Long-term Retention of Simulated Pediatric Airway Skills

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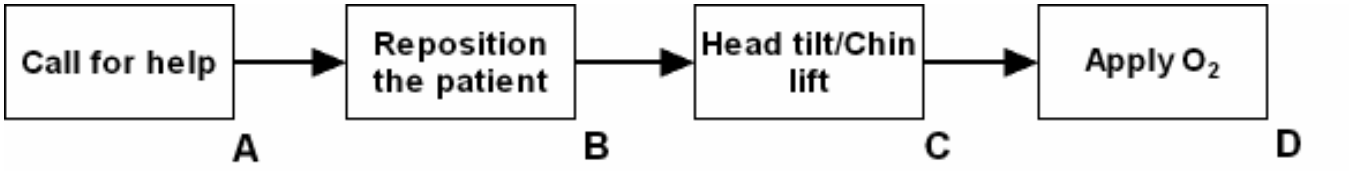
Introduction: This research evaluated the impact of high fidelity simulation on the retention of teaching pediatric airway management and performance of a pediatric airway algorithm. Specifically, medical student education was explored utilizing an infant simulator with a standard pediatric algorithm introduced to second year medical students (MS-2's), and repeated in third year medical student (MS-3's) courses.

Methods: Participants were University of Pittsburgh Medical School students who consented to the study procedures by an IRB exempt script. MS -2's are required to attend a clinical procedure course (CPC) that involved a pediatric airway management segment which incorporated video, power-point and simulation portions. Then at varying points in the third year of medical school, the MS -3's participated in a required anesthesia rotation, which incorporated simulation teaching of 8 – 10 students. During one session, they were retested for retention of what they had learned in the pediatric portion of the CPC the year prior. In both sessions, the students were presented with the same pediatric airway emergency, were required to assess the situation and then complete the algorithm. The "correct" algorithm involves four basic airway management skills seen in Figure 1. The time between courses was at least a six month interval. As an evaluation of performance, the completion of the pediatric airway algorithm was recorded as well as the time between attainments of certain airway objectives. MS-2's were exposed to the video and power-point presentation before performing the algorithm, whereas MS-3's performed the algorithm first and then reviewed the video and power-point presentation. Statistical analysis of the time to completion of the airway algorithm between groups utilized the two-sample Wilcoxon rank-sum test.

Results: Only 17% of each student group performed exactly the expected algorithm. Most frequently the correct endpoint was obtained but with the absence of the call for help. For completion of steps A to C; performance was faster by the MS-2's (median 19.5 sec, IQR 12.5-27.5) than the MS-3's (median 39.5sec, IQR 22 -72) ($p = 0.01$). MS-3 students were more likely to apply oxygen first, thus deviating from the "correct" algorithm.

Discussion: Previous studies have shown that simulation technology does not appear to increase short or long term knowledge retention, but students are more satisfied with the simulation learning experience. Differences that existed in the two groups of students involved the period of elapsed time from the initial presentation of the algorithm, and that the second year students reviewed the video immediately before performance of the algorithm. The impact of video training prior to simulation may deserve investigation.

Figure 1:


Call for help
Reposition the patient
Head tilt/Chin lift
Apply O_2
A
B
C
D