Abstract:

Background: Needle guides for ultrasound-guided internal jugular venous catheterization facilitate successful cannulation. The ability of a needle guide to prevent a posterior vein wall injury which may secondarily induce lethal complications, is unknown. Previous studies showed that a shallow angle of approach may reduce the incidence of posterior wall injuries. We developed a novel needle guide with a shallow angle of approach for ultrasound-guided venous catheterization and examined whether this needle guide reduces the incidence of posterior wall injuries compared to a conventional needle guide and free-hand placement in a simulated vein.

Methods: This study was a randomized crossover-controlled trial. The primary outcome was the rate of posterior vein wall injuries. Participants had a didactic lecture about three ultrasound-guided techniques using the short-axis out-of-plane approach, including free-hand (P-free), a commercial needle guide (P-com), and a novel needle guide (P-sha). The view inside a simulated vein was recorded during venipuncture.

Results: Thirty-five residents participated in this study. Posterior vein wall injuries occurred in 66% using P-free, 60% using P-com, and 0% using P-sha ($p < 0.01$). There was no significant difference in the incidence of posterior vein wall injuries between P-free and P-com.

Conclusions: Use of a shallow angle of approach needle guide resulted in a lower rate of posterior vein injuries during venipuncture of a simulated vein compared with other techniques using a steeper angle techniques.

Reference:

Watanabe K, Tokumine J, Lefor AK, Yorozu T. Shallow-angle needle guide for ultrasound-guided internal jugular venous catheterization: A randomized controlled crossover simulation study (CONSORT). PLoS One. 2020;15(6):e0235519. Published 2020 Jun 30. doi:10.1371/journal.pone.0235519

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