

Serious gaming to learn how to perform general anesthesia for cesarean delivery: a randomized controlled trial comparing two debriefing methods

Allison Lee, MD, MS, Ruth Landau, MD, Stephanie Goodman, MD, Chen-Miao Chen, PhD, Madhabi Chatterji, PhD
Columbia University, New York, NY

- Resident exposure to performing general anesthesia (GA) for cesarean delivery (CD) is significantly declining¹, so the development of innovative educational tools is warranted
- **EmergenCSim™** is a serious 3-D videogame (SG) (**Figure 1**) that reproduces the environment of an obstetric OR and has an embedded scoring and debriefing tool. The learner, via an avatar, must perform GA for emergent CD for umbilical cord prolapse from a “first-person-shooter” perspective
- The optimal debriefing method after playing SGs is unknown
- **Hypothesis:** An in-person semi-scripted debrief *plus* SG-embedded electronic debrief will provide superior learning outcomes than SG-embedded electronic debrief alone
- **Primary Outcome:** Difference between experimental groups in change in mean score from pretest to post-test



Figure 1: CA-1 resident playing serious game

Methods

Subjects: Novice CA-1 residents (n = 51) – week 1 of OB rotation

- (1) Watched a recorded lecture on GA for emergent CD
- (2) Took a 26-item MCQ pre-test
- (3) Played the SG (maximum score 196.5) and got electronic debrief (**Figure 2**)

Randomized to

- Intervention group (**Group IPD+ED**, n = 25) – received in-person debrief in addition to electronic debrief
- Control group (**Group ED**, n = 26) - received electronic debrief only

All in-person debriefs conducted by same investigator

- (4) All played the SG a 2nd time, with instructions to try to increase their SG score

- (5) Took again, the 26-item MCQ post-test

Pre-and post-tests were validated parallel forms

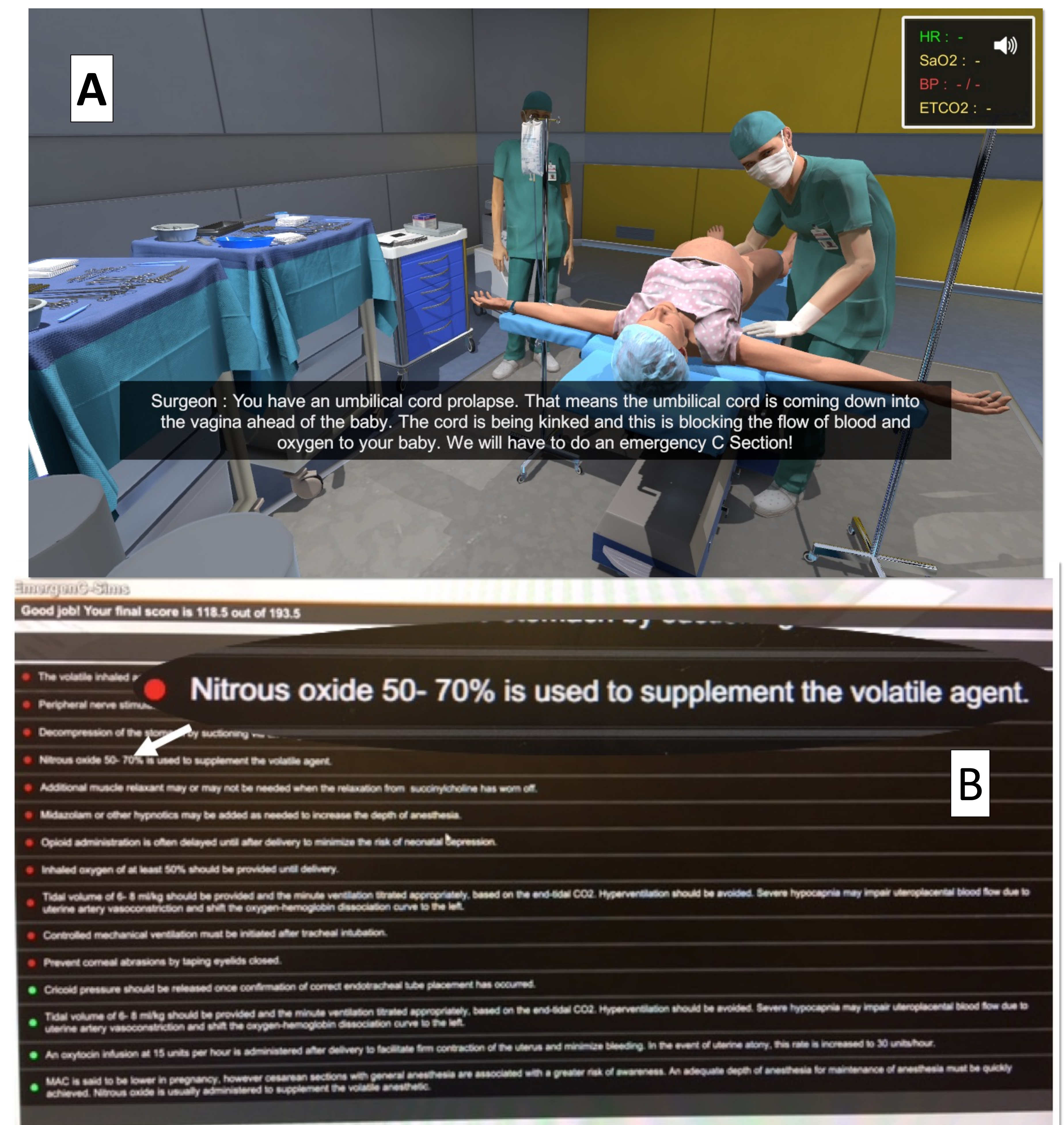


Figure 2: EmergenCSim™ screenshots **A:** Start of game play as resident enters OR –audio +verbal script provided, **B:** Electronic debrief page – magnified image of one item inset

Results

Table: Scores on MCQ test and Serious Game by Group

Scores	Intervention group (IPD+ED) n=25	Control group (ED) n=26	P value
26-item MCQ pre- test scores	19.4 (SD 2.3)	18.6 (SD 2.5)	p=0.185
26-item MCQ post- test scores	22.1 (SD 1.6)	22.6 (SD 2.2)	
1 st SG score (maximum 196.5)	141 (SE 4.5)	135 (SE 4.4)	p < 0.001
2 nd SG score (maximum 196.5)	173.3 (SE 2.9)	163.1 (SE 2.9)	

Data presented as mean (standard deviation (SD) or error (SE))

References:

1. Int J Obstet Anesth. 2011 Jan;20(1):10-6.
2. J Educ Perioper Med. 2018 Apr 1;20(2):E621.

Conclusions

- In-person debrief was associated with a significant improvement in SG score but not MCQ scores, suggesting benefit to in-person individualized debriefing
- Lack of improvement on the 26-item MCQ test (only 2-3 points) may be due to relatively high pre-test scores at baseline.²
- The overall gains in SG performance scores suggests SGs may have a role as independent, less resource-intensive educational tools

- **Future Directions:** Determine correlation in test and SG outcomes with simulated scenario and clinical performance



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