Pediatric Quick Reference Dosing Guide

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Background

- Due to varying weights, age groups and metabolic differences when compared to adult patients, pediatric medication dosing is weight-based to prevent toxicity and achieve maximum therapeutic benefit.
- Like adult dosing, there are ranges of therapeutic doses for a variety of medications, but these ranges vary greatly depending on the resource.
- Broselow tapes can be used during resuscitation but are based on standard height-weight ratios and are not suitable for outpatient medication or antibiotic dosing.
- There is no standard dosing guide readily available to residents for many of the common medications used in the Pediatric Emergency Department (PED), resulting in variable dosing, which may be ineffective or supratherapeutic.

Objective

To create a standard, validated dosing reference guide for emergency medicine (EM) residents to use while on shift to prevent medication errors, decrease the number of order clarifications by pharmacies, and improve patient care.

Methods

A list of medications reflective of Kingwood PED prescribing patterns and their standard doses will be created and validated. This list will be made available in the PED physician areas and a smaller, “Quick Guide” will be given to each EM resident.

We will create a short 10-question quiz that tests medication dosage knowledge and weight-based dosing for outpatient medications. EM resident knowledge will be determined, and scores will be compared pre- and post-intervention.

We will track the number of order clarification calls made by outpatient pharmacies for prescriptions sent by residents and the frequency will be compared throughout the study period and 3 months pos—intervention to evaluate for improvement.

Dosing Guide

Study period:
March 11 - December 17

Pre-Test

March 20th

Post-Test
Dec 18th

Target Group

1st - 3rd year Emergency Medicine Residents

Results

To calculate volume of drug dosing:
Amoxicillin (400mg/5mL) for AOM for a 20 kg child
Dosing for Amoxicillin: 45 mg/kg divided into 2 doses for 10 days
45 mg/kg x 20 kg = 900 mg
400mg/5mL = 80 mg/mL
900 mg divided by 80 mg/mL = 11.25 mL rounded to 11 mL
11mL / 2 doses = **5.5 mL BID for 10 days**

Analgesia

Motrin/Ibuprofen (>6 months)
- 10 mg/kg/dose, 100mg/5mL*
- Max dose 40 mg/kg/day, 400 mg/dose

Tylenol/Acetaminophen
- 15 mg/kg/dose, 160 mg/5mL*
- Max dose 4 g/day

Toradol (>2 years)
- IV/IM 2-16 years: 0.5 mg/kg/dose q6h
- IV/IM >16 years: 15mg/dose q6h
- Max dose 15 mg/dose, 60 mg/day

Fentanyl
- IV/Intranasal 1-12 years: 1-2 mcg/kg/dose q2-4h
- IV/Intranasal >12 years: 0.5-1.0 mcg/kg/dose q1-2h

Morphine
- Oral 0.2 - 0.5 mg/kg/dose
- IV 0.1 - 0.2 mg/kg/dose

Anti-seizure

Versed/Midazolam
- Oral 0.5 mg/kg/dose, Max dose 20 mg
- IV/IM 0.1 mg/kg/dose, Max dose 2 mg
- Intranasal 0.2 - 0.4 mg/kg/dose, Max dose 10mg

Ativan/Lorazepam
- 0.1mg/kg/dose, Max dose 2 mg

Keppra
- Loading Dose: 60 mg/kg/dose, Max dose 3g
- IV 10 mg/kg/dose, Max dose 3g
- Oral 20 - 40 kg: 250 mg/dose BID
- Oral >40 kg: 500 mg/dose BID

Antimicrobials

Acyclovir
- <3 months: 20 mg/kg/dose TID
- 3 months - 11 years: 10 - 15 mg/kg/dose TID
- >11 years: 10 mg/kg/dose TID

Amoxicillin
- Otitis/PNA 20-22.5 mg/kg/dose BID
- Other 50 mg/kg/dose Daily

Augmentin
- Otitis/PNA 20-22.5 mg/kg/dose BID
- Other 45 mg/kg/dose Daily

Ancef/Cefazolin
- 25-50 mg/kg/dose q8h
- Max dose 2g/dose

Ampicillin
- Oral 50-100 mg/kg/dose q6h
- IV/IM 30-50 mg/kg q6h, Max dose 8 g/day
- IV Neonates <28 days 50 mg/kg/dose q6h

Azithromycin
- 10 mg/kg/dose, Max dose 500 mg (1st dose)
- 5 mg/kg/dose Daily, Max dose 250 mg

Cefepime
- 50 mg/kg/dose q8-12h, Max dose 2g

Ceftazidime
- 50 mg/kg/dose q8h, Max dose 2g

Outcome Measures

- ***Problem: There is no standard pediatric dosing guide***
  - Residents are not trained on correct resources to obtain validated medication dosing
  - There are no easily accessible references available to residents while on shift
- ***Problem: There is no formal education assessment for residents***
  - Residents are not assessed on their baseline knowledge of medication dosing or weight-based dosing calculation
  - The lack of assessment hinders development of specific learning objectives

Discussion

Pediatric medications are dosed based on weight to prevent toxicity and achieve maximal therapeutic effect. Dosing is significantly variable depending on the resource and standardization has been shown to be an effective way to decrease variability in prescribing patterns and improve patient safety.

Easy access to this guide will help prevent medication errors and decrease time spent clarifying orders called in by outpatient pharmacies.

Assessing resident knowledge and comparing this knowledge before and after the intervention will help in creating learning objectives for pediatric EM education.

Outcomes evaluation

- Resident utilization of reference guide stratified by residency class
- Prescribing patterns and frequencies of each medication used
- Number of pharmacy clarification calls for incorrect outpatient dosing

References

1. https://www.pdr.net/
2. https://pecc.med.unc.edu/pediatric-medication/
3. https://www.chop.edu/pathways-library

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