

Enteral nutrition practices predictors of length of hospital stay and mechanical ventilation duration in children with cancer in a Unit of Pediatric Intensive Care. Rio de Janeiro, Brazil



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PURPOSE

To describe enteral nutrition (EN) practices and evaluate the factors related to EN predictors of clinical outcomes - length of hospital stay (LHS) and mechanical ventilation duration (MVD) in a Unit of Pediatric Intensive Care (PICU) of a Reference Center for Cancer Treatment in Rio de Janeiro, Brazil.

METHODS

- **Study design:** Observational, longitudinal, retrospective.
- **Sample:** All children admitted to the PICU during 2013.
- **Eligibility criteria:** Diagnosed with malignancy, Aged 1 to 18 years, Length of hospital stay > 72h, Use of EN during hospitalization PICU.
- **Collected data:** Start time of EN, Route of access, Positioning the nasoenteric catheter, Time range of the full nutritional needs, Type of formula used to start the TNE, Gastrointestinal symptoms, mechanical ventilation duration, Length of hospital stay.

• **Statistical analysis**
In logistic regression were estimated the odds ratio between the exposure factors, with a confidence interval (CI) of 95% and significance level $p < 0.05$. The controlled variables in the model were disease severity, age, calorie and protein cumulative deficits,

RESULTS

- The sample selected was 54 patients, median age was 8.02 (2.35 - 12.79) years and median time of diagnosis of oncological disease of 0.04 (0.02- 1.02) years.
- Chemotherapy is the most common treatment modality (30.8%; $n = 16$) and the main causes of hospitalization in the PICU were respiratory failure (26.4%; $n = 14$) and sepsis (24.5%; $n = 13$).
- The median time from onset of EN was 27 (21-55) hours, early EN the first 48 hours was 70.4% ($n = 38$).
- The polymeric formula was initially the most used (75.9%, $n = 41$).
- The cumulative deficit of calories and protein was 21.5 (14.0-29.6) kcal/kg/ day and 0.60 (0.33-0.97)g /kg/day, respectively.
- Diarrhea, younger children (< 8 years) and calorie cumulative deficit were LHS predictors. Abdominal distention and age were the variables associated with higher MVD.
- The median of length of hospital stay was 11(6.0-18.0)days and mechanical ventilation duration was 11(6.0-16.86)days.

CONCLUSION

The findings of this study reinforce the importance of prevention of gastrointestinal complications, such as diarrhea, and the need to valorise also the risk of younger children to have worse clinical outcomes on the severity. There is a wide variation between EN practices in critically ill children with cancer. Thus, the construction of nutritional protocols and the formation of multidisciplinary nutritional therapy can be a strategy for improving clinical outcomes.

Table 1: Description of nutritional therapy practice in pediatric intensive care unit of a Reference Center for Oncological Treatment, Rio de Janeiro, 2013.

Variables (n)	Average (IQR) ou % (n)
Start time of ENT (hours; n= 54)	27 (21-55)
Route of administration of ENT (n= 54)	
NEC	85.2 (n=46)
NGC	1.9 (n=1)
Gastrostomy	12.9 (n=7)
Time of ENT(days; n=54)	7 (4-14.75)
Time to reach the full nutritional needs(n=35)	4 (2.5-7.5)
Percentage of patients achieving full ENT	64.8 (n=35)
Enteral nutrition-48h	92.6 (n=50)
Type start diet ENT(n=54)	
Polymer formula	75.9 (n=41)
Oligomeric formula	16.7 (n=9)
Elemental formula	7.4 (n=4)
Cumulative calorie déficit (kcal/kg/day; n=54)	21.5 (14 - 29.6)
Cumulative protein déficit (g/kg/day; n=54)	0.60 (0.33-0.97)
GIT complications frequency (n=54)	
Diarrhea	25.9 (n=14)
Constipation	31.5 (n=17)
Distention abdominal	46.3 (n=25)
Reasons to stop ENT (n=35)	
Exams	17.1 (n=6)
Procedures	28.6 (n=10)
Intolerance to the diet	20.0 (n=7)
Surgery	8.6 (n=3)
Others	25.7 (n=9)

NGC= Nasogastric Catheter; NEC= Nasoenteric Catheter; IQR= Interquartile range; ENT: Enteral Nutrition Therapy; GIT: Gastrointestinal tract.

Table 2: Incidence Density ratio of hospital stay outcomes in PICU and mechanical ventilation.

Variables (n)	Length of hospital stay in PICU ≥ 14 days					
	β	P	IC 95%	OR	P	IC 95%
Presence of diarrhea	3.37	0.003	1.12-5.63	29.3	0.003	3.07-279.9
Age	- 0.35	0.002	0.57-0.34	0.70	0.002	0.56-0.87
Cumulative calorie deficit	- 0.063	0.005	0.12-0.01	0.93	0.005	0.88-1.00
Mechanical Ventilation Duration in PICU ≥ 7 days						
Age	- 0.14	0.021	0.22-0.27	0.86	0.021	0.76 - 0.97
Presence of abdominal distension	1.34	0.031	0.12-2.56	3.84	0.031	1.13-13.04

OR: odds ratio; 95% CI: 95% confidence interval. PICU: Pediatric Intensive Care Unit.

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