



Placement and Use of Pediatric Vascular Access in the US

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Background: Pediatric vascular access in the pre-hospital setting is challenging and can cause significant psychological distress. Many times, following placement, these access sites are not used, though the frequency of this occurrence is unclear. Our objective was to evaluate the frequency of prehospital placement and use of pediatric vascular access in the US.

Methods: This study was a cross-sectional analysis of the 2018 NEMESIS Research Dataset v3.4.0. Included were all pediatric (age <18 years) 911 scene response activations with advanced life support providers. Interfacility, medical transports, and activations with no patient found were excluded. Descriptive statistics and two one-sided tests (TOST) of equivalence were calculated between activations with vascular access placed (intravenous, intraosseous, external jugular, arterial line, multiple) versus no access. First recorded, age-corrected vital signs were compared for vascular access versus no access. Among those with access, we also evaluated use of access during EMS care (e.g., any intravenous fluid or medication delivery).

Results: A total of 779,261 activations met inclusion criteria with vascular access placed in 108,288 (14%). The most common access type was intravenous (97%, n=104,995), with 2% (n=2,325) receiving intraosseous access and 1% (n=682) receiving multiple types. Patients with and without access differed only by age groups (<2 years, 8% with access compared to 21% without, p<0.000, relevant difference). The majority of vascular access was placed in patients with vital signs within normal limits. Of those with access, 8% were hypotensive compared to 5% without access, and 5% with access were unresponsive compared to 1% without access. Patients with access placed had increased median on-scene time: 15 minutes (IQR 11-20) compared to 12 minutes (IQR 9-18). Among those with vascular access, only 40% (n=43,784/108,228) were used for any fluid or medication delivery by EMS.

Conclusion: Vascular access was uncommon in pediatric 911 ALS activations with >50% never being used. The majority of patients with vascular access had vital signs within normal limits. The low use of vascular access once established suggests many were potentially avoidable. Further study is needed to understand when pediatric vascular access is most appropriate.