MEDICATION ERRORS RELATED TO HIGH-ALERT MEDICATIONS IN TERTIARY CARE PAEDIATRIC HOSPITAL

An analysis of register-based data

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Background and importance
Paediatric patients are prone to adverse drug events, including medication errors (MEs). Although high-alert medications are often associated with serious MEs, fewer studies have focused on describing these errors within paediatric populations (1–3).

Aim and objectives
The aim of this study was to investigate the prevalence and characteristics of self-reported MEs related to high-alert medications in a paediatric university hospital setting.

Materials and methods
This was a cross-sectional study of self-reported MEs (n=2,404) in a tertiary care paediatric hospital during 2018–2020; 743 (31%) of the MEs involved high-alert medications (Figure 1) (3). A quantitative descriptive analysis (frequencies and percentages) was performed using Microsoft Excel®. The prevalence of different high-alert medications, Anatomical Therapeutic Chemical (ATC) groups, drug formulations and administration routes appearing in the study sample were defined. Finally, the most severe MEs were identified and summarized.

Results
Among the studied sample of ME reports (n=743), 71 different high-alert medications were identified. The most common ATC subgroups were blood substitutes and perfusion solutions (B09; n=345; 40%) antineoplastic agents (L01; n=139; 16%), and analgesics (N02; n=128; 16%). The most common medications comprised parenteral natrium (n=130; 15%), hypertonic sodium chloride (n=93; 11%), potassium chloride concentrate (n=66; 8%), morphine (n=47; 5%), and heparin (n=43; 5%) (Table 1). Most high-alert medications were administered intravenously (n=636; 73%) (Figure 2). Moreover, IV preparations were administered via off-label routes (n=52; 6%), such as, oral administration and intranasal routes. Most serious MEs (n=16; 2%) were associated with analgesics (N02) (n=8), antineoplastic agents (L01) (n=3), and antithrombotic agents (B01) (n=3) (Figure 3).

Conclusions and relevance
According to the present and previous studies, MEs on concentrated electrolytes and parenteral nutrition represent a central risk to paediatric medication safety (1–2). While severe MEs in these groups remained low in this study, a high proportion of severe MEs associated with analgesics and antineoplastic agents represented a key finding. Preventive risk management actions should be targeted on these high-alert medications as well as to secure safety in intravenous administration and off-label drug use in paediatric patients.


Table 1. Active substances, administration routes and ATC-codes of ISMP high-alert medications (n=72) identified in the study sample (n=743 incident reports) (3). IV=intravenous, IM=intramuscular, IT=intrathecal, IV=intravenous, PO=oral, SC=suseptaneous, *off-label route.

Figure 1. Flowchart of the study.

Figure 2. An overview of dosage forms (n=879) of the ISMP high-alert medications identified in the study sample (n=743 incident reports) (3). IV=intravenous, IM=intramuscular, IT=intrathecal, IV=intravenous, PCA=patient controlled analgesia, PO=oral, SC=susceptaneous.

Figure 4. An overview of the most serious medication errors (n=16) related to 10 different ISMP high-alert medications (3). CVC=central venous catheter, IV=intravenous, PCA=patient controlled analgesia, PO=oral, TPN=total parenteral nutrition.