Ultrasound imaging reduces intravenous cannulation failure in children | 1

The aim of this updated review was to determine whether percutaneous central venous catheterization with the aid of ultrasound reduces cannulation failure in children" Shime et al (2015).

Reference:

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Abstract:
OBJECTIVE: Ultrasound imaging has been shown to be beneficial for percutaneous central venous cannulation in systematic reviews of randomized controlled trials in adult patients, but not in pediatrics. The aim of this updated review was to determine whether percutaneous central venous catheterization with the aid of ultrasound reduces cannulation failure in children.

DATA SOURCES: PubMed was searched using the terms: ultrasound, catheterization, central vein (including internal jugular and femoral veins), and pediatrics.

STUDY SELECTION: Both nonrandomized comparative studies and randomized controlled trials were eligible for inclusion if they assessed the rate of cannulation failure using real-time, dynamic ultrasound guidance, ultrasound-assisted vein prelocation, and/or anatomic landmark technique.

DATA EXTRACTION: Five nonrandomized studies and nine randomized controlled trials were included. The rates of cannulation failure and arterial puncture were retrieved.

DATA SYNTHESIS: Random-effects meta-analysis was applied.

CONCLUSIONS: The meta-analysis of five nonrandomized studies showed that the rate of cannulation failure was significantly lower with real-time ultrasound guidance than anatomic landmark technique (odds ratio, 0.44 [95% CI, 0.27-0.72]; p = 0.001). The combination of nine randomized controlled trials also showed lower failure rates with either the real-time ultrasound guidance or the prelocation technique over the landmark technique (odds ratio, 0.22 [95% CI, 0.07-0.69]; p = 0.0003) and fewer arterial punctures in the ultrasound group (odds ratio, 0.31 [95% CI, 0.09-1.08]; p = 0.07). However, seven out of nine studies were assessed as having high risk of bias. Since the lower cannulation failure and less frequent chance of arterial puncture with ultrasound were predominantly shown in studies at high risk
of bias, further definitive and adequately powered studies with clear outcomes are needed. Thank you to our partners for supporting IVTEAM

- Ultrasound guided peripheral intravenous access reviewed
- Ultrasound guidance during cannulation of arteriovenous fistulas
- Components for training in ultrasound guided peripheral intravenous cannulation