

## RHH PTT Simulation PARU – Neurosurgical Patient Deterioration

### Context:

- RHH PARU encounter a large load of a broad spectrum of patients, procedures and complexities
- There are many staff who have not had the chance to rotate through anaesthetics nursing to gain further experience in basic airway management and assisting anaesthetists with advanced airway management
- PARU staff have been actively engaging in skills-based training to increase their knowledge and abilities
- There have been emergency situations where as part of the process review post-event, it has been suggested that simulated airway management education would be helpful
- This simulation-based education is to build upon the existing knowledge and skills of PARU nurses, empowering them for future events
- There have been also incidences of post-neurosurgical procedure patients deteriorating in recovery
- Accordingly, this scenario has been written to facilitate discussion, education and familiarity with both airway management and neurosurgical patients, though the weighting is heavily towards airway management

### Overview:

- Mr Lee Rinaldo, 67 year old male post-craniotomy for meningioma
- Mr Rinaldo has been in PARU for 20 minutes after handover from the anaesthetist after an uneventful surgery and extubation
- The initial primary PARU nurse is now going on break and hands over the patient to another PARU nurse
- After handover, the patient deteriorates with lowered conscious state and decreasing saturations secondary to loss of airway
- PARU nurses assess patient and manage airway but without success
- Anaesthetic registrar arrives and helps with airway management, progressing to intubation (other airway management is unsuccessful)
- Intubation is successful and patient stabilises

### Learning Objectives:

- Consistent demonstration of effective teamwork behaviours including:
  - Shared mental model
  - Closed loop communication
  - Leadership + back up behaviours
- Timely locating of equipment for managing unwell patient including airway rescue trolley
- Demonstrate a structured approach to the performance of airway management

### Setting:

- Post-Anaesthetic Recovery Unit at 1900hrs on a weekday

Target audience:

- Recovery Nurses of all experience levels
- Anaesthetics registrar past level 1 supervision or anaesthetics consultant

Equipment required in recovery bay:

- Standard observations machine

Subsequent equipment likely to be sourced by participants (drugs and equipment to be used from active consumables to prevent mixing of simulation equipment with clinical space):

- Resuscitation drugs
- Airway rescue trolley including laryngoscope, endotracheal tube, syringe, +/- LMA
- Anaesthetic trolley
- Emergency trolley (potentially)

Simulation Equipment required:

- ATLAS manikin on trolley at 15-20 degrees head up with Hudson mask in place
- Simulated patient paperwork (See Appendix 2)
- Realiti360 system with staging monitor attached to front of recovery monitor
- IV access in situ (with run off bag attached to fluid out port of ATLAS manikin)
- Appropriate name tag on manikin (stickers in sim folder)

Faculty:

- 2 Anaesthetics Sim Faculty
  - 1 performs pre-brief, facilitates scenario and secondary debriefer (mostly analysis)
  - 1 runs simulation technology, performs primary debriefer (intro, reactions, summary)
- Perioperative Team Training Nurse

Personnel (participants):

- 1 Anaesthetist
- 4-6 PARU nurses

Timing (1 hour total):

- 5 minute set up
- 5 minute pre-brief
- 10-15 minute scenario performance
- 20-25 minute debrief
- 5 minute pack up and close

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Sequence of events:

- Existing PARU nurse (confederate) hands over to another PARU nurse as they are due to go home (see Appendix 1. Handover Script below)
- Once confederate nurse has left the room, the vitals are stable for 30 seconds before slow desaturation occurs (see table below for time frames)
  - If the nurse checks neurological state in this timeframe, there is no response
- Recognition by nurse of deterioration and call for help (brief press of emergency bell)
- Simple airway management (chin lift, head tilt, jaw thrust, increase oxygen flow)
- Gather emergency equipment (bag valve mask, airway rescue trolley, emergency trolley, anaesthetic trolley)
- Potential for attempted bag mask ventilation
- Anaesthetist arrives 3 mins after emergency bell (they have a 3 minute timer; they are aware of this time restraint, but nurses involved are not)
- Anaesthetist takes over airway management and proceeds as they see fit
- The only successful modality of airway management is intubation regardless of other methods attempted
- Once patient is intubated, vitals improve
- Team to perform brief discussion of next steps

Briefing script for participants:

- (All participants receive general PTT pre-briefing – see Appendix 3)
- Thank you again for participating in today's scenario
- You are all recovery nurses in your normal roles with your normal level of responsibility
- It is 7pm on a weekday
- [Confederate nurse name] has been looking after Mr Lee Rinaldo, a 67yo male, after an elective craniotomy for resection of a meningioma.
- [Confederate nurse] is due to go home and one of you is coming to take over care; the rest of you are currently waiting for other patients to come out from operating theatre
- Would one of you like to volunteer to take handover from [Confederate nurse]?
- Thank you very much – I'll leave [confederate nurse] to give you a handover and the scenario will begin

FACILITATORS PLEASE NOTE THE FOLLOWING:

- While it is quite likely that the deterioration has occurred due to an acute intracranial change, the intent is to keep the scenario focussed primarily on airway management in the first instance
- If participants are placing a large focus on ICP management that detracts from securing the airway, then faculty are to guide them towards the ABCDE approach where airway must be safely managed before neurological concerns

Stage	Vitals						Intended Events	
	A	B			C			D
		SpO <sub>2</sub>	RR	E <sub>T</sub> CO <sub>2</sub>	HR/ECG	BP		
Start	Patent	97% 6L Hudson	10	N/A	78 SR	118/76	Eyes shut, follow commands both sides	Handover
Transition 1	Once handover complete and Confederate Nurse has left the room							
Deterioration 1 (over 3 minutes)	Partial obstruction	70%	10	N/A (0 if CO <sub>2</sub> connected to BVM)	50 SR	140/88	No response to any stimuli Pupils equal and reactive if checked	Recognition of deterioration Call for help Simple airway manoeuvres Gathering equipment Attempted bag mask ventilation
Transition 2	Occurs automatically after 3 minutes							
Deterioration 2 (over 3 minutes)	Obstruction	50%	0	N/A	45 SR	140/88	No response to any stimuli Pupils equal and reactive if checked	Anaesthetist attends and takes over airway management Equipment for intubation prepared Intubation performed
Transition 3	Occurs once endotracheal tube inserted, cuff inflated and ventilation commences via ETT							
Recovery (over 1 minute)	ETT	93%	Participant dependent*	62	72 SR	132/80	No response to any stimuli Pupils equal and reactive if checked	Team recognition of improvement Discussion of situation and brief consideration of next steps *ATLAS manikin will recognise ventilation frequency
END	Scenario ends after participants discuss 1. Need to contact Neurosurgeons 2. Need for emergent CT scan. Faculty to prompt if not occurring							

## DEBRIEF STRUCTURE AND NOTES (PEARLS FORMAT)

(Originally published as Bajaj K, Meguerdichian M, Thoma B, Huang S, Eppich W, Cheng A. The PEARLS Healthcare Debriefing Tool. Acad Med. 2017):

Stage	Objective	Task	Sample Phrases	Notes
Setting the scene	Create a safe context for learning	State the goal of debriefing; articulate the basic assumption	"Let's spend X minutes debriefing. Remember, our goal is to improve how we work together and care for our patients."	
Reactions	Explore feelings	Solicit initial reactions & emotions	"Any initial reactions?" "How are you feeling?"	
Description	Clarify facts	Develop shared understanding of case	"Can you please share a short summary of the case?" "What was the working diagnosis? Does everyone agree?"	
Analysis	Explore variety of performance domains	<p>1) Learner Self-Assessment <i>Promote reflection by asking learners to assess their own performance</i></p> <p>2) Focused Facilitation <i>Probe deeper on key aspects of performance</i></p> <p>3) Provide Information <i>Teach to close clear knowledge gaps as they emerge and provide directive feedback as needed</i></p>	<p>What aspects were managed well and why? What aspects do you want to change and why?</p> <p>Advocacy: I saw [observation], I think [your point-of-view]. Inquiry: How do you see it? What were your thoughts at the time?</p> <p>I noticed [behaviour]. Next time you may want to consider [suggested behaviour], because [rationale]</p>	
Any Outstanding Issues/Concerns?				
Application/ Summary	Identify take-aways	<p>Learner-centred</p> <p>Instructor-centred</p>	<p>"What are some take-aways from this discussion for our clinical practice?"</p> <p>"The key learning points for the case were [insert learning points here]."</p>	

## **Appendix 1.** ISOBAR Script for confederate PARU nurse

Hi [PARU nurse], I'm [Confederate Nurse] - thanks for coming to take over!

I: This is Lee Ranaldo, a 67yo male who has been here for 20 minutes after a craniotomy. He's been stable so far. Shall we do an ID band check?

S: Lee had an elective Category 1 posterior fossa craniotomy for resection of a newly diagnosed meningioma. Here's his anaesthetic chart (provides chart). It was an uneventful anaesthetic and operation; the operation note is on DMR and there are no specific post-op orders that need actioning.

O: Lee has been very stable out here; he's maintaining his own airway, sats have been good on a Hudson – I was just leaving that on until he's a bit more awake, respiratory rate 10-12, heart rate in the 70s, sinus rhythm, Systolic has been in the 120s. Neurologically, he's still pretty drowsy with his eyes closed, but following commands when I ask him to squeeze my hands and move his feet on both sides. Pupils are equal and reactive. "Lee, squeeze my hand on both sides... great, thank you". He doesn't seem to be in any discomfort, so I haven't given any analgesia as yet. His temperature 36.5, BSL 6.6.

B: In terms of his past medical history, he's a retired builder just with some high blood pressure and high cholesterol. Allergy-wise, he's got a rash to penicillin but is ok with cephalosporins.

A/R: He's been stable out here, I'm just waiting for him to wake up a bit more before I trial him without the Hudson mask, see if he needs any pain relief and then hopefully get him up to Neurosurgical HDU before too long.

## **Appendix 2.** Simulated Patient Paperwork

See link:

[https://drive.google.com/file/d/1uYrRu3WV7EIFUc7fSdDt8C7-IVM81HLy/view?usp=drive\\_link](https://drive.google.com/file/d/1uYrRu3WV7EIFUc7fSdDt8C7-IVM81HLy/view?usp=drive_link)

## **Appendix 3.** Perioperative Team Training Pre-Brief slides (see page 7)

# Perioperative Team Training (PTT)



# What is PTT?

- Multidisciplinary, in-situ, scenario-based simulation training
- It is for learning, team-building, practice and enjoyment
- Non-technical skill focus
  
- It is not a test or an assessment

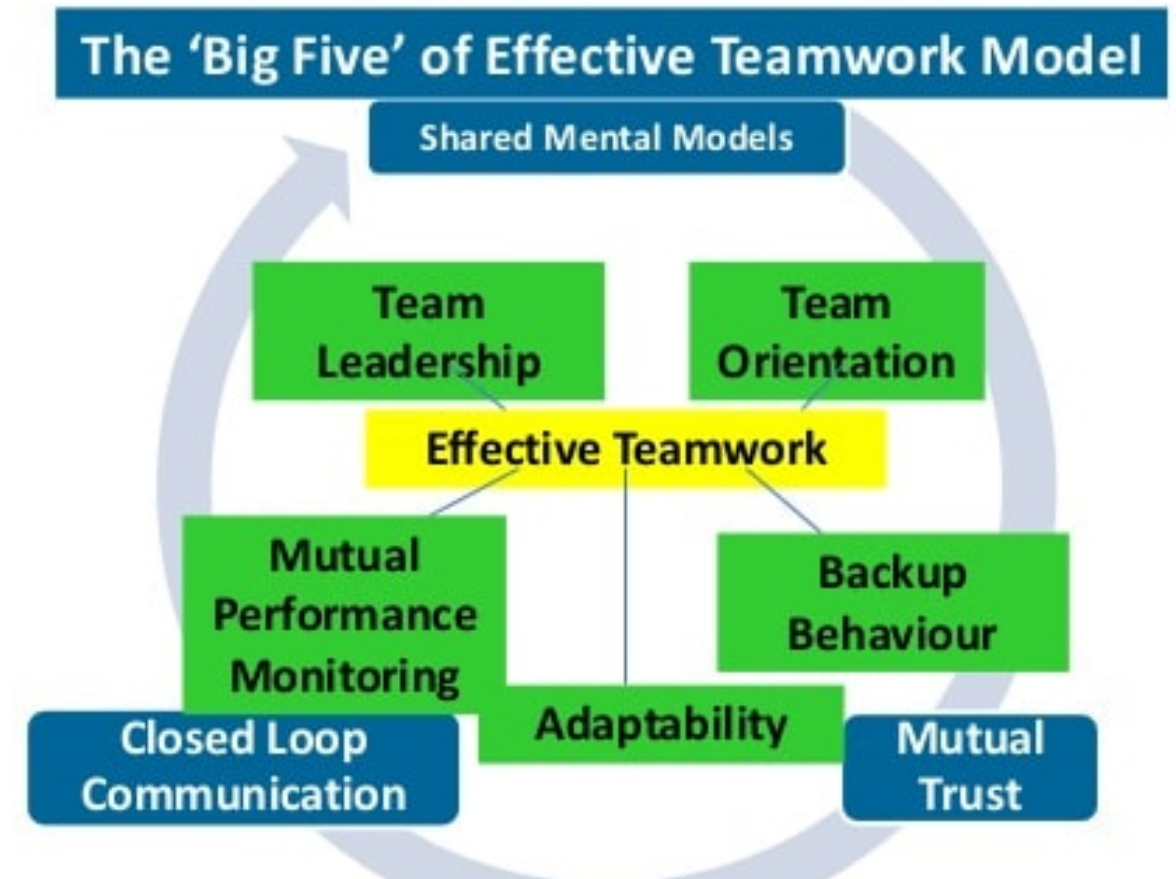


# The Basic Assumption

We believe that everyone participating in activities in Perioperative Team Training is intelligent, capable, cares about doing their best and wants to improve.

# Learning Objectives

1. Effective team communication
  - a. Shared Mental Model
  - b. Closed-Loop Communication
  - c. Mutual Trust
  - d. Leadership
  - e. Followership
2. Crisis management
3. Ensure correct locating and use of equipment



Adapted from Salas, Sims and Burke, 2005. "Is there a 'Big Five' in Teamwork." Model represents the 'Big Five' behaviours (green) and the Co-ordinating Mechanisms (blue) required for Effective Teamwork (yellow).

# Simulation and the Real World

- Environment and equipment
  - Use as you would; open and give things
  - Drugs
  - Monitor
- Emergency bell – only pretend to press
- Participants
- Patient
- “Pause”

If you don't know – ask 😊

# Final points

1. Confidential and safe
2. Be yourself – it's a regular day at work
3. Enjoy the learning opportunity

Thanks for participating!

## Appendix 4. Observer Guide

Thank you for observing the scenario today!

Your role involves the following:

- Read the scenario information below to gain an understanding of what is about to occur.
- Read the learning objectives: you will be allocated one prior to the scenario to observe.
- Watch the scenario carefully with your learning objective in mind.
- Participate in the debrief – it would be great if you can assist in providing constructive feedback related to what occurred and how it aligned with the expected behaviours.

Scenario:

- Post-Anaesthetic Recovery Unit at 1900hrs on a weekday
- Mr Lee Ranaldo, 67 year old male post-craniotomy for meningioma, has been in PARU for 20 minutes after handover from the anaesthetist after an uneventful surgery and extubation
- Existing PARU nurse (confederate) hands over to another PARU nurse as they are due to go home:
  - Hi [PARU nurse], I'm [Confederate Nurse] - thanks for coming to take over!
  - I: This is Lee Ranaldo, a 67yo male who has been here for 20 minutes after a craniotomy. He's been stable so far. Shall we do an ID band check?
  - S: Lee had an elective Category 1 posterior fossa craniotomy for resection of a newly diagnosed meningioma. Here's his anaesthetic chart ([provides chart](#)). It was an uneventful anaesthetic and operation; the operation note is on DMR and there are no specific post-op orders that need actioning.
  - O: Lee has been very stable out here; he's maintaining his own airway, sats have been good on a Hudson – I was just leaving that on until he's a bit more awake, respiratory rate 10-12, heart rate in the 70s, sinus rhythm, Systolic has been in the 120s. Neurologically, he's still pretty drowsy with his eyes closed, but following commands when I ask him to squeeze my hands and move his feet on both sides. Pupils are equal and reactive. "Lee, squeeze my hand on both sides... great, thank you". He doesn't seem to be in any discomfort, so I haven't given any analgesia as yet. His temperature 36.5, BSL 6.6.
  - B: In terms of his past medical history, he's a retired builder just with some high blood pressure and high cholesterol. Allergy-wise, he's got a rash to penicillin but is ok with cephalosporins.
  - A/R: He's been stable out here, I'm just waiting for him to wake up a bit more before I trial him without the Hudson mask, see if he needs any pain relief and then hopefully get him up to Neurosurgical HDU before too long.
- Once confederate nurse has left the room, the vitals are stable for 30 seconds before slow desaturation occurs
  - If the nurse checks neurological state in this timeframe, there is no response
- Recognition by nurse of deterioration and call for help (brief press of emergency bell)
- Simple airway management (chin lift, head tilt, jaw thrust, increase oxygen flow)
- Gather emergency equipment (bag valve mask, airway rescue trolley, emergency trolley, anaesthetic trolley)
- Potential for attempted bag mask ventilation
- Anaesthetist arrives 3 mins after emergency bell (they have a 3 minute timer; they are aware of this time restraint, but nurses involved are not)
- Anaesthetist takes over airway management and proceeds as they see fit
- The only successful airway management is intubation regardless of methods attempted
- Once patient is intubated, vitals improve
- Team to perform brief discussion of next steps: they must consider urgent neurosurgical opinion and the requirement for a CT scan

Learning Objectives:

- Consistent demonstration of effective teamwork behaviours including:
  - Shared mental model
  - Closed loop communication
  - Leadership + back up behaviours
- Timely locating of equipment for managing unwell patient including airway rescue trolley
- Structured approach to the performance of airway management

Learning Objective	Expected behaviours	Things to look for
Effective teamwork behaviours (adapted from Salas, E., Sims, D. E., & Burke, C. S. (2005). Is there a “Big Five” in Teamwork? Small Group Research, 36(5), 555-599.)		
Shared mental model	Team members have the same priorities	<p>Discussion of goals</p> <p>Recapping of stage of progress</p> <p>Coordinated approach to issues</p>
Closed loop communication	Requests are targeted to a specific person and communication occurs both ways	<p>Names are used as much as possible</p> <p>The recipient of a request relays their receipt of the request to its originator</p> <p>Once a task is done, the performer relays the completion to the requesting individual</p>
Leadership	There is a team leader who helps guide the team towards their objectives	<p>A leader who is either nominated or obvious to the group</p> <p>The leader provides helpful and clear instructions to the group</p> <p>The leader listens to the group</p>
Back-up behaviours	Team members work together to achieve their goals and to assist the leader where possible	<p>Team members display initiative in managing issues</p> <p>Team members form mini-teams to carry out tasks</p> <p>Team members make suggestions to the team leader</p>

Learning Objective	Expected behaviours	Things to look for
Timely locating of equipment for managing unwell patient including airway rescue trolley	<p>The need for the airway rescue trolley is recognised early and retrieved</p> <p>The anaesthetic trolley is retrieved and brought to the bed space</p> <p>Participants may or may not choose to also retrieve the emergency trolley</p>	<p>The correct trolleys are retrieved</p> <p>The airway rescue trolley is retrieved before the anaesthetist arrives</p> <p>Participants locate the correct equipment within the trolleys without undue delay</p> <p>The equipment is correctly prepared for use</p>

Learning Objective	Expected behaviours	Things to look for
Structured approach to the performance of airway management	<p>Participants perform basic airway manoeuvres first</p> <p>Participants progress recognise the lack of success and prepare for advanced airway management</p> <p>Participants perform advanced airway management</p>	<p>Participants increase oxygen flow and perform simple airway manoeuvres: chin lift, head tilt, jaw thrust</p> <p>Participants recognise the lack of success and use correctly sized and inserted airway adjuncts such as guedel airways and/or nasopharyngeal airways</p> <p>Participants escalate to a self-inflating bag to provide positive pressure ventilation</p> <p>Participants discuss and anticipate next steps at each stage</p> <p>Participants select and prepare an endotracheal tube and laryngoscope, recognising that this patient requires definitive airway management</p> <p>If a laryngeal mask airway is nominated as an interim option, it is appropriately selected and prepared</p> <p>The patient is eventually successfully intubated</p>

## Appendix 5. Evaluation

### Step 1:

All participants complete an anonymous Microsoft Forms survey with the following questions:

- Occupation
  - Selected from list
- How safe and supported did you feel during the PTT?
  - Very unsupported/unsupported/neutral/supported/very supported
- Did you find PTT a helpful learning experience?
  - Very unhelpful/unhelpful/neutral/helpful/very helpful
- What was the most positive aspect of today's session?
  - Free text
- What was the most negative aspect of today's session?
  - Free text
- How likely would you be to recommend PTT to your colleagues?
  - Very unlikely/unlikely/neutral/likely/very likely
- From an educational point of view, how can we improve team training?
  - Free text
- Do you think the session was worth the interruption to service provision?
  - No/maybe/yes

### Step 2:

Faculty review:

- How did the participants perform?
- How did the simulation perform?
- Was all equipment present?
- Were there any gaps in documentation?
- How did the debrief go?
- Were there any systems issues that need addressing?
- Overall, what worked well and what needs to change in future?

### Step 3:

Formal report to Surgical and Perioperative Services Executive, areas managers and participants (BCC)

See link:

<https://drive.google.com/file/d/1nS0AXIz-YVzvLrkM4MFoiHIkDxglQPhI/view?usp=sharing>