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Radial artery catheterization on arterial puncture training arm manikin by novice anesthesia trainees, does body posture matters: A randomized, crossover, pilot study

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Background: Radial artery catheterization is commonly used for invasive pressure monitoring in perioperative and intensive care unit settings. This procedure, however, does not come without risk and complications including radial artery occlusion, pseudoaneurysm, infection, and hematoma. Further, radial artery catheterization failure rates increase with the number of catheterization attempts, which should be kept to a minimum. While performing fine manipulation tasks use of the dominant hand, arm in a flexed position and sitting body posture are associated with a significant decrease in hand error.

Aim: We aimed to compare the traditional standing body posture and sitting with supported forearm body posture for radial artery catheterization in regards to clinically relevant endpoints.

Methods: Novice trainees trained in radial artery catheterization by palpation technique, on arterial puncture training arm manikin in sitting and standing body posture during a practice session. During post-test, the sequence of body posture was decided by randomization and video recording of all participants

was done while performing the skill. The primary endpoint of the study was needle manipulation time. Additional endpoints were (1) The number of skin perforations (2) The number of attempts targeting the vessel (3) The number of catheters placed in the first attempt.

Results: Twenty-two participants were analyzed. Needle manipulation time was significantly higher in traditional standing body posture [44 s (range 21–73 s) vs. 29 s (range 10–66 s), $P = 0.0002$]. In the traditional standing posture, a higher number of the attempt targeting the vessel (37 vs 28, $p = 0.025$) was required. The first attempt success rate was significantly higher in sitting with supported forearm posture group (17/22 vs. 10/22, $P = 0.015$). There was no significant difference in a number of skin perforations in both body postures (25 vs 23, $p = 0.081$).

Conclusion: Sitting with supported forearm body posture for radial artery catheterization significantly improves clinically relevant aspects of the procedure.

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