

## **SIMULATION SCENARIO PLAN**

**Title:** Recognition of endotracheal tube dislodgement

**Author:** Chris Nickson

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### **Personnel**

- Participating learners: junior medical staff; +/- ICU nurses
- Instructors: Facilitator/ Lead Debriefers and Co-debriefer, Confederate
- Participant Roles:
  - team leader
  - airway doctor
  - airway assistant +/- airway backup (2nd intubator/ emergency surgical airway)
  - drugs
  - scribe
  - +/- cricoid pressure

### **Objectives**

- To recognise and treat endotracheal tube dislodgement
  - loss of ETCO<sub>2</sub>
  - reintubation
- To demonstrate effective teamwork, including:
  - statement of plan
  - role allocation
  - closed loop communication
  - leadership and followership skills

## Storyboard

- **Information provided to participants:** Sid Vicious is a 32 year-old man with a history of alcohol and IV drug use. He presented to the ED after drinking vodka and using speed. He was agitated, abusive and difficult to control and had coexistent epistaxis. He was intubated due to his uncontrollable behaviour, with thiopentone 300mg IV and suxamethonium 100mg IV (either prehospital or in ED). He was a grade 2 intubation, after a failed attempt by a more junior intubator. His nose was packed and the epistaxis settled. He has just arrived in the ICU/ED with a propofol infusion running.
- **Scenario events:** Team to recognise accidental extubation, allocate roles, develop plan and perform a safe approach to re-intubation.

## Requirements

- ICU simulation cubicle
- Mannikin (e.g. ALS)
- Mock airway and drug trolley (includes: standard sized endotracheal tubes, bag-valve-mask, LMA, laryngoscope, oropharyngeal airways, tube ties; intubation and resuscitation drugs such as propofol, suxamethonium, atropine, adrenaline, amiodarone, phenylephrine, saline, ketamine, fentanyl, midazolam, rocuronium, cis-atracurium, thiopentone)
- C-MAC
- Yankauer sucker and endotracheal suction cannula
- ETCO2 monitor
- peripheral lines in both arms
- Ventilator on standby
- iSimulate monitors (preprepared monitor kit with 2 ipads using iSimulate software)
- Intubation checklist
- Scribe sheet

## Progression (see table)

- Stage 1
  - team assesses patient with the assistance of the confederate:
    - gradually worsening hypoxia
    - patient is breathing spontaneously
    - no ETCO<sub>2</sub> reading (ETCO<sub>2</sub> is connected, works if tested, was working in ED)
    - collateral history reveals coughing and bucking during transfer treated with propofol boluses. Transport team did not have paralytics
    - ETT is tied in appropriately, and is 20 cm at the teeth (position unchanged)
    - Post-intubation CXR taken before transfer to ICU showed ETT was in trachea, but was above the clavicles (i.e. sitting high)
    - Audible breaths can be heard on close examination
- Stage 2
  - if paralytics given prior to reintubation hypoxia will accelerate as no longer ventilating
  - if laryngoscopy performed, endotracheal tube tip will be in esophagus or pharynx
  - if ETT removed: BVM will be successful only if paralytics given, leading to improved oxygenation
- Stage 3/4
  - uneventful intubation
  - confirmation of placement e.g. ETCO<sub>2</sub>, auscultation
  - ongoing sedation and ventilator settings

## Information for participants

- **Generic briefing** (see briefing plan)
- **Specific briefing for this scenario:** Team are told they are the ED/ICU Nightshift team and given the 'information provided to participants' listed under 'Storyboard'.
- **If requested:** Normal FBC, UEC, LFTs, coagulation profile, Trop, CK, CMP. Normal ECG. CXR post-intubation (if done) showed ETT sited above clavicles. Urine drug screen positive for amphetamines and barbiturates (post-induction). Blood alcohol 0.25. Normal ABG.
- **Medications if requested:** Given thiopentone 300mg IV and suxamethonium 100mg IV over 30 min ago as part of RSI. Thiamine 300 mg IV given, propofol infusion.

Stage	A	B	ETCO2	SpO2	ECG	BP	Neuro
1. Start	ETT size 8-0; air leak	RR 24 on PSV 10/5	absent	SpO2 90% and falling on FiO2 1.0	SR 120	160/90	GCS5T (E1VTM4)
2. BVM	patent ith manoeuvres after ETT removal	ventilation effective after NMB	unable to measure until ETT replaced	SpO2 95% and falling despite HFO2 or PPV	SR 120 and increasing until sedated and hypoxia corrected	160/90+ (less if sedated)	GCS5T (E1VTM4) Or paralysed
3. Apnea	patent with manoeuvres	apnea	0	SpO2 95% if pre-oxygenated/ apox effective; otherwise lower	SR 120 or lower if sedated	160/90+ - lower if effective induction	GCS2T if induction/ paralysed
4. post intubation	ETT	Normal	35	SpO2 100% on FiO2 1.0	SR 80	120/80	paralysed

### Information for Confederate

- Confederate to be helpful but not assertive
- Confederate to assist junior staff with their roles if inexperienced
- Important that the confederate states that the patient localises to the ETT, follows commands and clearly wants the ETT removed when assessed
- If asked relevant questions will provide the following information:
  - bloods unremarkable
  - intubated with thiopentone 300mg IV and suxamethonium 100mg IV (either prehospital or in ED)
  - coughing and bucking in transit, given propofol boluses - no additional paralytic give
- Confederate to use graded assertiveness if gross errors in plan
  - e.g. why don't we have an ETCO2 trace? Is the ETCO2 working? Is the tube in the right place? I think I can hear an air leak... Do we need to re-intubate?
  - e.g. challenge gross errors in drug selection or dosing (allow subtly incorrect use or slightly big drug doses that

wouldn't kill the patient outright)

## Debriefing

- recognition of accidental extubation
  - endotracheal tube can become displaced (e.g. by coughing) even if no change in position at the teeth
  - more likely if the ETT is sited high in the trachea
  - always suspect if loss of ETCO<sub>2</sub> there is an air leak (cuff leak is a differential diagnosis)
  - consider laryngoscopy to confirm ETT position; in an emergency may need to remove ETT and perform BVM ("if in doubt, take it out")
- safe transport of an intubated patient
  - use of transport checklist and preparation of medications needed for transport
  - ensure adequate sedation and usually pre-emptive neuromuscular blockade
- safe approach to reintubation
  - sedation and neuromuscular blockade makes BVM more effective (use 2-handed technique and airway adjuncts)
  - adequate preoxygenation prior to intubation attempt
- teamwork: clear leadership (ideally hands off approach), role allocation, followership/ speaking up, sharing of mental model, closed loop communication, use of available resources

## Duration

- Preparation 30 min, Briefing 5 min, Simulation <10 min, Debriefing 5-20 min

## Resources

- RAPID SEQUENCE INTUBATION: <http://lifeinthefastlane.com/ccr/rapid-sequence-intubation/>
- UNPLANNED EXTUBATION: <http://lifeinthefastlane.com/ccr/unplanned-extubation/>
- CAPNOGRAPHY WAVEFORM INTERPRETATION: <http://lifeinthefastlane.com/ccr/capnography-waveform-interpretation/>
- CAPNOGRAPHY AND CO<sub>2</sub> DETECTORS: <http://lifeinthefastlane.com/ccr/capnography/>
- TRANSPORT OF ICU PATIENTS: <http://intensiveblog.com/transport-icu-patients/>