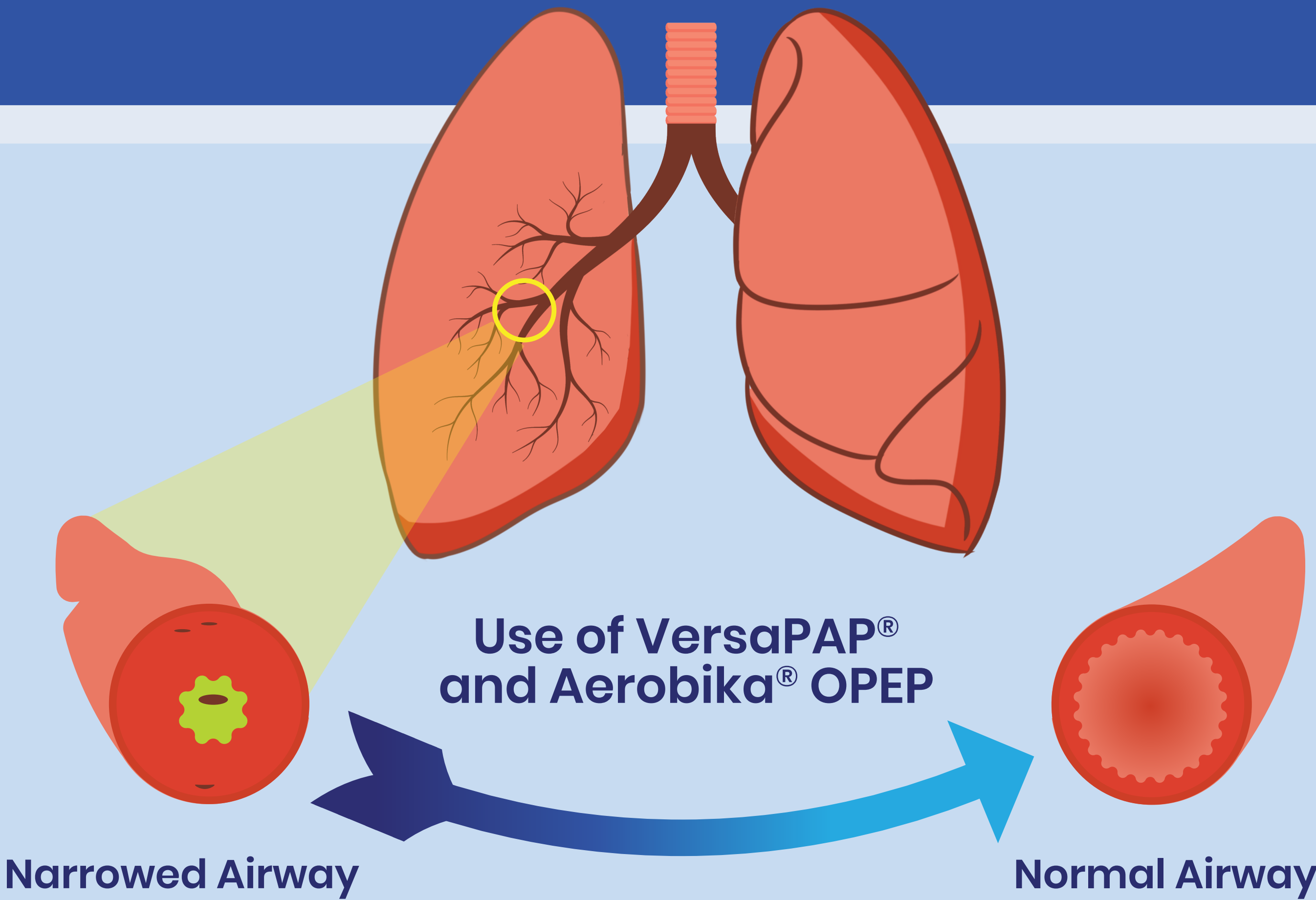


Introduction:

Refractory atelectasis complicating severe COPD exacerbations represents a significant therapeutic challenge, often prolonging ICU stays. While conventional airway clearance techniques including oscillatory devices, percussion vests, and hypertonic saline nebulization are standard care, treatment failure necessitating prolonged high-flow oxygen support occurs frequently.

The combination of VersaPAP® with oscillatory positive expiratory pressure (OPEP) devices for simultaneous oscillations and lung expansion (OLE) has not been previously described in this population.



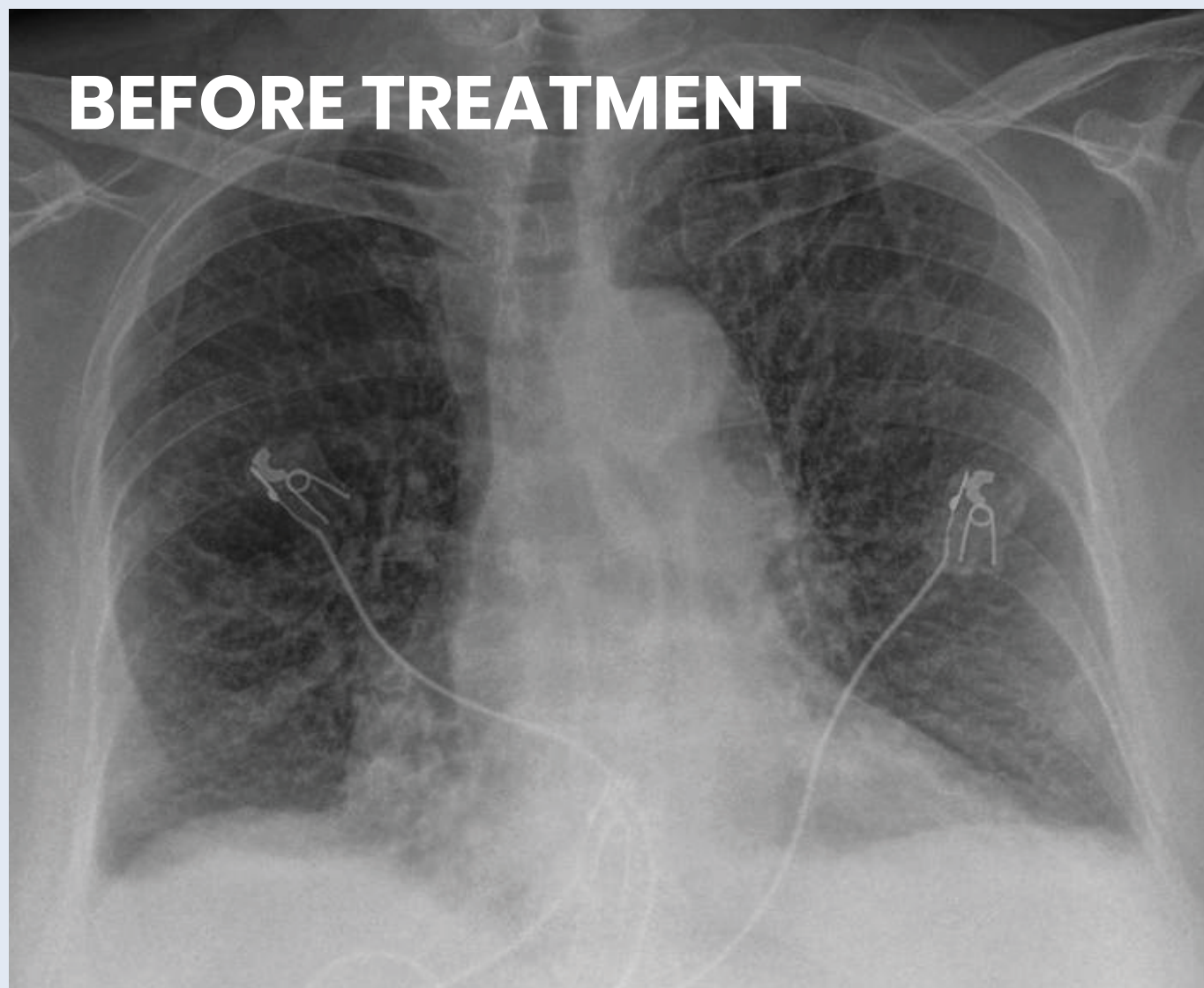
Discussion:

This case demonstrates the successful identification of the right candidate for the application of combined VersaPAP® and Aerobika® therapy for refractory atelectasis unresponsive to conventional airway clearance techniques in severe COPD. The rapid clinical and radiographic improvement suggests coaching by RTs along with the synergistic effects of continuous positive airway pressure with oscillatory therapy may be superior to sequential application of individual modalities.

This novel approach potentially offers valuable rescue therapy for similar cases, reducing ICU length of stay and avoiding escalation to invasive mechanical ventilation. Further investigation should evaluate optimal timing, frequency, and patient selection criteria for this combined therapeutic approach.

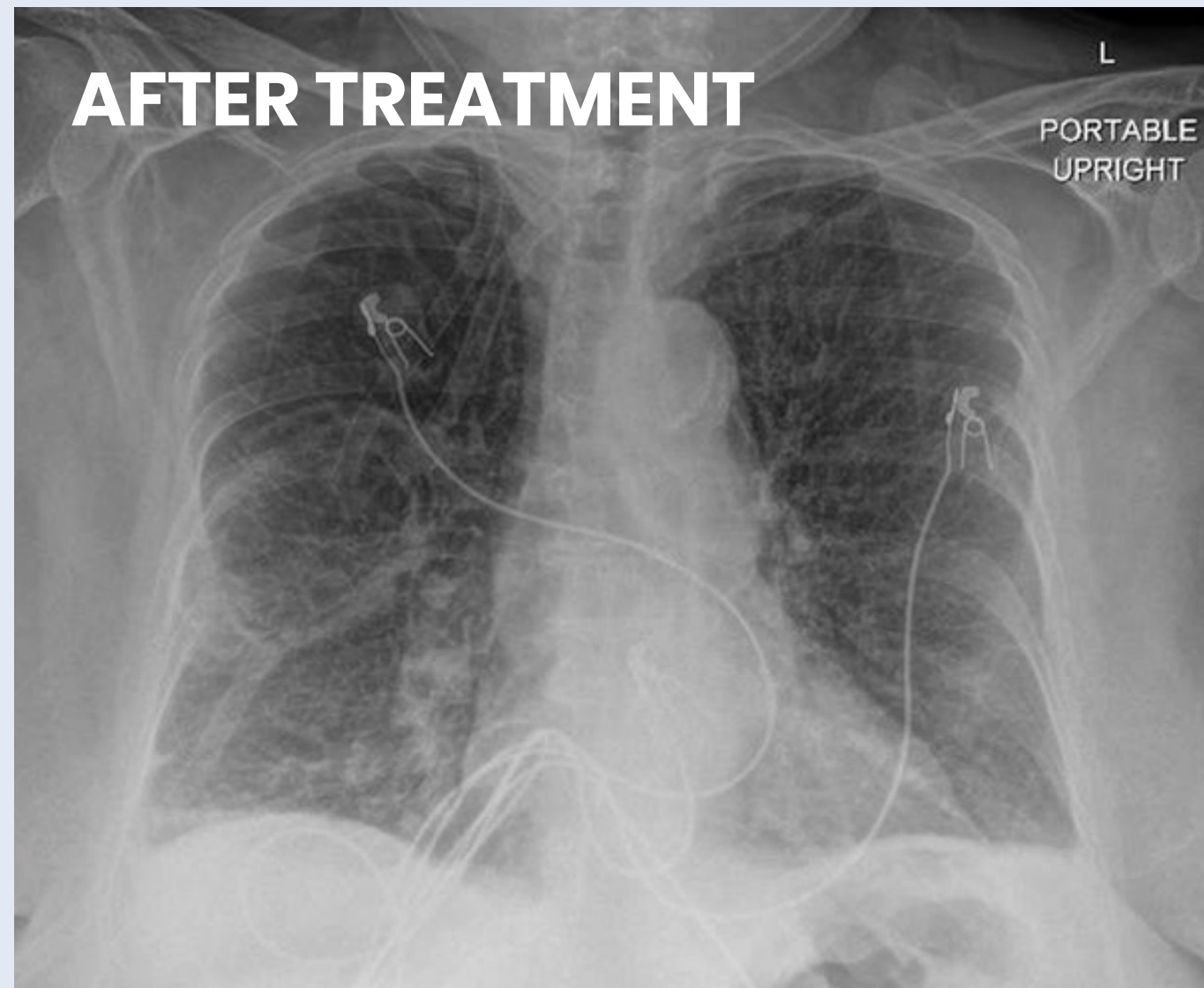
Case Description:

A 73 year old female with end-stage COPD (GOLD stage IV) was admitted with hypoxemic respiratory failure requiring high-flow nasal cannula at 50 lpm with FiO2 ranging from 60-100%, supplemented with nocturnal bilevel positive airway pressure. CT showed collapse of the right middle lobe and new collapse of the right lower lobe with mucus impaction in the bronchus intermedius and lower lobe bronchus. Additional areas of mucus plugging in the left lower lobe. Chest radiography aligned with CT.



Despite aggressive conventional airway clearance therapies including mechanical insufflation-exsufflation (Cough Assist), high-frequency chest wall oscillation (the Vest), OPEP therapy, and hypertonic saline nebulization delivered at various intervals over 16 days, the patient showed no radiographic improvement and remained unable to wean from high-flow oxygen support.

A novel approach combining VersaPAP® with the Aerobika® device was initiated to provide OLE therapy. The regimen consisted of four daily 15-minute sessions with hypertonic saline given prior to session starting and all other airway clearance modalities were discontinued. The patient maintained HFNC support during daytime hours and BiPAP nocturnally.



After six treatments over 26 hours, oxygen requirements dramatically decreased from HFNC 50L at 60% FiO2 to 6 lpm via oxygen conserving nasal cannula. Patient started to expectorate a large amount of thick secretions.

Repeat chest radiography demonstrated significant re-expansion with diaphragmatic excursion improving from the sixth to eighth rib interspace bilaterally.



Significant Improvement After Six OLE Treatments with VersaPAP® and Aerobika®

Parameter	Previous Treatment	VersaPAP® + Aerobika® (OLE Therapy)
Therapy Duration	16 days	26 hours
Radiographic Improvement	No improvement	Significant lung re-expansion
Oxygen Requirement	HFNC 50 L/min at between 60% and 100% FiO ₂	6 L/min nasal cannula
Secretion Clearance	Minimal	Large amount of thick secretions expectorated
Clinical Response	No meaningful change	Rapid clinical improvement
Weaning from Oxygen	Not achieved	Successfully weaned
Overall Outcome	Persistent atelectasis	Marked recovery