Penn Medicine COVID-19 Clinical Guide: Endotracheal Tube Obstruction

Updated 9/15/20 – Recommendations may evolve rapidly – Do not save file – If printed, update frequently – Check for latest version here

Signs of Loss of ETT Patency

AC/VC
↑ Peak inspiratory pressures (PIP)
Prolonged exp times

PSV/PC
PSV: Prolonged insp/exp times
PC: Prolonged exp times

Note: Vt may not fall until near complete occlusion[1]

Mechanics
↑ Inspiratory airway resistance (Ri)
↓ Compliance
Progressive auto-PEEP

Patient
Difficulty passing suction catheter
Retractions/increased WOB
Resp efforts fail to trigger breaths

Monitoring Resistance

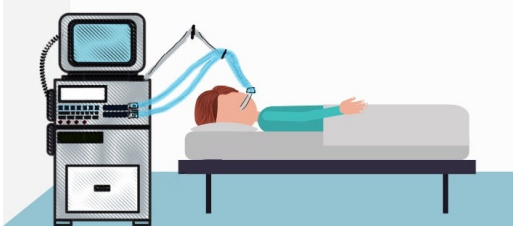
	Normal Lungs	ARDS	COPD
Inspiratory Resistance (cmH2O/L/s)	10 – 15	10 – 15	10 – 30
Compliance (ml/cmH2O)	> 60	10 – 50	> 60
Peak Inspiratory Pressure (cmH2O)	< 20	< 35	20-60

Ri > 15 is abnormal

Measure Q12h & with clinical/ventilator changes warranting reassessment

Place patient on AC/VC square wave flow pattern to measure

Patient must be passive for accurate measurement; if high concern for obstruction, consider temporary sedation +/- paralysis to obtain accurate vent mechanics



On AC/VC Square Wave

On flow 60L/min:
Ri = PIP – Plat

Other flow rates:
Ri = (PIP – Plat) / Flow (L/s)

(*Vent should calculate & display Ri*)

ETT Obstruction Overview

↑ Incidence in COVID-19, especially with non-humidified vent circuits

- Small decreases in ETT diameter result in large increases in resistance
- Unexplained asynchrony or difficulty tolerating spont modes warrant evaluation
- Progressive autoPEEP & ↑ PIP/Ri on AC/VC square wave warrant urgent mgmt

Suction Catheter RED FLAGS:
Difficulty passing → urgent intervention; Inability to pass → emergent intervention

Treating & Reversing ETT Obstruction

Clinical Instability and/or Inability to Pass Suction Catheter?

NO

Urgent Management

Consider bronch if unclear if obstruction in ETT or native airway

Give 2mL 3% saline or 2mL 10% Mucomyst +/- albuterol[a] via Aerogen[b] inline nebulizer

After treatment, perform inline suctioning

+/-

If available, use in-line EndOclear catheter vs. Fogarty balloon to strip secretions/biofilm
(Fogarty requires anesthesia or IPulm)

YES

Emergent Management

Call Airway Rapid Response overhead for emergent airway intervention

ETT exchange or reintubation
(exchange catheter preferred, alternatively VL or DL at provider discretion given comfort)

Call Anesthesia for consideration of airway intervention
(If unable to effectively & rapidly address ETT concerns via consult, can call Airway RR)

Concern for persistent ETT obstruction

NOTE: Airway Rapid Response previously used for **emergent airway loss**
Now can be called for **unstable** airway with risk of **impending airway loss**

a) To prevent bronchospasm
b) If Aerogen not available, directly instill medication into ETT, DO NOT use open nebs

[1]Tung. Anesth Analog. 2002

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