**BACKGROUND**

- Postoperative pulmonary complications (PPCs) are the most common and significant factors implicated in postoperative morbidity, mortality and hospital costs.
- Pneumonia was the 6th leading cause of death in 2015 according to the National Vital Statistics Reports by the CDC.
- Diaphragm dysfunction after surgery leads to a 50 to 60% decrease in vital capacity testing up to a week, and a 30% decrease in functional residual capacity (FRC).

**RISK FACTORS**

- Procedure related:
  - Aortic Aneurysm repair
  - Abdominal Surgery
  - Acute Atelectasis
  - Pneumonia
  - Exacerbation
  - Anesthesia
  - Postoperative Pulmonary Complications

- Admission related:
  - Vital Signs
  - Pneumonia score
  - IMT

**ABSTRACT**

Postoperative pulmonary complications after cardiac or abdominal surgeries may have significant ramifications on mortality and mortality rates. A comprehensive preoperative program, that incorporates IMT and exercise training, may greatly optimize the patient’s status in the perioperative period and greatly improve postoperative pulmonary outcomes. Enhancing physical performance and respiratory mechanics prior to surgical interventions may enable an individual to better withstand the stress of surgery. This may ultimately improve clinical outcomes by decreasing morbidity, mortality, and healthcare costs.

It is important to review current research on preoperative IMT and exercise training in patients undergoing surgery, and its implications in healthcare.

**METHODS**

The electronic databases of Cochrane Library, PubMed, Web of Science, ACP, Journal Club, and Clinical key were accessed via the Albany Medical College Schaffer library website. The full print versions of relevant studies were examined. The following key terms were included in the search in different combinations: preoperative/postoperative/respiratory exercise training/physical training/inspiratory/pulmonary complications/pulmonary outcomes/surgery/ventilatory/prehabilitation.

**RESULTS**

**Postoperative Pulmonary Complications**

- Duration of postoperative hospitalization:
  - IMT Group (n=137): 7.5 (5-14)
  - Control group (n=137): 8.9 (7-16)

- Odds Ratio (95% CI):
  - Pneumonia rate: 0.53 (0.39-0.69)
  - IMT group: 0.54 (0.39-0.68)

**Conclusions**

- Preoperative IMT decreased the incidence of PPCs and duration of postoperative hospitalization in high risk patients undergoing CABG surgery.

**DISCUSSION**

- Postoperative pulmonary outcomes are significant determinants of a patient’s recovery and quality of life after surgery.
- An individualized and comprehensive preoperative pulmonary rehabilitation program that incorporates IMT and physical exercise as its main premise may be beneficial to patients undergoing surgery, and may significantly improve postoperative pulmonary outcomes, decrease mortality rates, hospital LOS and hospital costs.
- Cardiopulmonary exercise testing is a diagnostic test that may be integrated into the preoperative physiological assessment of patients undergoing surgery and may serve as a valuable tool to screen patients at high risk for developing postoperative pulmonary complications. It may provide a more intuitive approach to detecting bronchial reactivity and PEF, which cannot be detected by conventional cardiopulmonary function tests. It may also serve as a way to identify patients who would be able to safely participate in an exercise program, and adhere to it.
- Identifying patients at high risk, and optimizing cardiorespiratory fitness prior to surgery, may significantly improve health outcomes.
- Future studies should focus on high risk patients undergoing cardiothoracic or abdominal surgeries. It is important to design an evidence based screening tool that can identify high risk patients and those whom benefit from preoperative pulmonary rehabilitation. Preoperative pulmonary rehabilitation should be individualized and should consist of a combination of pharmacological interventions, IMT and exercise training, starting approximately 4 to 8 weeks prior to surgery.

**REFERENCES**