

Teaching Fiberoptic Intubation Skill: Acceleration of the Learning Curve with Simulators

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Learner Audience: Simulation Training at a University Hospital

Background: Mismanagement of difficult airway is one of the most common causes of anesthesia-related morbidity and mortality. [1] The importance of fiber-optic intubation (FOI) is very well established in recognized and unrecognized difficult airway, but the prevalence of this skill among anesthesiologist is still low [2]. Studies have shown that to become an expert in FOI, a trainee should perform 40 to 50 FOI. [3] Currently, the standard tool for teaching involves actual patient encounters which may be associated with patient and operator discomfort, patient safety concerns, and significant amount of time to achieve expertise with concomitant increase in the cost of health care. Hence, can patient simulator training accelerate novices' learning curve to acquire the necessary skills for FOI similar to that of the experts?

Hypothesis: Training with patient simulator will enable medical students to acquire basic FOI skills comparable to experienced anesthesiologists.

Method Designs: Twenty three participants (15 medical students as novices and 8 attending anesthesiologists as expert) were enrolled in the study. To establish the expert level, 8 attending anesthesiologists perform oral and nasal FOI with the simulator. All novices underwent pre and post training testing and their performances were video-recorded. Training comprised of dexterity skill training with a Virtual Reality using the Accutouch Bronchoscope, a video presentation demonstrating FOI skill and an experienced instructor provided feedback during the conduct of their training session on the simulator. Novices were then asked to perform FOI after their training as deemed satisfactory by the instructor. To conceal their identity, all participants donned a cap, mask, gloves and surgical gown. The video recorded performances of both groups which were evaluated by a blinded-trained rater on FOI using a previously validated scoring sheet. The pre- and post-training performances were compared to the experts' performances, respectively, by chi-square (pass/fail) and Mann-Whitney U test (sum scores of the 11 evaluation items and Global Rating Scale (GRS) scores).

Outcome: Compared to the expert group, the novice group had significantly ($P < 0.01$) lower pre training sum scores (2.93 ± 1.79 vs. 10.75 ± 0.46) and GRS scores (1.53 ± 0.74 vs. 3.99 ± 0.99). The pre-training passing rate was only 13.3% compared to the 100% passing rate for expert group ($P < 0.01$). The novice group had higher post-training sum scores (10.87 ± 0.35) and GRS scores (4.20 ± 0.78) than the expert group, but the difference is not significant. The novice group also achieved 100% post-training passing rate. Simulator training enabled the novices to acquire basic FOI skills comparable to those of experienced anesthesiologists.