Use a FMECA (failure modes, effects, and criticality analysis) multidisciplinary on the paediatric parenteral nutrition process

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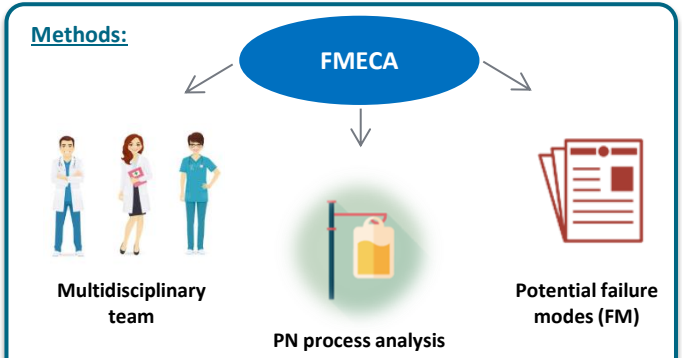
Aims and objectives: Parenteral nutrition (PN) in neonatal intensive care unit (NICU) involves a succession of risky processes (1) (e.g., prescribing, manufacturing, administration) involving different actors (physicians, pharmacists, nurses, preparers) with different levels of training.

The objective of this study was to identify and prioritize the risks associated with PN in order to improve the quality of the circuit.

Methods:



Occurrence* X Severity* X Detection* = Risk Priority Number

* 1 to 5, median of the scores obtained

Results:

The FMECA was completed between March and August 2018 and identified 99 FM into prescription (n=28), manufacturing (n=48) and administration (n=23) (Figure 1). The median RPN was 12 with scores ranging from 3 to 48. 25% of the scores had an RPN>21.75. Among the RPN in the last quartile: 12 were associated with a prescription FM, 5 with FM in relation to manufacturing and 8 with an FM related to administration (Figure 2).

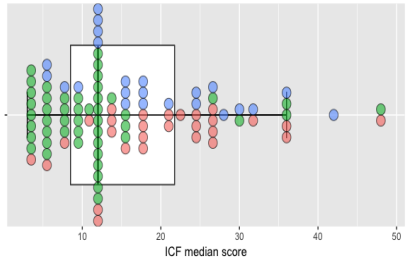


Figure 2: Boxplot representing the RPN of each risk identified by sub-process

: prescription
: fabrication
: administration

Failure modes	Sev.	Occ.	Det.	RPN
Manufacture of hospital preparation in the pediatric unit	4	3	4	**48**
Inability to assess nutritional and electrolyte needs	3	4	4	**48**
Septic contamination of PN when manufacturing in the care department	3,5	3	4	**42**
Absence of senior at the time of prescription	3	3	4	**36**
Prescription does not agree with ESPGHAN recommendations	3	3	4	**36**
Pharmacist not trained in parenteral nutrition validation	3	4	3	**36**
Absence of Pharmaceutical Validation before hospital preparation Production	3	4	3	**36**
Septic contamination of PN when added to Y	3	3	4	**36**
Masked Intakes of Drugs Not Considered at Prescription (Na^+ …)	2	4	4	**32**
Septic contamination of PN during handling	3	3	3,5	**31,5**

Figure 2: Failure modes and Risk priority number (RPN) for the major risks
(Det.: detection; Occ.: Occurrence; Sev.: Severity)

Conclusions: The FMECA identified 99 FM. Of these, 25 were prioritized to propose corrective measures. This multidisciplinary approach has facilitated the development of processes that allow a more accurate assessment of avoidability with all the actors involved in the nutritional care of the patient. In view of the results, there is a definite place for the clinical pharmacist in the care department to secure the prescription and administration of PN hospital preparation.

(1) Boulé M and al. Failure Mode, Effect, and Criticality Analysis of the Parenteral Nutrition Process in a Mother-Child Hospital: The AMELIORE Study. Nutr Clin Pract. oct 2018;33(5):656-66