A Length-based Pediatric Tape

Its effect on Dosage Accuracy and Time to Medication Delivery in the Pre-hospital Setting in the National Park Service (NPS)

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OBJECTIVES
To evaluate the accuracy of medication dosing and time to medication administration in the prehospital setting using a length-based pediatric emergency tape. This tape is used by NPS Emergency Medical Services (EMS) providers and is specific to the drugs in their scope of practice that are utilized in their protocols.

METHODS
Design
This study was a two-period, two-treatment crossover trial. Each participant was presented with two emergent pediatric patient scenarios; participants were randomized to which scenario they encountered first, and also to which scenario used the NPS EMS length-based resuscitation tape. In the control case, the providers used standard methods to arrive at medication dosing (e.g., asking parents to estimate the patient’s weight, or estimating the patient’s weight themselves); in the intervention case, they were allowed to use the NPS EMS length-based resuscitation tape. Each scenario required dosing two medications (Case 1 (febrile seizure) required IV midazolam and rectal acetaminophen; Case 2 (anaphylactic reaction) required IM epinephrine and IM diphenhydramine). Data was collected in February, 2013.

Setting
This study used simulated patient scenarios in the prehospital setting.

Participants
Twenty NPS EMS providers, trained at the Parkmedic/Advanced Emergency Medical Technician (AEMT) level, served as study participants.

RESULTS
Time to medication administration was significantly shorter in the intervention (tape) group than the control group, for three of the four medications used. In the febrile seizure case, time to both midazolam and acetaminophen was significantly faster. (midazolam mean 8.3 seconds in tape group vs. 28.9 seconds in control group, p = 0.005; acetaminophen mean 28.6 seconds in tape group vs. 50.6 seconds in control group, p = 0.036). In the anaphylactic reaction case, time to epinephrine did not differ (mean time 23.3 seconds in tape group, 22.9 seconds in control group, p = 0.96), while time to diphenhydramine was significantly shorter in the tape group (mean 13 seconds in intervention group vs. 37.5 seconds in control group, p = <0.05).

Overall, more medication dosing errors occurred in the control group than the tape group. Of the medication errors that would likely be clinically significant, all occurred in the control group (5 errors in control group vs. 0 errors in tape group, p = 0.024).

CONCLUSION
Use of a pediatric length-based tape in the prehospital setting, aimed at the scope of practice of the NPS Parkmedic/AEMTs, was associated with a significant reduction in time to medication administration in simulated prehospital pediatric emergencies. In addition, the number of dosing errors was significantly lower when a length-based tape was used. Further research is needed to investigate its impact in a clinical setting.