Pneumonia Prevention Recommendations

The following recommendations are the result of our study "Reducing Pneumonia after Cardiac Surgery: A Qualitative Study" where we identify a number of clinical practices that may reduce a patient's risk of developing post-operative pneumonia following CABG surgery.

Pre-operative Care

- **5-meter walk test**: This assessment test should be conducted prior to surgery to identify barriers to progressive mobility in the post-operative setting. This test has been shown to be an independent predictor of composite mortality and/or major morbidity. [1]
- **Oral and Nasal Preparation**: Oral and nasal decolonization should be conducted prior to surgery. Studies have documented the effectiveness and efficacy of chlorhexidine gluconate (CHG) in reducing ventilator-associated pneumonia. [2]
- **Pulmonary Function Testing**: Some patients may benefit from formal pulmonary function testing to enable appropriate risk stratification, and to support efforts aimed at mitigating further pulmonary dysfunction. [3]

Intra-operative Care

- **Blood Conservation**: Efforts should be made to prevent a patient's exposure to red blood cell transfusions. Prior work has identified a dose-response relationship between transfusion of red blood cells and the increased odds of post-operative pneumonia. [4]
- **Lung Protective Ventilation**: Efforts should be made to use lung protective ventilation strategies including Tidal Volume of 6mls/kg Predicted Body Weight (PBW), and Positive End-Expiratory Pressures of 5-12 cm/H20. [5] Excessive tidal volumes and/or distending pressures may promote lung injury and prolong ventilator use, increasing the risk of developing post-operative pneumonia. [6-7]

Post-operative Care

- **Blood Conservation**: Efforts should be made to prevent a patient's exposure to red blood cell transfusions. [4]
- **Management of Patients in the Intensive Care Unit (ICU)**: Appropriate consultation and post-operative management by a team approach model may influence early detection and treatment to prevent pneumonia.
- **Subglottic Suctioning**: Efforts should be made to use subglottic suctioning in reducing the risk of ICU length of stay and pneumonia. In a meta-analysis of five studies, subglottic suctioning reduced the duration of mechanical ventilation by 2 days and ICU length of stay by 3 days. [8]
- **Early Extubation**: Efforts should be made to facilitate early extubation (<6 hrs.) to prevent post-operative pneumonia. It has been reported an association between early extubation and lower rates of pneumonia, sepsis, length of stay, ICU readmission and reintubation. [9]
- **Daily assessment of oral care**: Oral hygiene care methods may be effective at combatting possibly pathogenic flora. Studies support the use of oral care (e.g., Mupirocin, Chlorhexidine Gluconate) as part of a multi-faceted approach for reducing pneumonia. [10-12] Less evidence exists regarding the appropriate frequency of the timing of the assessment (e.g., twice or four times/day).
- **Daily Spontaneous Awakening Trials**: All patients on mechanical ventilation being treated with sedative medication should receive a spontaneous awakening trial once a day to reduce the overall sedation exposure and reduce the length of mechanical ventilation. [11]
- **Daily Spontaneous Breathing Trials:** All patients on mechanical ventilation should receive a spontaneous breathing trial once a day to support daily assessment of patients for their readiness to be extubated. [13] Prior work has documented a number of benefits, including extubation times 1-2 days less than patients receiving usual care.

- **Pair Daily Spontaneous Breathing Trials with Spontaneous Awakening Trials:** All patients on mechanical ventilation should receive their daily spontaneous breathing trial at the same time as their daily awakening trial. [11]
- **Progressive Mobility**: Efforts should be made to assess each patient's progression of mobility (i.e., time to chair, time to ambulation) following surgery. Studies have described the benefit of an early and aggressive mobility program. [13, 14]

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