

SUPPLEMENTARY MATERIAL

Approach to mechanical ventilation: a simplified approach for a pulmonologist

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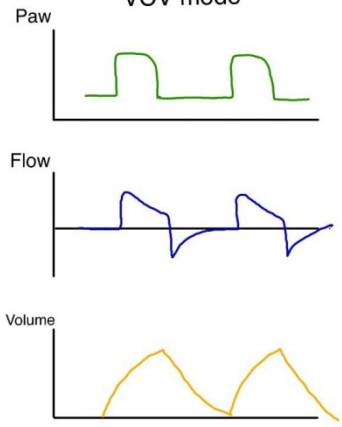
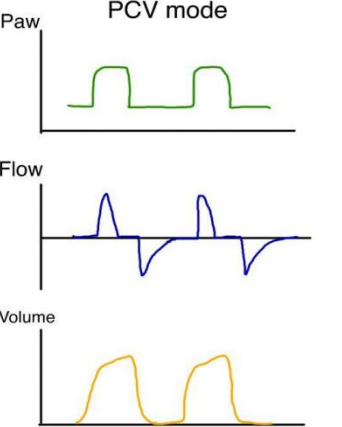
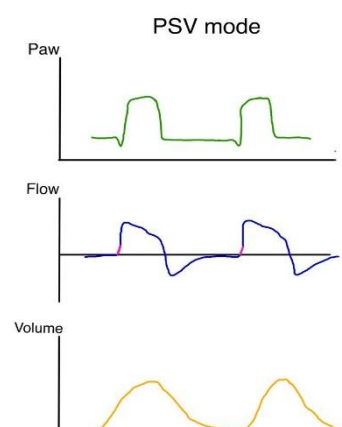
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Key words: mechanical ventilation, pulmonology, critical care, respiratory failure, ventilator management, invasive ventilation.

Supplementary Table 1. Three main ventilator modes and settings.

Mode of ventilation	Trigger	Target	Cycle
VCV	Assist-control	Flow	Volume
PCV	Assist-control	Pressure	Time
PSV	Assist	Pressure	Flow

Supplementary Table 2. Basic modes of ventilation.

Mode of ventilation	Graph	Trigger	Target	Cycle
VCV	VCV mode 	Assist-control	Flow	Volume
PCV	PCV mode 	Assist-control	Pressure	Time
PSV	PSV mode 	Assist	Pressure	Flow

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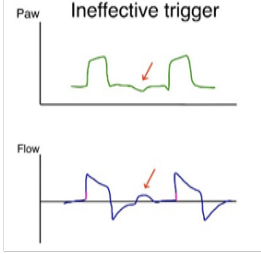
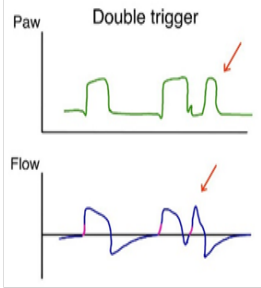
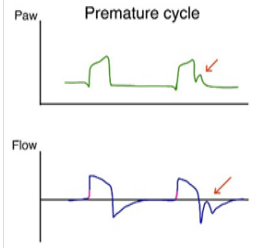
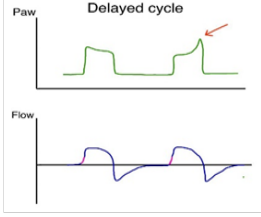
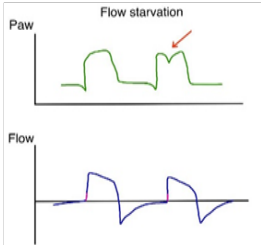
Supplementary Table 3. Management of ARDS based on ATS guidelines.

Intervention	PF ratio	Recommendation
Lung protective ventilation (Vt 6 ml/kg PBW & P plat 30 cmH ₂ O)	< 300	Strong recommendation in favor
Prone positioning	< 150	Strong recommendation in favor
High PEEP	< 200	Conditional recommendation in favor
Systemic corticosteroids	< 300	Conditional recommendation in favor
Veno-venous ECMO	< 80	Conditional recommendation in favor
Neuromuscular blockade	< 100	Conditional recommendation in favor
High frequency oscillatory ventilation	< 300	Strong recommendation against
Prolonged recruitment maneuvers	< 300	Strong recommendation against

Supplementary Table 4. Indications and protocol of invasive mechanical ventilation for COPD/asthma exacerbation.

Indications	
• pH 7.25 • Unable to tolerate non-invasive ventilation or • failure of noninvasive ventilation • Respiratory or cardiac arrest • Massive aspiration • Diminished consciousness • Failure to protect airway from secretions • Heart rate <50/min with loss of alertness • Hemodynamic instability despite fluid challenge • Severe ventricular arrhythmias • Life threatening hypoxia	
Protocol	
Mode	Volume-assist control mode
Initial tidal volume	4 - 6 mL/kg
Respiratory rate	8 - 12/min
PEEP	5 - 8 cm H ₂ O
Inspiration: Expiration ratio	1:3 - 1:6
Flow waveform	Square waveform
Goals	
Plateau pressure	30 cm H ₂ O
PaO ₂	55 - 60 mm Hg
pH	7.2 - 7.4

Supplementary Table 5. Patient-ventilator dyssynchrony – monitoring ventilator waveforms.

Dyssynchrony	Graph	Description	Pathophysiology	Risks	Suggestions
Ineffective trigger		Effort unable to trigger ventilator	Inadequate cycling Excessive support Large time constant Low respiratory drive	Prolonged ventilation Repeated pleometric work	Increase trigger sensitivity Decrease sedation Increase expiration time Increase PEEP
Double trigger		Continuation of inspiratory effort after end of insufflation	Insufficient inspiratory time High respiratory rate	Double mechanical stress on lung	Increase inspiratory time Increase VT Modify cycling to make inspiration longer
Premature cycle		Continuation of inspiratory effort after end of insufflation	Insufficient inspiratory time High respiratory rate	Eccentric contraction of respiratory muscles Double triggering	Increase inspiratory time
Delayed cycle		Continuation of insufflation after the end of inspiratory effort	Inadequate cycling Gas trapping	Short neural expiration and gas trapping Dyspnea	Decrease inspiratory time
Flow starvation		Delivered flow does not match patients demand	Insufficient peak flow High respiratory rate	Dyspnea Increased work of breathing	Increase peak flow >50L/min Shorten inspiratory time

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