to 6 mL/kg IBW
- Change to Pressure Control Mode with maximum pressure of 35 cmH$_2$O
Ventilator Management:

**ABG Goals:**
- pH 7.35 – 7.45
- PaCO2 35-45 mmHg or pt’s normal if CO2 retainer
- PaO2 > 65 mmHg
- HCO3 22 – 26 mmEq/mL
- BE 0 ± 2
- SaO2 > 90%
Ventilator Management:

Call physician if ABG results are:

- pH < 7.30 or > 7.5
- PaCO2 < 30 or > 55 mmHg and acidotic
- PaO2 < 60 mmHg and not corrected by ventilator
- BE < -5
Ready, set, wean!

Criteria to Initiate Weaning:
- Chest tubes drainage below 100cc/hr
- Blood pressure is within prescribed parameters
- Cardiac index ≥ 2
- Absence of frequent ventricular dysrrhythmias
- Pt is spontaneously breathing
- FiO2 ≤ .50
- Ve ≤ 12 lpm
Liberating from ETT

**Weaning Procedure:**
- Wean PEEP to 5 cmH\(_2\)O
- Ventilator mode to CPAP with PS
- Adjust PS to keep \(Vt \geq 5\) mL/kg IBW
- Maximum PS = 20 cmH\(_2\)O
- Wean PS to 5 cmH\(_2\)O
- Patient must be on PS of 5 cmH\(_2\)O for ≥15 minutes
Liberating from ETT

**Obtain weaning parameters:**
- NIF > -20 cmH\(_2\)O
- VC > 10-15 mL/kg
- Ve ≤ 12 lpm
- RR > 10 or < 24 bpm
- Spontaneous Vt > 5mL/kg IBW
Liberating from ETT

Neuro Assessment:

- Move all extremities on command
- Nods appropriately to questions
- Cough reflex intact
- Can lift head and legs off of bed
“If at first you don’t succeed…”

**Failure Criteria:**
- Vt < 5 mL/kg IBW
- SpO2 < 90 % with FiO2 < .50
- RR > 30 bpm
- HR increase of 20 bpm
- Arrhythmia
- Increased WOB
Tick Tock Tick Tock...

Criteria Requiring Physician Evaluation:
MD must be consulted if any of following conditions exist:

- Patient does not meet extubation criteria
- RN or RT has reservations about the appropriateness of extubation
- Cardiac index <2
Success!

Approximate hours on ventilator post op; 4
Average doses of midazolam in ICU; 1
Calls to MD for extubation order; 0
Reintubation rate < 3%

talking to your family instead of breathing through a tube

….priceless
Extubation protocol used since inception of SJH Cardiac Surgery Program has resulted in stable median extubation times over more than ten years.
Non-patient related barriers

RT unavailable to be at bedside
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