



Intravenous literature: Nguyen, B.V., Prat, G., Vincent, J.L., Nowak, E., Bizien, N., Tonnelier, J.M., Renault, A., Ould-Ahmed, M., Boles, J.M. and L'her, E. (2013) Determination of the learning curve for ultrasound-guided jugular central venous catheter placement. Intensive Care Medicine. August 23rd. .

#### Abstract:

**PURPOSE:** Use of ultrasound (US) when introducing central venous catheters (CVC) may improve success rates, reduce the number of needle punctures, and decrease complication rates, but has been hampered by supposed difficulty in learning how to perform the technique. This study describes the learning curve for US-guided jugular CVC placement after a training program.

**METHODS:** After an initial slide presentation and a video, intensivists who had not previously used US for CVC placement were evaluated qualitatively for US set up (score S1) and technical skills (score S2). Quantitative measures included durations of different components of the procedure (T 1, time from entry of the US into the patient's room to sterile dressing of the intensivist; T 2, time needed for sterile drapes, venous line preparation, and sterile sheath placement; T 3, time from skin puncture to venous flashback; T 4, time from guide insertion to dressing; T tot, total duration of the procedure); number of skin punctures; and a difficulty score allocated by the intensivist.

**RESULTS:** We performed 150 evaluations of 30 intensivists: 50 % had no prior experience of CVC placement and 50 % no prior US experience. Maximal S1 and S2 scores were obtained with the fourth and eighth placement procedures, respectively. T 1 and T 2 did not change with ongoing training (5 and 8 min, respectively), but T 3 and T 4 decreased, from 5 min (first procedure) to less than 1 min (seventh procedure), and from 10 min (first procedure) to 7 min (sixth procedure), respectively. T tot decreased from 34 to 21 min at the eighth procedure. The number of skin punctures and the difficulty score decreased rapidly with the number of evaluations.

**CONCLUSIONS:** Our study demonstrates that skills in US-guided CVC placement can easily be acquired with training.



## Determination of the learning curve for ultrasound-guided jugular central venous catheter placement | 2

