Selected Best Practices and Suggestions for Improvement

PSI 11: Postoperative Respiratory Failure

Why Focus on Postoperative Respiratory Failure?

- Even though there is debate regarding the definition of true postoperative respiratory failure, it still remains an important patient adverse event. Generally, postoperative respiratory failure is the failure to wean from mechanical ventilation within 48 hours of surgery or unplanned intubation/reintubation postoperatively.[1]
- Postoperative respiratory failure has been associated with increased cost, an increased length of stay, and increased mortality.[2,3]
- As value-based purchasing evolves, quality will be increasingly linked to payment. Postoperative respiratory failure is not currently part of Medicare's Hospital Value-Based Purchasing, but could be considered for future inclusion.

Recommended Practice	Details of Recommended Practice
Assess risk factors.	Develop a set of risk factors for postoperative respiratory failure and screen all patients undergoing elective surgery.[3]
Initiate various treatments during the perioperative and postoperative period to reduce a patient's risk of developing respiratory failure.	To prevent or lessen the risk of developing postoperative respiratory failure, perform lung expansion exercises, selective use of NG tubes and use short acting neuromuscular blockade.[2,4]

Best Processes/Systems of Care

Introduction: Essential First Steps

- Engage key nurses, physicians and other providers, hospitalists, respiratory therapists, dieticians, and pharmacists from infection control, intensive care, and inpatient units including operating room; and representatives from quality improvement, radiology, and information services to develop time-sequenced guidelines, care paths, or protocols for the full continuum of care.

Recommended Practice: Assess Risk Factors

- Determine which patients are at increased risk for postoperative respiratory failure to better prepare clinicians to anticipate adverse events postoperatively, as well as improve allocation of resources after surgery.[3]
- Risk factors for postoperative respiratory failure are[2,3]:
    - Age.
    - History of chronic obstructive pulmonary disease and/or congestive heart failure.
    - Smoking.
    - Functional dependence.
    - Serum albumin <3.0 g/dL.

- BUN >30 mg/dL.
- Higher ASA score/class.
- Emergency surgery.
- High-risk surgery (e.g., emergent and prolonged procedures, open vs. laparoscopic).

Recommended Practice: Initiate Various Treatments During Perioperative and Postoperative Period To Reduce Risk of Respiratory Failure

- Ensure that patients are using lung expansion exercises such as incentive spirometry, deep breathing, intermittent positive-pressure breathing, and continuous positive airway pressure. These exercises have been shown to reduce the likelihood of postoperative respiratory failure.
- Use nasogastric tubes selectively since they can increase the risk of aspiration.
- Use short-acting neuromuscular blockade. Long-acting neuromuscular blockade has a higher incidence of residual block, and patients with higher residual block were 3 times more likely to develop postoperative pulmonary complications than those without residual block.[5]

Educational Recommendation

- Plan and provide education on protocols and standing orders to physicians and other providers, nurses, and all other staff involved in postoperative respiratory failure prevention and care (emergency department, intensive care unit, etc.). Education should occur upon hire, annually, and when this protocol is added to job responsibilities.

Effectiveness of Action Items

- Track compliance with elements of established protocol steps.
- Evaluate effectiveness of new processes, determine gaps, modify processes as needed, and reimplement.
- Mandate that all personnel follow the postoperative respiratory failure protocol and develop a plan of action for staff in noncompliance.
- Provide feedback to all stakeholders (physicians and other providers, nursing, and ancillary staff; senior medical staff; and executive leadership) on level of compliance with process.
- Monitor and evaluate performance regularly to sustain improvements achieved.

Additional Resources

Systems/Processes

- WHO Postoperative care
  http://www.who.int/surgery/publications/Postoperativecare.pdf

Policies/Protocols

- AARC Clinical Practice Guideline: Incentive spirometry: 2011
  http://www.rcjournal.com/cpgs/pdf/10.11.1600.pdf

Tools

- QxMD. Postoperative Respiratory Failure Risk Calculator http://www.qxmd.com/calculate-online/respirology/postoperative-respiratory-failure-risk-calculator

Staff Required

- Surgeons
- Intensivists
- Nursing
- Respiratory therapy

Equipment

- Incentive spirometer

Communication

- Systemwide education on policy/protocol of monitoring postoperative patients.

Authority/Accountability

- Senior leadership mandating protocol for all providers.

References

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2. Utter G. Why focus on postoperative respiratory failure? [PowerPoint]. Premier Healthcare Alliance; November 10, 2010. http://www.qualityindicators.ahrq.gov/Downloads/Resources/Presentations/2010/Utter%20Premier%20PRF%20overview.11042010.pdf. Accessed May 20, 2016.
3. Brueckmann B, Villa-Uribe J, Eikermann M, et al. Development and validation of a score for prediction of postoperative respiratory complications. Anesthesiology 2013 Jun;118(6):1276-85.
4. Smetana G. Postoperative pulmonary complications: an update on risk assessment and reduction. Cleve Clin J Med 2009 Nov;76 Suppl 4:S60-S65.
5. Lawrence V, Cornell J, Smetana G. Clinical guidelines. Strategies to reduce postoperative pulmonary complications after noncardiothoracic surgery: systematic review for the American College of Physicians. Ann Intern Med 2006 Apr 18;144(8):596-608.