



Simulation Education in Neuraxial Anesthesia Resource-Constrained Settings

GLOBAL HEALTH



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Introduction

- Neuraxial anesthesia is a critical skill to learn and perform in modern anesthesia practice
- In sub-Saharan Africa, anesthesia providers consist of few anesthesiologists and mostly non-physician clinical officers whose training can be variable
- Hands-on teaching opportunities in clinical setting are at times limited due to limited workforce (i.e. teaching faculty) in low resource settings
- There have been anecdotal reports of high complication rates of neuraxial (PDPH especially)
- Complications of neuraxial can be preventable if there is focused teaching on patient selection and medication effects

Aims

- Create a neuraxial curriculum including sim scenarios and partial task training, tailored to local context that could improve fund of knowledge and affect clinical practice for providers in low resource settings

Lecture

Standardized lecture incorporating core objectives for performing neuraxial anesthesia, including indications/contraindications, physiology, technique, and complications

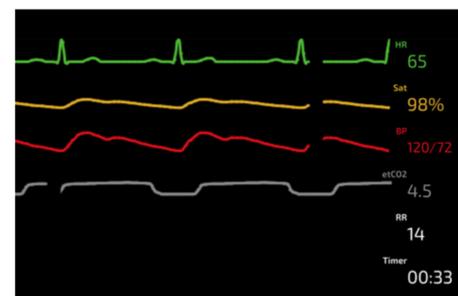
Low Fidelity Neuraxial Models

We constructed low fidelity neuraxial models based on a model developed by Dr. Merlin Larson for teaching anesthesia residents at UCSF. Cost was about \$20 per model and items locally sourced, including native fruits.



Simulation

- At Makerere University, we have previously established low-cost simulation center
- At Busitema University in Mbale, we recently developed a new low-cost simulation center
- For both centers, vitals are displayed using SimMon software that was developed and provided by Niels Castle
- We developed simulation scenarios to teach neuraxial anesthesia and manage high spinals that will be taught to anesthesia officers
- Simulation scenarios involve the scenario with guides for performance rating, debriefing, and educational materials.



Scenario Phase	Scenario Task	Patient Status	Instructor Actions	Learner Actions (Check as completed)	Scenario Task Evaluation					
					1	2	3	4	5	
Pre-anesthetic	Pre-assess patient	Awake, oriented, answers questions	Answers pre-assessment questions	<input type="checkbox"/> pre-assessment of patient (indication for C-section), decide on anesthetic technique <input type="checkbox"/> prepare/select drugs (spinal, GA and emergency) <input type="checkbox"/> check airway equipment and machine	<input type="checkbox"/>					
	Prepare equipment				<input type="checkbox"/>					
Advance once...all initial readings are taken (prompt for completion, "should we place the rest of the monitors, too before positioning for spinal?")										
Placement of spinal anesthetic	Apply monitoring	BP 130/80 pulse 90 SpO2 97%	- monitoring on	<input type="checkbox"/> applied monitoring	<input type="checkbox"/>					
	Decide appropriate anesthetic technique and performs steps for block		- prompt "what anesthetic technique will you choose?" (unless already stated by learner)	<input type="checkbox"/> decides on spinal anesthesia but has prepped for GA in case of complication, describes appropriate spinal drug and dose (eg bupivacaine hyperbaric 10mg) <input type="checkbox"/> states the steps involved in placement of block - prepping the skin, insertion with introducer, placement of spinal needle, etc.	<input type="checkbox"/>					
Assess level	Unable to lift legs, if tested block level is approx T10		-if necessary, prompt, "spinal is given, and you have lain the patient down" Surgeon asks "is it ok to start prepping yet?"	<input type="checkbox"/> makes an assessment of level of block <input type="checkbox"/> discusses with surgeon block is not to desired level, will need more time, but can prep and drape	<input type="checkbox"/>					
					<input type="checkbox"/>					
Advance once...patient's bp has been corrected to normal or prompt for other measures										

Challenges

- Simulation is not a part of the formal curriculum at Makerere University, so scheduling sessions was challenging
- Unpredictable factors such as strikes and hospital closures made course administration challenging during the study period
- Materials were sources locally though finding ideal materials was somewhat challenging and required modifications
- Cost effective audio/video setups for recording were challenging given loud environment and power reliability

Future Directions

- Pilot study to be conducted and course will be refined
- After course refinement, larger implementation with Anesthetic Officers (non physicians) to assess impact on fund of knowledge and practice patterns
- Support secured from WFSA to scale this pilot and evaluate impact on AO practice in Uganda

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