Medication Dosing Card Improves Resident Prescribing Practices in Pediatric General Surgery

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ABSTRACT

Pediatric medication errors are a common source of adverse events. Most errors occur at the prescription phase. Interestingly, surgical pediatric patients appear to be at higher risk of harmful medication errors compared to nonsurgical pediatric patients. We aimed to decrease incorrect medication orders in the pediatric surgical population by facilitating weight-based prescriptions made by General Surgery residents, using a medication dosing card.

Prior to implementation of our medication dosing card, qualitative assessments were performed on first-year residents during their pediatric surgery rotation, evaluating their comfort and competency in weight-based prescribing practices. Following implementation, we re-surveyed residents to assess their experience with weight-based dosing using the medication card.

Between 2015 and 2016, over 72% of first-year residents who rotated through SickKids Hospital felt unprepared to order weight-based pediatric medications, and over 50% found the SickKids e-formulary difficult to use. The medication dosing card was then circulated to all first-year residents between 2016 and 2017. We obtained a 100% (n=11) response rate to our post-implementation survey. Sixty-four percent of residents found that the medication card increased their confidence and efficiency in orders and 73% felt this tool should be continued in the future.

Distribution and use of our pediatric medication dosing pocket card is expected to improve General Surgery residents' ability to order correct pediatric doses.

INTRODUCTION

Pediatric medication error rates range from 0.15 up to 92% across studies^{3, 4, 6}

Most mistakes are made in prescription phase; largely secondary to dosage errors (28%)⁶, and oftentimes with antibiotics and narcotics⁹

Lack of knowledge about pediatric dosing is the most common cause of error, but also inexperience, fatigue, stress, and high workload⁸

1% medication errors carry significant potential for harm, with 0.24% errors causing actual harm⁵

Surgical pediatric patients are at higher risk for harmful medication errors compared to nonsurgical pediatric patients⁷

A "laminated, credit-card sized aide-memoir" was introduced to maxillofacial residents to minimize prescription error due to weight-adjusted dosing²

Implementation of a similar "dosing table" pocket card and posters on the ward resulted in a significant reduction in overall rate of dosing errors from 34.5% to 5.8%¹

AIM

Our aim was to decrease the rate of incorrect orders of common medications made by first-year General Surgery residents during their 2-month pediatric surgery rotation at the Hospital for Sick Children.

METHODS

Between July 2015 and June 2016, we conducted qualitative surveys on residents to evaluate their level of comfort and competency in pediatric weight-based dosing of common medications.

We then developed a medication dosing pocket card of commonly prescribed General Surgery medications and their associated standard dosing ranges in the pediatric population. This card was distributed to residents between June 2016 to July 2017.

Medication dosing card

Following implementation, we conducted another qualitative survey with a primary outcome of assessing residents' level of comfort and competency with weight-based dosing using the dosing card.

RESULTS

Pre-implementation

- 77% (n=14) response to the pre-implementation survey:
- 72% (n=10) felt uncomfortable ordering weight-based pediatric medications
- 50% (n=7) felt that the hospital e-Formulary was not easy or intuitive to use
- 50% (n=7) felt their orders were typically incorrect and required correction by the pharmacist

Post-implementation

- 100% (n=11) response to the post-implementation survey:
- 73% (n=8) residents felt unprepared ordering weight-based pediatric medication before starting their rotation
- 72% (n=8) residents used the medication card
- 64% (n=7) of residents had improved confidence and efficiency in ordering medication with the dosing card

RESULTS

Comparing the Medication Dosing Card to the e-Formulary

- 55% of residents felt that the medication dosing card was easier and more convenient to use than the e-Formulary
- 73% felt the card should be continued in the future
- 64% preferred either having the medication dosing card alone or in combination with e-Formulary as available resources, over just the e-Formulary alone

Modality of Choice

Limitations

- Small population size
- Inherent differences in pre- and post-implementation groups due to curriculum changes (e.g. more comprehensive teaching on pediatric prescribing practices) or variabilities in individual resident clinical experience with pediatric care

CONCLUSIONS

There is a significant risk of medication prescribing error and subsequent harm in the pediatric surgical population. Surgical residents do not feel adequately prepared nor equipped to order pediatric medications. The literature suggests drug dosing summary cards improve medication error rates.

Our present data suggest that medication dosing cards are safe and useful to surgical trainees in improving their accuracy and efficiency with ordering pediatric weight-based medications. However, we recognize that this tool does not serve as a substitute for the hospital e-Formulary.

FUTURE DIRECTIONS

Investigate the quantitative impact of this tool in reducing medication error and harm

Develop a mobile device-based application to facilitate accessibility

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