Medication Errors in Pediatric Patients After Implementation of a Field Guide With Volume Based Dosing

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WHAT WE LEARNED

Implementation of a prehospital field guide with volume-based dosing for pediatric patients led to significantly fewer medication dosing errors.

BACKGROUND

• Pediatric medication error rates by paramedics > 30%
  • Epinephrine error rate 56%
  • Dextrose error rate 50%
  • Diphenhydramine error rate 61%
• Handtevy™ Field Guide System
  - Precalculated mL doses by age/length
  - Superior to Broselow LBT in simulation
  - Customized to each EMS system

HYPOTHESIS

• Implementation of a field guide would reduce pediatric medication errors to less than 15%.

METHODS

• Introduced Field Guide system – 2015
• Single center retrospective cohort study
  • EMS records July 2017 – June 2019
• Medications administered ≤ 13 years old
• Primary outcome – medication error rate
  • Error: A dose that differed from the predetermined dose by age by > 20%
• Reviewed by 2 investigators
• Excluded online medical direction cases

RESULTS

• 483 drug administrations to 375 patients
• Overall appropriate administration - 89.4%
• 10.6% error rate
  • 4.3% overdoses
  • 6.2% underdoses
• Highest error rate > 9 years old
• Largest overdose
  • Solumedrol – 3x accepted dose
• Largest underdose
  • Epinephrine 1:1 – 10-fold underdose
• Perfect dosing (0 errors)
  • Adenosine
  • Dextrose 10%
  • Glucagon
• Most frequent errors:
  • Midazolam IN > Fentanyl IN > Fentanyl IV

LIMITATIONS

• Retrospective cohort study
• Lack of comparable system data prior to implementation of field guide

CONCLUSIONS

• Implementation of a field guide resulted in a significantly lower medication error rate for pediatric patients compared to historical controls
• Strategies to reduce pediatric medication errors by EMS providers are essential to improving the care of critically ill and injured children.