

Background

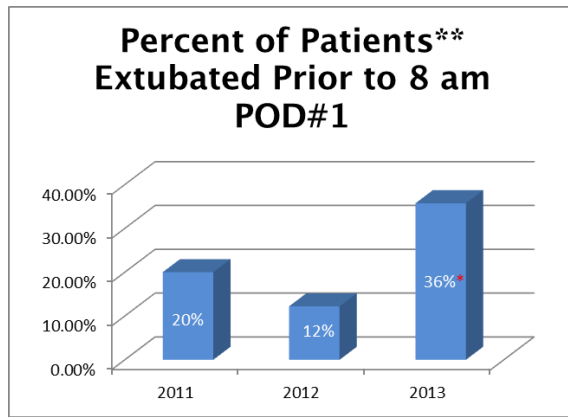
- Early extubation is associated with fewer ventilator associated complications, reduced requirement of sedatives, earlier mobilization, and potentially decreased length of stay
- Current practice included:
 - Few extubations occurring in the first 24 hours
 - Initiation of continuous opioid drips in all patients
 - Variable post-op pain/sedation management leading to over-sedated patients and prolonged intubation times
 - Extubations occurring later in the day POD#1 (after rounds)
 - No identification of “early extubation” candidates pre-operatively

The Intervention

- Interdisciplinary early extubation workgroup was formed
- Extensive literature search was performed
- Where data was lacking in literature, protocols from leading heart centers were utilized
- Guidelines created to aid in identification of patients and guide pain/sedation management
- Candidates identified at weekly interdisciplinary conference and communicated to team
- Order set created in EPIC reflecting and linking to guidelines (Currently in progress)

Results

- Expected results: increase percentage of “early extubation” patients (as defined by extubation by 8am on POD#1)
- Chart below shows historical percentage of patients extubated by 8AM POD#1



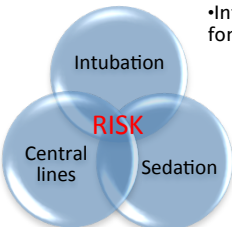
* 40% of the 2013 early extubations were AFTER the early extubation work group began creating guidelines
** Total excludes pacemaker implantation, minor procedures & NICU PDA closures

Aims

- Reduced ventilation time (thus reduction in ventilator associated complications and faster mobility)
- Early de-intensifying (central line/chest tube/pacemaker wire removals)
- Consistency in pain/sedation management
- Identification of early extubation candidates

Lessons Learned

- Interrelated issues resulting in need for development of other guidelines:
 - Readiness for Extubation Guidelines
 - Nurse Driven Sedation/Opioid Decision Tree



Guidelines for Identification & Management of Early Extubation Post-Cardiac Surgery Candidates

Purpose:
Reduce ventilation time, early de-intensifying

Procedure:
The following are general guidelines to consider but ultimately decisions for early extubation will be made in the OR, based on patient condition and OR course.
Patient discussion will occur in conference the Friday prior to OR. In the event a patient is identified as a candidate for early extubation in conference, this information will be included in the Friday email of cases.

Early extubation is defined as extubation prior to 8AM on POD#1

Consideration for early extubation:
RACHS-1 category 1-3
Non-CPB cases (including single ventricle patients)
“Beating heart” bypass (right heart bypass)
Age > 3 months
Open chest
Gross & Contain patients

Contraindications for early extubation:
Long CPB/Aortic time and/or difficulty separating from bypass
DNKA
Concomitant factors/associated complex defects
Complex non-cardiac issues
Poor ventricular function post-op (AEB report on OR or post-op echo)
High risk for arrhythmias
PHTN precautions
Open chest
RACHS category 4-6
History of pulmonary infections or obstructive airway disease
Necrotic & solitary > 3 cm
Factors to consider when deciding on early extubation:
CPR time
Aortic time
Complexity of surgery
Necessity of significant inotropic support
Hemodynamic stability
Presence of significant bleeding
Genetic abnormality
Chronic lung disease
Airway issues or difficult intubation
Timing of removal of lines/services

Early extubation pain/sedation management guidelines

Prior to extubation:

- Start Precedex at 1mc/kg/hr; may increase to 2 mcg/kg/hr by increments of 0.2mcg/kg as needed until desired level of sedation is achieved
- Give Morphine 0.05mg/kg IV Q2hr (max 2mg)
- Tylenol 15mg/kg ATC Q6 hours PRN (on early extubation candidates: may give initial 40mg/kg PR dose) (max 60mg)

After extubation:

- D/C Precedex for extubation (discretion of attending to leave Precedex on after extubation)
- Change Morphine to 0.05mg/kg IV Q2hr (max 2mg)
- Transition to oral agents (oxycodone) as soon as taking p.o. and D/C Morphine
 - Infants & children: Day volume (0.03-0.1mg/kg/dose) Q 6hr (consider ATC for first 24 hours, then PRN) (recommended to be given with Tylenol)
 - Older children & Adults: Percocet (3/325) 2 tab Q 4-6 hrs (consider ATC for first 24 hours, then PRN)
- Toradol 0.5mg/kg IV Q 6 hours x 48 hours (MAX dose 15mg) providing no contraindications (renal impairment, bleeding, age < 3 months, therapeutic anticoagulation) NOTE: May be used in conjunction with non-therapeutic heparin prophylaxis for central line (PTT <50)

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References:

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