Risk and pharmacoeconomic analyses to improve the safety of the injectable medication process in the paediatric and neonatal intensive care units

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Background

Many studies deal with adverse drug events among adults but there are relatively few reports concerning children. Intravenous therapy is a complex process (reconstitutions; dilutions). Dose calculations are a common contributor to medication error, even more in Paediatrics due to weight, age and unadapted formulations of drugs.

To analyse reliability problems, there has been a growing awareness that prospective risk analysis approaches used in a number of high hazard industries should be applied to health care. Among other methods, Failure Modes, Effects and Criticality Analysis (FMECA) is a well described tool that assesses a process systematically. It identifies possible or likely errors, called Failure Modes (FM), and gauges what their effect will be even before they take place. FMECA allows a quantitative evaluation of the criticality of each FM.

Methods

The Ishikawa diagram organized the 31 FM step by step (Fig. 1).

The 10 most critical FM are presented in grey on Table 1.

The most critical FM was the same for each model drug: the microbial contamination during the preparation.

Among the 3 model drugs, gentamicin totalized the greatest sum of CI, followed by morphine and dopamine.

Conclusion

The use of a prospective risk analysis allowed us to quantitatively evaluate the relationship between the medication process of injectables and the paediatric patients’ safety. It allowed us to build a strategy for continuous quality improvement by selecting the most appropriate safety measures.

Based on the results of the pharmaco-economic analysis, we decided to invest in the most cost-effective safety measures:

- Clinical pharmacy
- Ready-to-use syringes

Our institution is currently applying CPOE. A pocket drug planer was also created. The use of a vial of dilution is currently under evaluation in terms of accuracy and precision.

Reference

Williams E, Hosp Pharm 1994;29:331-37

This poster can be downloaded at http://www.hcuge.ch/Pharmacie/rd/posters.htm