Anesthesia Machine Checkout and Troubleshooting: Does How We Teach Residents Impact Retention?

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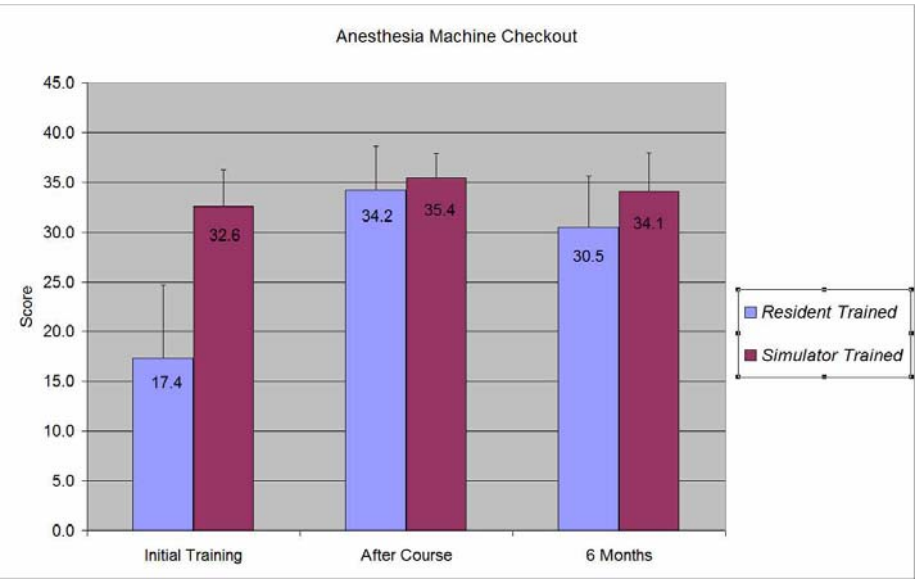
Introduction: Recent advances in anesthesia machine design have automated the process of checking machines. However, most anesthesia sites are still using machines requiring manual checkout. Traditionally, CA-1 residents are trained by watching senior colleagues perform machine checkouts during daily routines and then performing them under their supervision. In this study, we compared traditional training with training in a Simulation Center using an anesthesia machine that could be modified to simulate machine failures.

Methods: After IRB approval, 25 CA-1 residents were randomly divided into 2 groups. Group SIM spent their first week of residency in the Simulation center taking a course on basics of anesthesia with one day devoted exclusively to anesthesia machines including lectures, demonstrations, routine practice, and identification and repair of malfunctions. Their second week was spent one-on-one with a senior resident in the operating room. Group RES spent the same two weeks in the opposite order. Skill testing after initial training (INT) was done after the first day in the Simulator (SIM group) or after one week in the operating room (RES group). Both groups were tested immediately after the complete course (AFT) and 6 months later (6MO). The exam consisted of performing a machine check with an unknown number of malfunctions present. All exams were videotaped and reviewed by two blinded observers and scored using a checklist.

Results: The SIM group did significantly better after INT (32.56±1.03 SEM vs. 17.38 ± 1.88, $p<0.0001$) and trended better at 6MO (34.06 ± 1.08 vs. 30.5 ± 1.49, $p=0.062$) with no significant difference at the end of the course. RES also did significantly better AFT vs. INT (34.20 ± 1.15 vs. 17.38 ± 1.88, $p<0.0001$).

Discussion: Training residents to perform complete machine checks while under time pressure to get the room ready in the morning is difficult. The RES group did much worse on their INT exam compared to their SIM counterparts. Both groups finished the course with equal scores. Simulator training was significantly better for teaching machine checks. Also, retention of knowledge at 6MO trended toward better in the SIM group. This suggests that initial anesthesia resident teaching methods may have an impact on future retention and performance of thorough machine checks.


Anesthesia Machine Checkout
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Score
17.4
32.6
34.2
35.4
30.5
34.1
Initial Training
After Course
6 Months
Resident Trained
Simulator Trained