



Needle Guided Approach Shortens Insertion Time and Improves Success Rate of CVC Placement

Needle Guides for Venous Catheter Insertion During Chest Compressions: A Crossover Simulation Trial

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Summary and Methods

Trial participants consisted of 25 anesthesiologists with more than 2 years of clinical experience and/or who received simulation training at the author's institutions. All participants had received prior simulation-based CVC training. Simulation trial equipment consisted of: CVC simulator, SonoSite iLook ultrasound machine using the L25 (5-10 MHz) linear transducer and with the Infiniti™ Needle Guidance System (CIVCO Medical Solutions, Kalona, Iowa) attached to the transducer. Prior to the start of study, ultrasound imaging confirmed the internal jugular vein and surrounding structures moved up and down with compression. Continuous chest compressions were performed by 3 basic life support instructors at 100 compressions per minute per standard guidelines.

Participants performed US-CVC with the internal jugular vein using the long-axis approach in both normal and needle-guided trials. The numbers of venous puncture attempts, CVC (guide-wire) insertion success rates and CVC insertion times were recorded. After the study, participants rated the difficulty of the venous punctures and guide-wire insertions (extremely easy to extremely difficult) using a visual analog scale. The order of intervention (w, w/o needle guides and w, w/o compressions) were randomized resulting in 4 interventions per participant.

Discussion and Results

In the present study all participants were able to perform US-CVC within 2 venous punctures. However, success rate and insertion time were significantly worsened by chest compressions in normal trials. In contrast, the success rate did not significantly decrease with chest compressions in the needle guide trials. With the needle guide, the transducer and needle move together during chest compressions, leading to safe and definite needle progression. Moreover, the needle guide allows for rapidly securing an IV line for US-CVC, even during chest compressions.

Conclusions

The authors concluded using Infiniti needle guided technique for the insertion of a CVC during chest compressions resulted in:

- shortened insertion time
- improved the success rate

Author Commentary

"Our simulation study demonstrated that the needle guide shortened insertion time and improved the success of US-CVC during chest compressions by anesthesiologists."

"With the needle guide, the echo probe and the needle move together during chest compressions, leading to safe and definite needle progression on the monitor."

