

ACCURACY OF PEDIATRIC PREHOSPITAL MEDICATION DOSING USING A CALCULATION-FREE TOOL

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Background: Prehospital medication dosing errors for pediatric patients occur frequently due to weight-based calculations. Though length-based tools exist to estimate medication doses in milligrams, paramedics still need to convert the dose to an administration volume. Alternative age-based dosing tools, tailored to EMS agency protocols, provide calculation-free guidance for dosing volumes. Though simulation-based studies have compared these two dosing methods, it is unclear if one method is more accurate than the other when used during prehospital clinical care. The objective of this study was to determine if a calculation-free dosing tool that provides medication doses by volume improves dosing accuracy for pediatric prehospital patients compared to a length-based dosing tool.

Materials/Methods: This 30 month cross-sectional study evaluated 0-13 year old patients who received a non-inhaled medication and were transported by paramedics in an urban EMS system. The EMS agency changed from using a length-based tool (Broselow tape) to a calculation-free, age-based tool (Handtevy system) midway through the study period. We electronically queried the EMS database and linked cases to emergency department (ED) records to compare dosing accuracy with each tool. An accurate dose was defined as being within 20% of the recommended EMS protocol dose.

Results: 711 medication administration events were included for analysis. Overall dosing accuracy was 70% (95% CI: 66.5-73.4%). There was no difference in dosing accuracy between the two tools: 69.9% (length-based tool) compared to 70.2% (calculation-free tool), OR 0.98 (95% CI: 0.71-1.36; p=0.93). Of the inaccurately dosed medications, 13.2% were overdosed: 9.9% (length-based tool) and 16.3% (calculation-free tool). Underdosing occurred in 16.7% of medication events: 20.2% (length-based tool) and 13.6% (calculation-free tool).

Conclusions: This study showed there was no difference in dosing accuracy between length-based and calculation-free dosing tools for paramedic administered medications in children. Larger multi-center investigation and qualitative research in this area are needed to determine both the generalizability and implications of these findings.