



This randomized controlled trial evaluated the effects of a pragmatic CVC simulation program on procedural protocol adherence, technical skill, and patient outcomes” Peltan et al (2015).

Reference:

Peltan, I.D., Shiga, T., Gordon, J.A. and Currier, P.F. (2015) Simulation Improves Procedural Protocol Adherence During Central Venous Catheter Placement: A Randomized Controlled Trial. *Simulation in Healthcare*. 2015 Jul 6. .

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Abstract:

**BACKGROUND:** Simulation training may improve proficiency at and reduce complications from central venous catheter (CVC) placement, but the scope of simulation’s effect remains unclear. This randomized controlled trial evaluated the effects of a pragmatic CVC simulation program on procedural protocol adherence, technical skill, and patient outcomes.

**METHODS:** Internal medicine interns were randomized to standard training for CVC insertion or standard training plus simulation-based mastery training. Standard training involved a lecture, a video-based online module, and instruction by the supervising physician during

actual CVC insertions. Intervention-group subjects additionally underwent supervised training on a venous access simulator until they demonstrated procedural competence. Raters evaluated interns' performance during internal jugular CVC placement on actual patients in the medical intensive care unit. Generalized estimating equations were used to account for outcome clustering within trainees.

**RESULTS:** We observed 52 interns placing 87 CVCs. Simulation-trained interns exhibited better adherence to prescribed procedural technique than interns who received only standard training ( $P = 0.024$ ). There were no significant differences detected in first-attempt or overall cannulation success rates, mean needle passes, global assessment scores, or complication rates.

**CONCLUSIONS:** Simulation training added to standard training improved protocol adherence during CVC insertion by novice practitioners. This study may have been too small to detect meaningful differences in venous cannulation proficiency and other clinical outcomes, highlighting the difficulty of patient-centered simulation research in settings where poor outcomes are rare. For high-performing systems, where protocol deviations may provide an important proxy for rare procedural complications, simulation may improve CVC insertion quality and safety.

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