Needle Guide Improves Needle Visibility and Decreases Access Time During CVC by Improving Needle and US Plane Alignment

US-guided catheterization of the subclavian vein: free-hand vs. needle-guided technique

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Summary and Methods

The authors conducted the first clinical, prospective, randomized trial of ultrasound-guided subclavian vein cannulation for central venous catheterization with an in-plane multi-angle needle guide (Infiniti Plus, CIVCO, Kalona, IA). This study was approved by the Ethics Committee of the Faculty of Medicine of Ruhr University, Bochum, Germany and includes analyzed results from 159 catheterizations.

Three ultrasound machines (MyLab 25 Gold XVG; Esaote Biomedica, Cologne, Germany, LOGIQ e; GE Healthcare, Solingen, Germany, FlexFocus 800; Analogic Ultrasound Group, Paderborn, Germany) equipped with a standard preset for vascular and a 10MHz transducer were utilized for this study. Participants were randomized into either a freehand or needle-guided technique group. All patients underwent ultrasound of the subclavian vein while in the supine position to obtain the optimal degree of arm abduction for vein access and to evaluate for the presence of venous thrombosis. Cannulation was performed with an 18G echogenic needle (VascularSono Cannula; Pajunk, Geisingen, Germany). Confirmation of the CVC position was documented by chest x-ray or intra-atrial ECG (Alphacard; B. Braun, Melsungen AG, Melsungen, Germany).

Discussion and Results

Success rates in the first and second attempts for CVC placement were higher in the needle-guided group. When compared to the freehand technique, needle guidance provided improved needle visibility, decreased access time, fewer needle passes and redirects to complete the cannulation. This study provided clinical proof of results independent of operator experience.

Three arterial punctures occurred during the trial. Two occurred during freehand technique and one in the needle guide group due to misinterpretation of the sonoanatomy, false use of the needle guide or blind advancement of the needle.

Conclusions

The authors conclude using Infiniti Plus needle guided technique to place a subclavian vein CVC resulted in the following when compared to freehand technique:

- Improved needle visibility by 54.4%
- Decreased access time by 52.9%
- Fewer needle passes and redirects
- Increased success rate for first and second attempts.