

Table 15: Suboptimal ventilator management that adversely affects patients

<u>Problem</u>	<u>Clinical Setting</u>	<u>Prevention or Correction</u>
Unintended hyperventilation (acute respiratory alkalosis)	"normalizing" arterial PCO ₂ in patient with "acute-on-chronic" CO ₂ retention	Recognize underlying metabolic alkalosis (high serum bicarbonate) Use arterial pH, not PCO ₂ , as guide for ventilator adjustments
	too-rapid ventilator cycling in assist-control mode if needed	Adjust triggering sensitivity to minimum level that prevents spontaneous cycling (e.g. 1-1.5 cm H ₂ O); make sure inspiratory flow rate is sufficient for patient's needs; sedate patient
Unintended hypoventilation (acute respiratory acidosis)	Unstable or fluctuating ventilatory drive in patient on low SIMV rate (potential for variable patient contribution to required minute ventilation)	Increase SIMV rate to meet patient's total minute ventilation requirement Switch to A/C mode
	Back-up rate set too far below patient's triggering rate in A/C	Increase back-up rate to 2-3 breaths/min less than patient's stable triggering rate
Inadvertent air-trapping and auto-PEEP	Obstructive lung disease (COPD; asthma)	Avoid/correct hyperventilation (keep arterial PCO ₂ normal rather than low) Increase expiratory time (high inspiratory flow rate; no end-inspiratory pause)
		Replace standard corrugated ventilator circuit with low-compliance, low-compressible-volume tubing

Table 15, continued (2 of 3)

Excessive patient work of breathing	Low SIMV rate with small-diameter endotracheal tube or weak/fatigued patient	Increase SIMV rate to provide all or most of patient's required minute ventilation Switch to A/C mode
	T-piece trial with small-diameter endotracheal tube	Add inspiratory pressure support sufficient to overcome tube resistance Add inspiratory pressure support sufficient to overcome tube resistance at patient's required minute ventilation
	A/C mode with excessive triggering effort	Adjust trigger/assist sensitivity to 1-1.5 cm H ₂ O
Inappropriate use of neuromuscular blocking agents	Patient who previously tolerated now "fighting the ventilator"	Disconnect patient from circuit and ventilate manually to make sure ventilator is functioning normally (volume; pressure; flow pattern) Rapidly assess airway patency, symmetry of chest expansion, vital signs, and other monitoring data Perform more complete patient assessment and adjust ventilator settings as clinically indicated
	Unintended hyperventilation (acute respiratory alkalosis)	Recognize underlying metabolic alkalosis (high serum bicarbonate); use arterial pH, not PCO ₂ , as guide for ventilator adjustments Sedate patient with appropriate agent (e.g. benzodiazepine) if above does not apply and assessment of patient and ventilator reveals no acute problem

Table 15, continued (3 of 3)

	Neuromuscular blocking agent used without concomitant sedation	Administer sufficient sedative to calm patient and produce amnesia
Technology gap in patient management	Physician ordering ventilator mode or settings fails to appreciate technical or clinical problem with therapy as ordered Nurse or respiratory therapist unfamiliar or uncomfortable with ventilator, mode, or settings as ordered	Discussion between physician, nurse, and respiratory therapist before therapy is carried out, initiated by either party (especially important with new or unfamiliar ventilator modes)
Bedside communication failure	Those caring for patient at bedside (nurse, respiratory therapist) do not understand patient's problem or rationale for ordered therapy Failure on part of nurse or respiratory therapist to communicate concerns about above problems	Explanation by physician caring for patient about diagnosis, pathophysiology, and/or therapeutic rationale Discussion with attending physician, initiated by concerned nurse or respiratory therapist