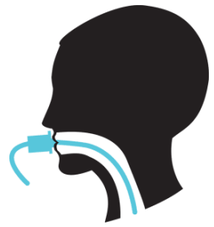
IC Manual
best practice guidelines for intensive care

Suctioning an Adult Patient with an Artificial Airway

ASSESSMENT

ACI NSW Agency for Clinical Innovation



ASSESSMENT

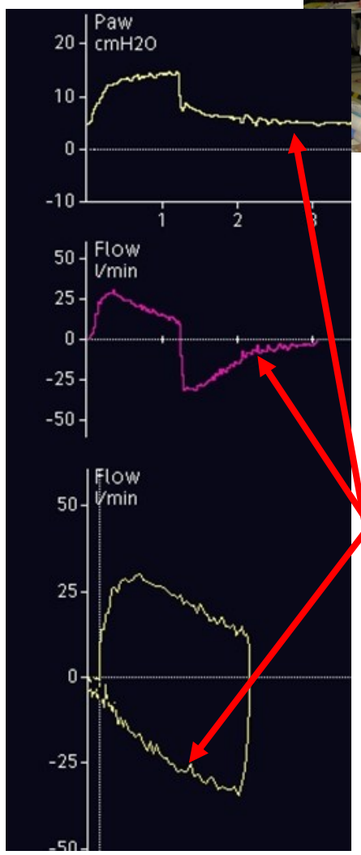
1	Assessment of the patient to identify the need to suction a tracheal tube should be continuous with chest auscultation performed every two hours or more frequently as indicated by clinical signs such as those mentioned in recommendation 2. **Consensus**
2	The decision to suction a tracheal tube must be made on the basis of the clinical need to maintain the patency of the tracheobronchial tree. A tracheal tube should only be suctioned when clinically indicated by signs which could include: i. Visible, palpable or audible secretions (such as sputum, gastric or upper airway contents, or blood); ii. Respiratory: desaturation, rising peak inspiratory pressure (during volume-controlled mechanical ventilation/modes), decreasing tidal volume (during pressure-controlled ventilation/modes), increased respiratory rate, increased work of breathing or coarse breath sounds on auscultation; iii. Cardiovascular: increased heart rate and blood pressure; iv. Other: restless/agitated or diaphoretic patient; **v.** A saw-tooth pattern on a Flow-Volume Loop or expiratory flow-time waveform, as illustrated on the ventilator graphics. **Grade C**
3	Prior to suctioning, consideration should be given to the potential complications and contraindications in individual patients. **Consensus**
4	To reduce patient anxiety and to promote patient understanding of, and compliance with the suctioning procedure, patients should be given clear information regarding the suction procedure including: the need for suction, the consequences of not suctioning when it is required and the effects of suctioning. Furthermore this information should be repeated with each suction procedure as some patients may not recall previous instructions. **Consensus**
5	Patient assessment during and post suction should include an evaluation of the effects on the patient's pre suction signs and symptoms. This should include monitoring of cardiac rate and rhythm, blood pressure, pulse oximetry, airway reactivity, tidal volumes, peak airway pressures, or intracranial pressure. **Consensus**
6	Some patients groups require constant/continuous monitoring of ECG & pulse oximetry pre, during and post suctioning. **Consensus**
7	Documentation of the assessment and suction procedure must occur. **Consensus**

POTENTIAL ADVERSE EVENTS

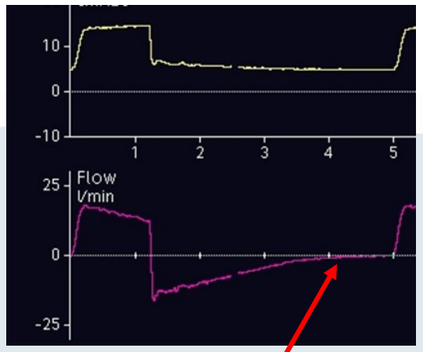
System	Hazards / Complications	Patients at risk
Respiratory	• Decrease in dynamic lung compliance and FRC • Atelectasis • Hypoxia / hypoxaemia • Tissue trauma to the tracheal and/or bronchial mucosa • Bronchoconstriction / bronchospasm	• Acute pulmonary haemorrhage • ALI/PEEP dependent/high O_2 requirements • Lack of cough reflex • High risk of bronchospasm/ reactive airways
Cardiac	• Hypertension • Hypotension • Cardiac dysrhythmias	• Unstable CVS
Neurological	• Changes in cerebral blood flow and increased ICP	• Unstable/high ICP • Spinal injury with autonomic dysreflexia
Haematological	• Bleeding	• Coagulopathy i.e. platelets <20, INR>2.5
Infection Prevention	• Increased microbial colonization of lower airways	• Immuno-compromised

Table adapted from AARC (2010) Clinical Practice Guidelines.

ALI = acute lung injury, CVS = cardiovascular system, FRC= functional residual capacity, ICP = Intracranial pressure INR = International normalised ratio, O_2 = oxygen, PEEP = Positive end expiratory pressure



Sawtooth pattern on the pressure, flow and flow/ volume waveforms indicating loose secretion build-up in endotracheal tube or condensate in tubing. NOTE: this occurs on inspiration and expiration



Prolonged expiration (less than 80% expired in 1 second) indicating partial obstruction of tube caused by kinked tube

Ventilator graphics courtesy of POW ICU

ASSESSMENT ITEMS

Physiological variable	Before	During	After
Respiratory			
Breath sounds	√	√	Nil added (I)
SpO_2	√	√	Improved (I) *
RR	√	√	Improved (I)
Pattern of breathing	√	√	Improved (I)
Sputum Colour	√	√	Document
Sputum Amount	√	√	Document
Sputum Viscosity	√	√	Document
Palpation	√		√ (i)
ABGs	√		>20mins (D) #
Ventilator Parameters			
Saw tooth pattern	√		Absent (I)
Tidal Volume	√		Increased (I)
Peak airway pressure	√		Decreased (I)
Compliance	√		Increased (I)
Cardiovascular			
Heart rate	√	√	Baseline (D)
Rhythm	√	√	Baseline (D)
BP	√	√	Baseline (D)
MAP	√	√	Baseline (D)
Neurological			
ICP	As indicated	As indicated	As indicated (I)

Grading of Recommendations	
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation/s but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution
CONSENSUS	Expert opinion where consensus was set as a median of ≥ 7 (Likert 1-9)

The guideline can be found at http://aci.health.nsw.gov.au/networks/intensive-care/ic-manual

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SUCTION TECHNIQUES

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THE SUCTION CATHETER

8	Size of the suction catheter should be less than half the internal diameter of the tracheal tube. **Grade D**
9	The total suction procedure (from insertion to removal of catheter) should take a maximum of 15 seconds with negative pressure applied continuously as the catheter is being withdrawn from the tracheal tube. **Grade D**
10	In patients considered at high risk of adverse events, trauma to and stimulation of the carina should be minimised to prevent complications. Therefore the suction catheter should only be inserted down a tracheal tube until it just emerges out of the lumen of the tube. **Consensus**
11	In patients not considered high risk of adverse events, the suction catheter may be passed until either a point of resistance is felt or a cough is stimulated, then withdrawn 1-2cm prior to continuous suction. **Consensus**
12	The maximum occluded suction pressure should be limited to - 80 to 150mmHg (20kPa) for OSS & CSS. The wall outlet should have a high pressure gauge attached. **Consensus**

PRE-OXYGENATION

13	If a patient has high oxygen and PEEP requirements and/or is known to de-saturate to clinically significant levels, pre-oxygenation should be considered. **Grade B**
14	If pre-oxygenating, use the ventilator capability to deliver 100% oxygen. **Grade B**

SALINE

15	To prevent the occurrence of adverse events, bolus instillation of normal saline should not be routinely used prior to suctioning. **Grade B**

OPEN VERSUS CLOSED SUCTION

16	Closed suction catheter systems should be used as the system of choice for patients with an ETT or tracheostomy who require suction. **Grade C**
17	Closed suction catheter systems should be changed as per manufacturer's instructions. **Grade D**
18	Closed suction systems should be cleaned as per the manufacturers' instructions to maintain patency and minimise colonisation. **Consensus**

HYPERINFLATION

19	Hyperinflation should not be performed on a routine basis prior to suctioning. **Grade B**

SUB-GLOTTIC SUCTION

20	Tracheal tubes with sub-glottic suction capability should be used for mechanically ventilated patients who are expected to be ventilated >72hours. **Grade B**
21	If a tracheal tube does not have sub-glottic suction capability, a Y-catheter should be used to remove "above the cuff" secretions. **Consensus**

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SUCTION CATHETER DEPTH

For all patients
- Encourage participation with active inspiration and cough

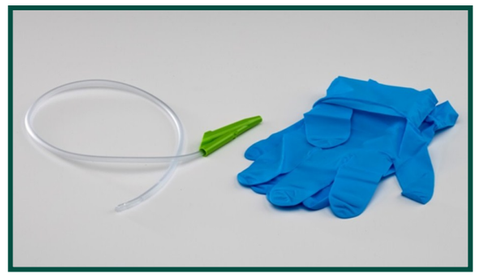
For patients at low risk of Adverse Event
- Insert catheter until resistance or cough
- Withdrawn 1-2cms
- Withdraw catheter slowly with continuous suction

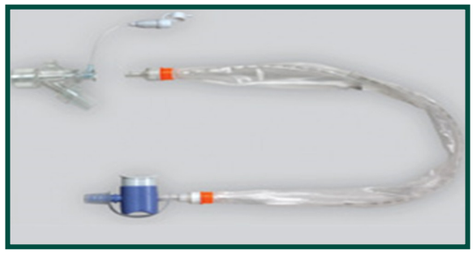
For patients at high risk of Adverse Event
- Stimulation of the carina should be avoided
- Measure the desired catheter depth
- Insert the catheter until it just emerges from the lumen of the tracheal tube

The guideline can be found at http://aci.health.nsw.gov.au/networks/intensive-care/ic-manual

INFECTION PREVENTION

22	Standard Precautions require the use of PPE to prevent contamination and mucosal or conjunctival splash injuries and is mandatory while suctioning a patient. This must include *goggles & mask* or *face shield*/ gloves and gown/apron as per NSW 2007 infection control policy **PD 2007_037**
23	The 5 moments of hand hygiene must be adhered to. **PD2010_058**
24	When using OSS technique an aseptic non touch technique is to be used. **Consensus**
25	Clinicians should perform a risk assessment for specific droplet and airborne precautions prior to suction. **Consensus**





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