MULTIDISCIPLINARY SIMULATION EDUCATION: IMPROVING CARE OF PATIENTS WITH NEUROLOGICAL EMERGENCIES

Dhimant Dani, MD
Staff Intensivist, Neurocritical Care, Cerebrovascular Center
Assistant Professor Of Medicine and Neurology
Learner's School Of Medicine, Cleveland Clinic Foundation
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OUTLINE

- Limitations of traditional medical education model
- Best strategies for medical learning
- Neuro Emergency simulation and education
- Results, takeaways
- Conclusion and Future
- Discussion/Questions?

TRADITIONAL RESIDENCY TRAINING

- William Halsted, 1890

  "See one, do one, teach one…"

  "We need a system, and we shall surely have it, which will produce not only doctors but doctors of the highest type, men who will stimulate the first youths of our country to study medicine and surgery and to devote their energies and their lives to raising the standard of health science".

- Residency unchanged for over 100 years.

Is there a better way to train and educate medical providers?

CHALLENGES FACING TRADITIONAL RESIDENCY EDUCATION &TRAINING

- In 2003, ACGME instituted the 80 hour work week.
- Increasing medical-legal concerns.
- Desire for decreased adverse patient outcomes.
- Residency training is hard!
- High acuity, complex patients
- Increased focus on subspecialty training before generalist training has taken shape.
- Steep learning curve
- Requires several years

HOW DO WE LEARN BEST?

- We know what doesn't work.
- Active physical or mental involvement is best!
- Multisensory tasks.

DELIBERATE PRACTICE

- Versus repetition= Plateau less than maximal level
- Constantly setting new goals and seeking additional experience to achieve
- Doing the same thing= automated, increased repetition no longer leads to improvement

FOUR PRINCIPLES OF DELIBERATE PRACTICE

1. Have a task with a well-defined goal
2. Be motivated to improve
3. Be provided with immediate feedback
4. Be provided with ample opportunities for repetition and gradual refinements of performance

WHY DOES SIMULATION MATTER IN NEUROLOGIC EMERGENCIES?

- TIME IS BRAIN!!
- Stroke, seizures and intracranial hypertension
  - Immediate response and treatment is essential to preventing long-term brain damage and disability
  - One way street!!
- The luxury of practice is not feasible in a real life emergency

USING SIMULATION IN NEUROLOGIC EMERGENCIES MATTERS

- High acuity patients
- Multidisciplinary team – ED, Neurology, Neurosurgery, Trauma, Anesthesia …
- Complex decision making
  - Time sensitive treatments available- tPA, Thrombectomy, ICP crisis
- Rapid decision making required to majority of cases
- Multiple factors in patient history, exam, radiologic studies needed

USING SIMULATION IN NEUROLOGIC EMERGENCIES MATTERS

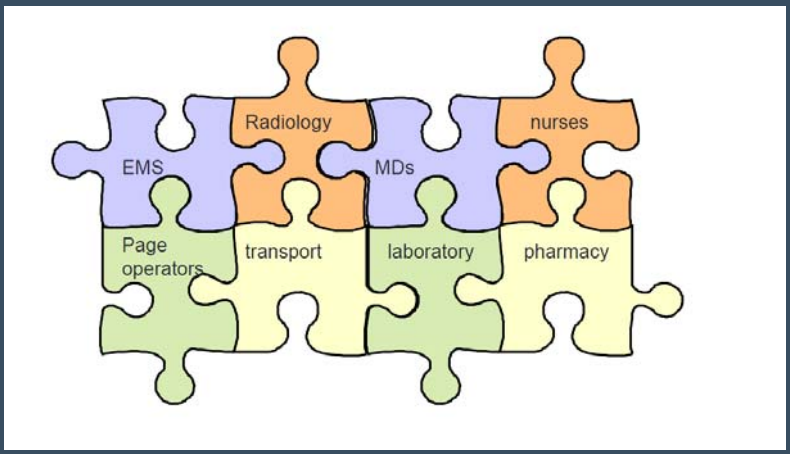
Limited exposure to Neuro Emergencies
+
High acuity patient, multiple team members, and complex decision making
=
High risk for delays in treatment, decision errors

DOES THIS MATTER?

High risk for delays in treatment, decision errors this can lead to

- Poor patient outcomes
- Decreased satisfaction of experience for patients and providers
- Increased cost burden to society with more disabled patients

ALL THE PIECES OF THE PUZZLE



SIMULATION FOR TRAINEES

Learning objectives

- Abbreviated history
- Perform targeted exam (brief exam, NIHSS, tools for physical exam)
- Identify signs/symptoms of neurological emergencies including seizure, herniation syndromes, acute stroke
- Interpret non-contrast head CT
- Identify the indication and contraindication of tPA
- Call for appropriate consultation
- Courteous yet efficient manner with patient
- Coordination with other care providers

METHODS

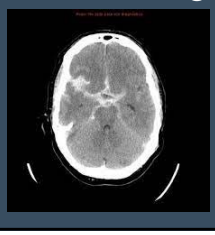
1. Stroke/Critical Care neurologist trained actor to a play a standardized patient if needed
2. A stroke nurse interacted with trainees and carried out nursing duties.
3. 5-6 trainees attended a 4 hour training session with 3 scenarios
4. Trainees communicated with the simulation faculty and RN during scenario
5. Debriefing occurred after each scenario
6. Trainees completed evaluations after the simulation

SCENARIOS

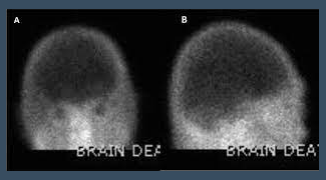
- Ischemic stroke with IV thrombolysis

- Heparin-associated Intracerebral Hemorrhage

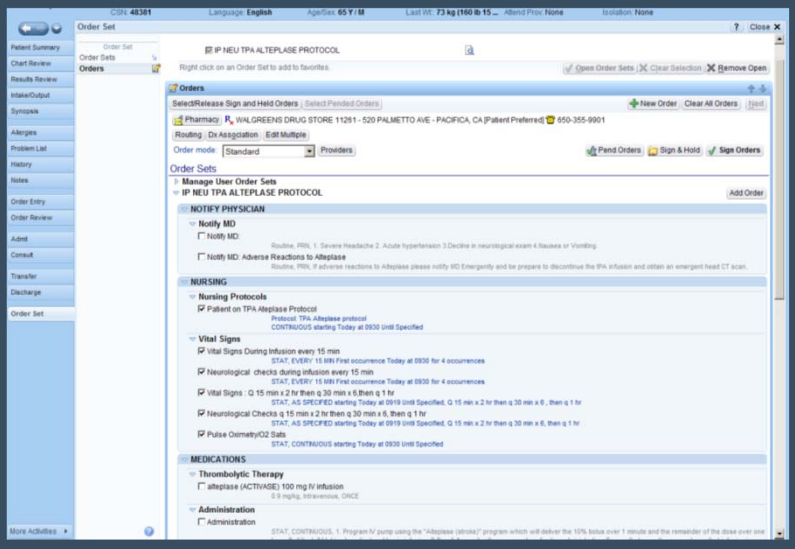
- Subarachnoid Hemorrhage



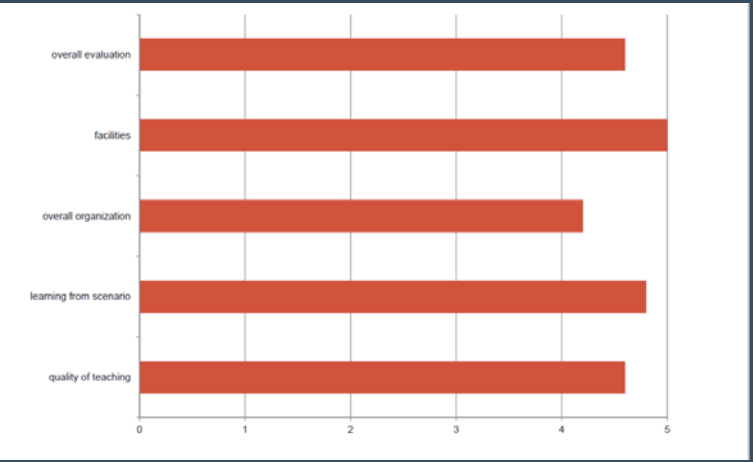
- Death by Neurologic Criteria



ORDER SET



TRAINEE POST-EVALUATION



POST SIMULATION KNOWLEDGE

- Included array of multiple choice questions covering clinical content
- Average score of 7.8-9/10 in post stroke knowledge assessment
- Crisis resource management

TRAINEE FEEDBACK

"*Having a real life actor was really helpful to learn how to act quickly during an emergency.*"

"*Realistic situation without risk- this is great for learning.*"

FUTURE EXPANSION

- Simulations for use in process flow improvements
  - Educating large group involved in those patient's care : ED, Critical Care Transport, Other Hospitals in Regional health System
- Supporting larger education efforts with broader simulation efforts
- Use of virtual and augmented reality

The World of Virtual Reality and Health

WHAT IS VIRTUAL REALITY

Real-time simulation where the user is effectively immersed in a responsive virtual world that provides visual and audio (and sometimes other) sensory inputs that make the virtual world seem real and helps user feel present in the simulation.

Virtual world + real inputs

MILITARY AND VR/AI

- VA and DoD are leading development of VR and AR healthcare apps
- Training and Education – field medicine
- PTSD
- Rehabilitation
- Pain management
- Behavioral health

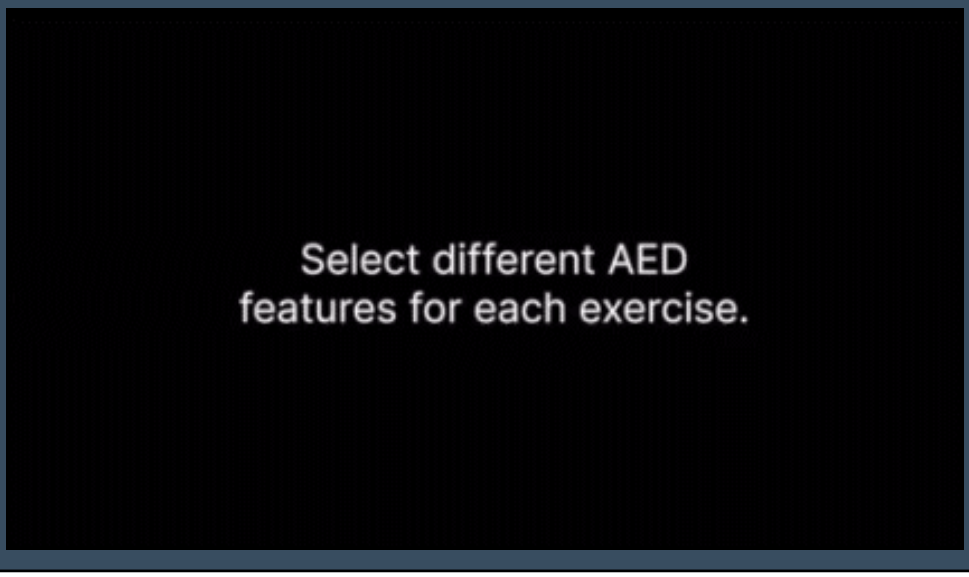
VR IN MEDICAL EDUCATION

Iserson, K. (2018). Cambridge Quarterly of Healthcare Ethics,27(2), 326-332.

VR ADVANTAGES

- Low cost and easy set up .
- Faculty need not be present
- In-folded feedback at the end
- Learners make mistakes without risk of harm to patients.
- No specific location or clinical area needed.
- Fun and psychologically safe learning environment.
- Convenient, learners can use during down time or breaks.
- Relatively easy to imbed standardized policies and latest evidence-based practice.
- Relatively easy to monitor learner performance and generate data..
- Addresses larger group without major time and space commitment

HOW DOES VR WORK?



OPPORTUNITIES

- Better team based care
- Process improvement
- Core clinical and technical proficiencies

SPECIAL THANKS TO MY TEAM

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QUESTIONS?