Multidisciplinary Quality Improvement Initiative Using VersaPAP® Therapy to Reduce Post-Operative Pulmonary Complications in Cardiovascular Surgery

Melissa Olson, MHA, RRT-ACCS | M Health Fairview, Minneapolis, MN

RATIONALE

Post-Operative Pulmonary Complications (PPCs) developing after cardiovascular surgery are common and incur an average additional cost of $77,000 per patient in our facility. Our primary goal with this change of practice was to improve our cardiovascular surgery program outcomes through the treatment of atelectasis.

We hypothesized that implementing a standardized positive airway pressure therapy protocol within a multidisciplinary framework would reduce PPCs and associated healthcare costs.

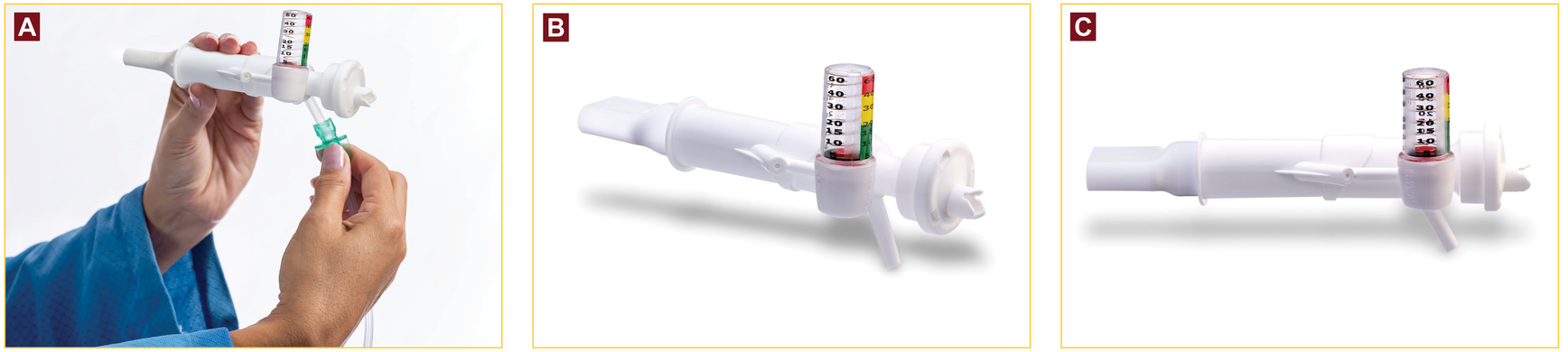


Figure 1. The VersaPAP® device (Monaghan Medical):

A) Connected to the patient circuit demonstrating bedside setup during post-operative PAP therapy;
B) Lateral view showing mouthpiece, pressure manometer, and patient-circuit connection;
C) Side profile highlighting integrated pressure gauge and exhalation port assembly.

METHODS

Design:

- Three month pilot quality improvement initiative in the cardiovascular surgery ICU
- March - June 2025
- 300 post-operative cardiovascular surgery patients

Core Intervention:

VersaPAP® therapy initiated within 4 hours post-extubation and continued QID for 10 minutes until ICU discharge or mobilization

Escalation Pathway:

Aerobika® oscillatory therapy added to VersaPAP® via Respiratory Care Assess and Treat (RCAT) for patients requiring enhanced airway clearance.

Addressed Implementation Barriers:

- Workflow redesign,
- Respiratory therapist (RT) education,
- EPIC order set development,
- Assignment prioritization systems to embed protocol into routine care.

Barrier:	Solution:
Patient Refusal	Education and Coaching
Workflow Delays	Process Redesign
Clinical Instability	Adaptive Timing
Staff Variation	Standardized Protocol

KEY RESULTS

Implementation:

In the first 30 days, only 47 of 112 patients (41%) received VersaPAP® within 4 hours of extubation.

Barriers:

Delayed PAP delivery was mainly related to competing noninvasive ventilation demands, neurological instability, hemodynamic compromise, and patient refusal.

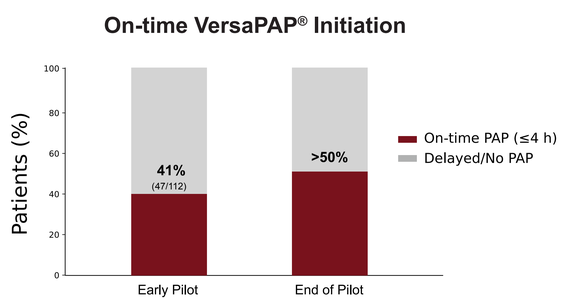
Improvement Over Time:

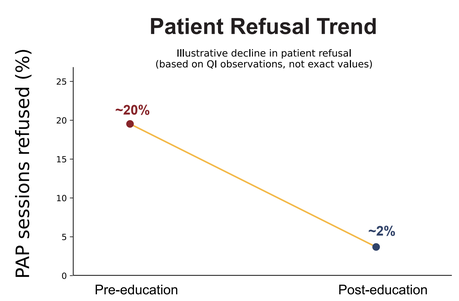
Targeted patient education and RT coaching nearly eliminated patient refusal and increased on-time PAP delivery to >50% by the end of the pilot.

Early Outcomes:

- Serial chest radiographs showed consistent resolution of atelectasis within 24-48 hours in compliant patients.
- Early quarterly trends suggested reduced PPCs, though definitive outcomes await further reporting.

Therapy Adaptation & Compliance Trends





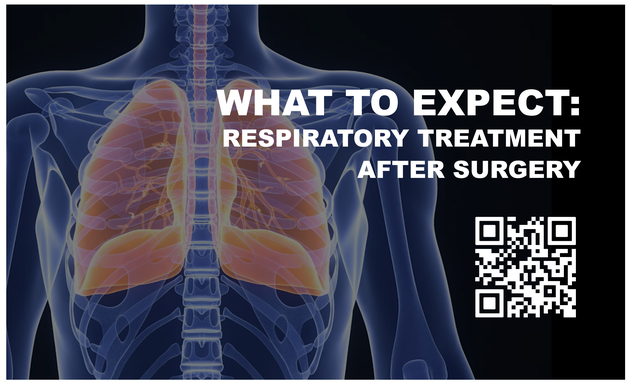
CONCLUSIONS

Multidisciplinary VersaPAP® implementation shows promise for reducing post-operative pulmonary complications in cardiovascular surgery patients.

Success required comprehensive staff education, workflow integration, and consistent therapy delivery.

Early radiographic evidence supports therapeutic efficacy when combined with respiratory therapist coaching.

This initiative may provide a cost-effective strategy for improving cardiovascular surgery outcomes and regaining quality metrics recognition.



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