Abstract:
OBJECTIVES: We hypothesized that the use of ultrasound guidance would improve the success rate of peripheral intravenous catheter placement in pediatric patients with difficult access in a pediatric emergency department (ED). Our secondary hypotheses were that ultrasound guidance would reduce the number of attempts, the number of needle redirections, and the overall time to catheter placement.

METHODS: This was a prospective randomized study of pediatric ED patients younger than 10 years old requiring intravenous access, presenting between August 2006 and May 2007. Inclusion criteria were 2 unsuccessful traditional attempts at peripheral intravenous access or history of difficult access. Exclusion was critical illness or instability. Patients were randomized to undergo peripheral intravenous catheter placement using continued traditional approaches or real-time, dual-operator ultrasound-guided technique. Measured outcomes were success of cannulation, number of attempts, number of needle redirections, and overall time to catheter placement.

RESULTS: Fifty patients were enrolled, with 25 patients randomized to each group. The overall success rates for the ultrasound-guided group were 80% and for the traditional-
attempts group, 64%, with a difference in proportions of 16% (95% confidence interval, -9% to 38%, P = 0.208). The ultrasound-guided group required less overall time (6.3 vs 14.4 minutes, difference of -8.1 minutes [95% confidence interval, -12.5 to -3.6], P = 0.001), fewer attempts (median, 1 vs 3; P = 0.004), and fewer needle redirections (median, 2 vs 10; P < 0.0001) than traditional approaches.

CONCLUSIONS: In a sample of pediatric ED patients with difficult access, ultrasound-guided intravenous cannulation required less overall time, fewer attempts, and fewer needle redirections than traditional approaches.

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