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Title **A randomized, blinded study to assess the effectiveness of simulation-based training for U/S-guided central venous access placement using aseptic technique**

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Introduction: Studies have shown that ultrasound (U/S) guided Central venous catheter (CVC) insertion has a reduced rate of complications. However due to the added steps with U/S there is a concern for contamination.

Hypothesis: There is no difference between didactic training and simulation-based training on the maintenance of aseptic technique during insertion of CVC using U/S.

Methods:54 subjects (29 residents and 25 student nurse anesthetists) were randomized into 2 groups. Both groups underwent didactic training including a PowerPoint presentation, introduction to the U/S machine and a review of internal jugular anatomy. Group B underwent additional simulation-based training comprised of watching a video and practicing U/S-guided aseptic technique on a CVC simulator. Groups A and B then performed U/S-guided CVC insertion on a simulator. Aseptic technique was scored by a blinded rater based on 10 basic steps using both “yes/no” and a 7-point Likert scale. Subsequently, Group A underwent simulation-based training and post-training testing. The Mann-Whitney U test compared groups A and B and the Wilcoxon signed-ranks test compared Group A’s pre- and post- training scores. Data are express Mean ± SD.

Results: There is a significant difference ($p < 0.001$) between Group A's pre- and Group B's post- simulation training scores on both the total summation yes/no criteria (Group A, 3.56 ± 1.89; Group B, 7.96 ± 0.19) and the average Likert scale score (Group A, 2.84 ± 1.00; Group B, 6.82 ± 0.43). A significant increase ($p < 0.001$) also exists between the Group A's pre- and post-training scores on both the total summation yes/no criteria (pre-training, 3.56 ± 1.89; post-training 7.93 ± 0.27) and the average Likert scale score (pre-training, 2.84 ± 1.00; post-training, 6.84 ± 0.25). No significant difference was found between the post simulation-based training scores of Groups A and B.

Conclusions:CVC insertion is of paramount importance in the critical care unit. Our study shows that simulation-based training combined with didactic training is superior to didactic training alone in teaching U/S guided CVC insertion aseptically.

Case Reports: