

"Care protocols, including assessment of vein diameter, vein depth, and catheter tip location using ultrasound examination for reducing mechanical irritation is a promising method to reduce catheter failure incidence" Takahashi et al (2020).



### Abstract:

Peripheral intravenous catheter failure is a significant concern in the clinical setting. We investigated the effectiveness of care protocols, including an ultrasonographic “pre-scan” for selecting a large-diameter vein before catheterization, a “post-scan” for confirming the catheter tip position after catheterization with ultrasonography, and the use of a flexible polyurethane catheter to reduce the mechanical irritation that contributes to the incidence of catheter failure. This intervention study was a non-randomized controlled trial to investigate the effectiveness of the abovementioned care protocols, the effects of which were compared to the outcomes in the control group, which received conventional care. For both groups, participants were selected from patients in two wards at the University of Tokyo in Japan between July and November 2017. Inverse probability score-based weighted methods (IPW) using propensity score were used to estimate the effectiveness of care protocols. The primary outcome was catheter failure, which was defined as accidental and unplanned catheter removal. We used Kaplan-Meier survival curves to compare rates of time until catheter failure. We analysed 189 and 233 catheters in the intervention and control groups, respectively. In the control group, 68 catheters (29.2%) were determined to have failed, whereas, in the intervention group, only 21 catheters (11.1%) failed. There was a significant difference between each group regarding the ratio of catheter failure adjusted according to

IPW ( $p = 0.003$ ). The relative risk reduction of the intervention for catheter failure was 0.60 (95% CI: 0.47-0.71). Care protocols, including assessment of vein diameter, vein depth, and catheter tip location using ultrasound examination for reducing mechanical irritation is a promising method to reduce catheter failure incidence.

Peripheral IV catheter failure from 2015

Peripheral IV catheter failure in 2019

Peripheral IV catheter failure rates reach an unacceptable level

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**Reference:**

Takahashi, T., Murayama, R., Abe-Doi, M., Miyahara-Kaneko, M., Kanno, C., Nakamura, M., Mizuno, M., Komiyama, C. and Sanada, H. (2020) Preventing peripheral intravenous catheter failure by reducing mechanical irritation. *Scientific Reports*. 10(1), p.1550. doi: 10.1038/s41598-019-56873-2.

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