Does Digital Matter: Using a Digital Air Leak Detection Device to Decrease Chest Tube Duration

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Purpose

• Determine if the utilization of a digital air leak detection device will decrease chest tube duration by one day in 50% of patients who have undergone a pulmonary lobectomy and continue to have an air leak on postoperative day (POD) 3.

Background

• Air leaks are the primary cause for hospital stay & risk for morbidities after a pulmonary lobectomy
• Air leaks can be assessed using analog or digital devices
• Digital devices provide objective, reproducible data, and reduce interobserver variability

Project Goals

• Team members demonstrate knowledge of Thopaz+ use
• Team members express value in use of Thopaz+
• Team members use Thopaz+ on appropriate patients
• Improved accuracy of air leak detection by team members
• Development of chest tube management algorithm
• Decreased chest tube duration
• Decreased hospital length of stay

Methodology

• 25 patients who had a pulmonary lobectomy were compared with historical patients from the previous 2 years for chest tube duration and hospital length of stay
• If air leak persisted on POD 3, patients were changed to the Thopaz+ digital air leak detection device
• Chest tube was removed when airflow was <20mL per minute for 8 hours, output was <400mL/24 hours, and fluid was not sanguinous or chyloous

Results

Analysis using the Mann-Whitney test demonstrated:
• 56% median chest tube duration one day less than historical patients (p-value 0.010 with a 95% confidence interval)
• 72% median hospital length of stay one day less than historical patients (p-value 0.004 with a 95% confidence level)
• Cost savings of $2659 per hospital day

Implications

• Development and implementation of a new chest tube management strategy
• Improved resource utilization for a limited resource
• A reduction in chest tube duration following a pulmonary lobectomy utilizing the digital air leak detection device:
  - Allows quicker bed turnover
  - Decreases hospital length of stay
  - Limits risk of morbidity
  - Reduces overall costs