

CUIDADO É FUNDAMENTAL

UNIVERSIDADE FEDERAL DO ESTADO DO RIO DE JANEIRO • ESCOLA DE ENFERMAGEM ALFREDO PINTO

RESEARCH

DOI: 10.9789/2175-5361.2018.v10i2.406-412

Sondagem enteral em crianças: a realidade de uma enfermaria de lactentes

Enteral tube in children: the reality of an infant nursery

Tubo intestinal en niños: la realidad de una enfermería de lactantes

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Enteral survey in children: the reality of a nursing infirmary, presented at the multiprofessional residence (nursing area) of the Institute of Child Care and Pediatrics Martagão Gesteira (IPPMG) of the Federal University of Rio de Janeiro (UFRJ) in 2012.

How to quote this article:

Souza TV; Almeida AJ; Soares PR; et al. Enteral tube in children: the reality of an infant nursery. Rev Fund Care Online. 2018 abr/jun; 10(2):406-412. DOI: <http://dx.doi.org/10.9789/2175-5361.2018.v10i2.406-412>

ABSTRACT

Objective: To identify the frequency that the hospitalized infant is underwent gastric/jejunal tube and analyze the reasons that lead to the tube loss during hospitalization. **Method:** Quantitative study approach that had the sample of 61 infants. Data were analyzed by determining the frequency values and their 95% confidence intervals. **Results:** It appears that the incidence of gastric enteral tube loss is relatively high, considering that 25 infants were underwent tube reposition between two to eight times, configuring 98 tube withdrawal procedures/loss during the study period. The main reason for the loss was accidental with 44.9%, 11.2% occurred due to unknown causes and 8.2% for obstruction. **Conclusion:** Data indicate the importance of frequent qualification of health professionals in order to reduce the impact and stress which occurs in the infant and his companion, during the procedure.

Descriptors: Artificial Feeding; Enteral nutrition; Pediatric Nursing; Hospitalized child.

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RESUMO

Objetivo: Trata-se de um estudo que tem como objetivo identificar a frequência que o lactente internado é submetido à sondagem gástrica/jejunal e analisar os motivos que levam a perda da sonda durante a hospitalização. **Método:** Estudo de abordagem quantitativa que teve a amostra de 61 lactentes. Os dados foram analisados determinando os valores de frequência. **Resultados:** Verifica-se que a incidência de perda da sondagem enteral é relativamente alta, tendo em vista que 25 lactentes foram submetidos ao reposicionamento da sonda entre duas e oito vezes, configurando-se em 98 procedimentos da perda da sonda durante o período do estudo. O principal motivo de perda foi a acidental, com 44,9%, 11,2% ocorreram por causa ignorada e 8,2% por obstrução.

Conclusão: Os dados apontam para importância da qualificação frequente dos profissionais de saúde com o intuito de reduzir o impacto e estresse que ocasiona no lactente e seu acompanhante, durante o procedimento.

Descritores: Alimentação artificial; Nutrição enteral; Enfermagem pediátrica; Criança hospitalizada.

RESUMEN

Objetivo: Se trata de un estudio que tiene como objetivo identificar la frecuencia que el niño hospitalizado es sometido al tubo gástrico / jejunal y analizar los motivos que conducen a la pérdida del tubo durante la hospitalización. **Métodos:** Estudio de abordaje cuantitativo que tuvo la muestra de 61 lactantes. Los datos fueron analizados determinando los valores de frecuencia y sus intervalos de confianza del 95 %. **Resultados:** Se verifica que el frecuencia de la pérdida de tubo gastrointestinal es relativamente alto, considerando que 25 niños fueron sometidos a la nueva posición de tubo entre dos a ocho veces, configurando 98 procedimientos de retirada/pérdida de tubo durante el período de estudio. La razón principal de la pérdida era casual, el 44.9 %, el 11.2 % ocurrió debido a causas desconocidas y el 8.2 % para la obstrucción. **Conclusión:** Los datos indican la importancia de la calificación frecuente de profesionales de salud a fin de reducir el impacto y el estrés que ocurre en el niño y su acompañante, durante el procedimiento.

Descritores: Alimentación Artificial, Nutrición enteral, Enfermería pediátrica, Niño Hospitalizado.

INTRODUCTION

Children need food in adequate quantity and quality for their growth and development as the child's caloric and protein demand is relatively large and, if there are severe or prolonged nutritional deficiencies, they will result in malnutrition.^{1,2} The consequence of the nutritional deficit in the child reduces the immunity, increases the risk of infections and, consequently, leads to an increase in hospitalization time and hospital costs.³

Thus, children who are hospitalized are more likely to worsen their clinical status due to any change in their nutritional status. Therefore, nutritional therapy by gastric or jejunal route should be instituted within the first 24 to 48 hours after admission, when oral feeding is not possible, to avoid the effects and impact of hospitalization on children, nutritional impairment and long periods, which is extremely detrimental to the pediatric patient.^{1,4}

There are two forms of nutritional therapy: enteral and parenteral. Enteral therapy uses the gastrointestinal system, considered from oral feeding or by catheter with gastric or jejunal topography. Parenteral therapy is done intravenously. Enteral nutritional therapy should always be the first choice route, provided the gastrointestinal tract is fully functioning, since it is a physiological pathway that promotes the maintenance of intestinal mucosal integrity, prevents bacterial translocation, has fewer complications cost is lower.³

Malnutrition affects 50% of hospitalized children and up to 70% of those severely ill, and one of the essential aspects of treatment is enteral nutrition.¹ This form of nutritional therapy is based on the use of a special purpose food with controlled intake of nutrients, either in isolation or in combination, formulated and prepared for use by mouth or by mouth, used to supplement or replace oral feeding as needed Nutritional status of the patient in a hospital regime, aiming at the synthesis or maintenance of the tissues, organs or systems.⁵

In professional practice, it is often observed that infants during their hospitalization are submitted to gastric and/or jejunal probing justified by the risk of malnutrition according to the increase in the basal metabolic rate. The younger the child, the greater their growth rate, as well as their reliance on food. These aspects make the infant more vulnerable to discomfort or nutritional disorders, especially if added to the emotional and infectious changes.⁶

Also, when the child is using the gastric or enteral catheter, it is susceptible to the loss of the same, either by the child's own mechanical traction that tends to take away this device that bothers it, improper attachment, obstruction or other causes. When this occurs, especially in children using the jejunal probe, the waiting time to receive nutritional support is greater due to the need to confirm the location of the probe in the post-pyloric region by radiography, also increasing the stress of the child by Need for a new procedure and the risk of malnutrition.

Malnutrition in children is common at the time of hospital admission. The early introduction of enteral feeding has been increasingly emphasized and used⁷ due to the energy expenditure related to the child's growth and development, added to the stress of the hospitalization and its presented clinical picture. Nutritional therapy should be recommended in order to prevent deterioration of nutritional status and make it capable of responding to a probable medical condition.¹

In an infirmary of infants, attention was drawn to the fact that daily they were submitted to frequent soundings, be they gastric or jejunal and regardless of their clinical diagnosis. As far as the probing frequency is concerned, however, the reasons were related to catheter obstruction, sometimes by accidental loss.

Understanding that the frequency of the probing procedure, due to its losses, could compromise the nutritional

status of the child by waiting time, besides causing discomfort during the procedure of passage of the catheter and, in the case of jejunal probes, the various radiographs and their exposure. The objectives of the study were: to identify the frequency with which the hospitalized infant undergoes the gastric / jejunal catheterization and to analyze the reasons that lead to the loss of the catheter during the hospitalization.

METHOD

This is a descriptive study with a quantitative approach of a non-random sample of convenience. The study site was the infirmary of a public teaching, research and care hospital located in the city of Rio de Janeiro, composed of 16 beds. As inclusion criteria, the following criteria were adopted: being of any gender, race or ethnicity, aged between 29 days and 2 years, who used nutritional therapy by gastric and/or jejunal catheter during the data collection period and who were hospitalized. Children older than 2 years who used probes for purposes other than feeding were excluded from the study. In this study, the gastric probe was considered to be that probe that was located in the stomach and the jejunal probe, such as that located in the jejunum, regardless of the type of probe, if the one of silicone or the one of polyvinyl.

The hospitalized infants (n = 61) were selected during the data collection period that occurred during the months of April 2011 to June 2012. The data were collected daily through a form that contained the following information: gender, age, diagnosis, number of probes, time interval between date of hospitalization and date of probing (in days), number and cause (s) of catheter loss, length of catheter stay (in days), and duration of hospitalization (days). It should be noted that notes were made regarding the use of oral medication when administered by probe in space for observations. Data from the catheter removal were still collected in the absence of indication for nutritional therapy. Completion of the form was done through information and records contained in the medical record.

The data were stored in an Excel program and the variables were analyzed, determining the frequency values; Average \pm standard deviation for variables with normal distribution (Kolmogorov-Smirnov test) and median with range for quantitative variables that do not present normal distribution. In the bivariate analysis of the data, the Chi-square test (χ^2), the unpaired Student *t* test for quantitative variables with normal distribution, and the Mann-Whitney *U* test for the quantitative variables that do not present normal distribution. A value of *p* <0.05 was considered statistically significant. For statistical analysis, the Graph Pad In Stat version 3.05 program (Graph Pad Software, San Diego, California, USA) was used.

The study was approved by the Research Ethics Committee at the study site under Opinion No. 54/09 on June 22, 2010.

RESULTS

During the period from 04/20/2011 to 06/18/2012, 61 infants admitted for admission to the infirmaries of children between 29 days and 2 years of age, with a record of 31 and 30 admissions in the years 2011 and 2012 respectively, of which 36 (59.0%) were male and 25 (41.0%) were female, with a mean age of 20.2 \pm 15.1 weeks.

With respect to the main diagnosis of hospitalized infants, respiratory diseases, such as bronchiolitis and pneumonia, predominated in 23 (37.7%) of the cases. The median length of hospital stay was 11 days (3 - 98).

The jejunal test was the most frequent (53 / 86.9%). In 2011, 24/31 infants were admitted without an enteral catheter, and 24/24 were probed after admission, with a median of 1.5 (1 - 8) soundings and a total of 56 sounding procedures performed; And 7/31 infants were admitted with an enteral catheter, and 7/7 received additional catheterization procedures, with a median of 1.0 (1-3) probing and a total of 10 probes performed after admission. In 2012, 20/30 infants were admitted without an enteral catheter, and 20/20 were probed after admission with a median of 1.0 (1 - 4) probes and a total of 27 probing procedures performed; And 10/30 infants were already admitted with an enteral catheter, and 10/10 received additional catheterization procedures with a median of 1.0 (1-3) probing and a total of 11 probes performed after admission. The median duration of the interval between the date of hospitalization and the first probe was 2 days (1 to 61 days).

Regarding the day of the week in which the first loss of enteral tube occurred, we observed a higher frequency for the days of Monday and Thursday. As to the work shift in which the first loss of enteral tube occurred (reported in 57/61 infants), we observed a higher frequency for shifts from 6:01 a.m. to 12:00 p.m. and 12:01 a.m. 18 records (31.6%) each.

Table 1 shows the characteristics of infants who received enteral probing during the hospitalization period.

Table 1 - Characteristics of infants who received an enteral catheter in the pediatric unit studied, in the period from April / 2011 to June / 2012 (n = 61)

Characteristics	n (%)
1. Gender	
Male	36.0 (59.0)
Female	25.0 (41.0)
2. Age (weeks)	
Average \pm standard deviation	20.2 \pm 15.1
Minimum value	3.0
Maximum value	66.0
3. Entrance examination	
Yes	17 (27.9)
No	44 (72.1)

(To be continued)

(Continuation)

Characteristics	n (%)
4. Duration of hospitalization (days)	
Median	11.0
Minimum value	3.0
Maximum value	98.0
5. Type of Probe	
Gástrica	7 (11.5)
Enteral	53 (86.9)
Gástrica/Enteral	1 (1.6)
6. Duration of Probe (days)*	
Median	6.0
Minimum value	1.0
Maximum value	81.0
7. Interval between probe loss and hospital discharge (days)**	
Median	3.0
Minimum value	1.0
Maximum value	32.0
8. Day of the week in which the 1st probe loss occurred	
Sunday	2 (3.3)
Monday	13 (21.3)
Tuesday	5 (8.2)
Wednesday	12 (19.7)
Thursday	13 (21.3)
Friday	12 (19.7)
Saturday	4 (6.5)
9. Shift of the day in which the 1st probe loss occurred	
0:01 h - 6:00 h	8 (13.1)
6:01 h - 12:00 h	18 (29.5)
12:01 h - 18:00 h	18 (29.5)
18:01 h - 24:00 h	12 (19.7)
Ignorado	5 (8.2)

* Interval between the date of hospitalization and the first probe.

** Excluding 4 infants who were discharged or transferred on gastroenteric catheter.

98 probe loss procedures were recorded during the study period (table 2). Removal of the catheter due to lack of indication for its stay during hospitalization was observed in 24/61 (39.3%) infants. A total of 12/35 (34.3%) infants had one-time loss of the tube, being attributed more frequently to accidental loss by the child (n = 5). In addition, 23/35 (65.7%) infants had loss of the probe in a number of procedures ranging from 2 to 8, totaling 62 loss events, for a variety of reasons.

Table 2 - Reasons for withdrawal/loss of enteral catheter in 61 infants hospitalized at the pediatric unit studied, RJ, from April/2011 to June/2012

Reason	Recall/Loss of Enteral Proben (%)		
	Isolated procedure (n = 36)	Procedure ≥ 2 (n = 62)	Total (n = 98)
1. No indication for maintenance	24 (66.7)	6 (9.7)	30 (30.6)
2. Accidental by the child	5 (13.9)	39 (62.9)	44 (44.9)
3. Accidental for manipulation	0 (0.0)	0 (0.0)	0 (0.0)
4. Obstruction	3 (8.3)	5 (8.1)	8 (8.2)
5. Deterioration of the probe	0 (0.0)	0 (0.0)	0 (0.0)
6. Inadequate fixation and dressings	1 (2.8)	4 (6.4)	5 (5.1)
7. Cause ignored	3 (8.3)	8 (12.9)	11 (11.2)
8. Psychomotor agitation	0 (0.0)	0 (0.0)	0 (0.0)

Table 3 shows the characteristics of the infants in relation to the enteral probing status at the hospital admission.

Table 3 - Bivariate analysis of the characteristics of the children in relation to the enteral probing status at admission at the pediatric unit studied, in the period of April/2011 to June/2012 (n = 61)

Characteristics	Enteral Probe to Admission n (%)		Value of P
	Yes (n = 17)	No (n = 44)	
1. Gender			
Male	5 (29.4)	31 (70.4)	0,0085*
Female	12 (70.6)	13 (29.6)	
2. Age (weeks)			
Average ± standard deviation	21.2 ± 17.6	21.7 ± 14.9	0.9115**
Minimum value	4.0	3.0	
Maximum value	66.0	66.0	
3. Duration of hospitalization (days)			
Median	12	10	0.8659***
Minimum value	3	4	
Maximum value	69	98	
4. Type of Probe			
Gastric	1 (5.8)	6 (13.6)	0.5569*
Enteral	16 (94.2)	37 (84.1)	
Gastric/Enteral	0 (0.0)	1 (2.3)	

(To be continued)

(Continuation)

Characteristics	Enteral Probe to Admission <i>n</i> (%)		Value of <i>P</i>
	Yes (<i>n</i> = 17)	No (<i>n</i> = 44)	
5. Duration of the probe (days)			
Median	4.0	6.0	0.1924***
Minimum value	1.0	1.0	
Maximum value	46.0	81.0	
6. Interval between probe loss and hospital discharge (days)			
Median	5.0	3.0	0.2846***
Minimum value	1.0	1.0	
Maximum value	23.0	32.0	
7. Day of the week in which the 1st probe loss occurred			
Sunday	0 (0.0)	2 (4.5)	0.7568*
Monday	2 (11.8)	11 (25.0)	
Tuesday	2 (11.8)	3 (6.8)	
Wednesday	3 (17.6)	9 (20.5)	
Thursday	4 (23.5)	9 (20.5)	
Friday	4 (23.5)	8 (18.2)	
Saturday	2 (11.8)	2 (4.5)	
8. Shift of the day in which the 1st probe loss occurred			
0:01 h - 6:00 h	2 (11.8)	3 (6.8)	0.1674*
6:01 h - 12:00 h	3 (17.6)	5 (11.4)	
12:01 h - 18:00 h	4 (23.5)	14 (31.8)	
18:01 h - 24:00 h	2 (11.8)	16 (36.4)	
Ignorado	6 (35.3)	6 (13.6)	

* Chi-square test (χ^2)

** Unpaired Student t test

*** Mann-Whitney U Test

In the subgroup of infants who had an enteral tube at the time of hospital admission (17/27.9%), the majority (12/70.6%) consisted of female infants, with a mean age of 21.2 ± 17.6 weeks.

Of the total infants studied, 44 (72.1%) were not taking enteral tube at hospital admission. In this subgroup of infants, there was a predominance of males (70.4%) and mean age of 21.7 ± 14.9 weeks. A total of 18 (40.9%) infants were screened on the same day of hospitalization. The median time elapsed between the date of admission and the first probe was 2.0 days (1-10 days).

In the bivariate analysis, a statistically significant difference was observed for the variable gender when compared to infants in relation to the status of enteral probing at admission ($p = 0,0085$).

DISCUSSION

Acute respiratory infections are the main causes of diseases in children and also of child hospitalization in developing countries, thus, the incidence and impact of these diseases in pediatric hospitalization units is justified.^{3,8}

With regard to the sample of 61 infants, it is verified that there is a greater percentage of children (59%) hospitalized compared to girls (41%), demonstrating the relevance regarding gender. The higher prevalence of wheezing and asthma in childhood among boys has been observed by several authors and has been justified by the smaller size of the airways of the boys in relation to the size of the lungs, in childhood and the forced expiratory flows of the boys, 20% lower than for girls during the first year of life, when these parameters are corrected by height.⁹

The use of probes in infants with respiratory problems is recommended as it helps them during breathing, reducing energy and caloric expenditure. Most severely ill children have a state of protein hypercatabolism, with high consumption of endogenous reserves, which can be minimized with nutritional therapy.⁴

Indication of the use of gastric or jejunal tubes will depend on the following conditions: presence or risk of malnutrition; Prolonged fasting; Congenital anomalies; Partial, functional or mechanical obstruction of the upper digestive tract; trauma; Sepsis; Neoplasms; Large burns; Neurological impairment and/or high bronchial aspiration probability; with the; Traumatic brain injury; Difficulty or inability to suck and swallow; gastroesophageal reflux; Respiratory failure and mechanical pulmonary ventilation.¹

When comparing the variables of the types of probe used, we observed a significant number of choice for the jejunal probe, which is best indicated for children at risk of regurgitation and bronchoaspiration.^{1, 3} In this study, however, the use of a gastric tube, which more closely resembles the physiology of the gastrointestinal system, is less frequent.

Jejunal nutritional therapy has been considered as a successful alternative to improve the nutritional status of hospitalized patients,¹⁰ since, shortly after hospitalization, there is a gradual worsening in the nutritional status of malnourished patients⁸, especially the pediatric.

Of the 61 infants studied, 17 (27.9%) admitted to the Pediatric Unit with a probe. Of the 44 (72.1%) infants hospitalized without probe, 18 (almost half) were probed on the first day of hospitalization. It was observed that the early introduction of enteral nutrition has been associated with a lower risk of infectious complications and shorter hospital stay, favoring health promotion and maintenance of immunity.^{1, 3, 10}

The interval between admission and the first jejunal probe was 48 hours, as well as, found in a study with malnourished children, an interval between the admission and the probe with a median duration of 48 hours¹. In a study in the

Intensive Care Unit with 117 patients, it was verified that 68% of these received enteral nutrition for at least 24 hours during hospitalization. Among these patients, 75% started nutritional therapy until the third day of hospitalization.¹¹

The weekdays in which the largest loss of the probe occurred were between Monday and Friday, except Tuesday which may be justified by the absence of medical residents for classroom activities. Although care for the child with enteral catheter is an assignment of the nursing team, it should be emphasized that with the presence of the resident increases the manipulation of the child for some procedures, such as physical examination. Regarding the time of loss, there is a concentration in the period of the day, mainly in the daytime period. It is assumed that during the week and in the morning there is a greater movement of health professionals for physical examination, collection of biological samples for laboratory tests, body hygiene, among others, predisposing to an increase in the frequency of loss of the enteral catheter for preventable causes.

The causes of loss of the probe were caused by: inadequate fixation, obstruction and accidentally, in addition to the ignored causes. Such interruptions directly interfere with the nutritional therapy of the infant, since these events delay the administration of nutritional therapy and lead to the exposure of the infant to prolonged and unnecessary fasting, as well as the radiographs to identify the topography of the jejunal catheter.

A prospective observational cohort study, whose sample consisted of 117 patients hospitalized for intensive care, showed that enteral nutrition was interrupted in 30% of the patients with a mean of 3.7 times/patient. The results also indicate that avoidable interruptions were more frequent in patients <1 year ($p < 0.006$), patients with longer hospitalization and greater delay in initiating enteral nutrition ($p < 0.01$).¹¹

In a study with adults, nutritional therapy is impaired by several factors such as fasting for procedures, exams, catheter obstruction, incorrect positioning, hemodynamic instability, nursing procedures, gastrointestinal intolerance and probe repositioning,¹² approaching with the results of this study.

Probe obstruction may be related to the retention of nutrient therapy formula residues in its lumen, inadequately macerated tablets introduced by the probe, resulting in inadequate supply of calories, delayed administration of medications and diet, ineffective therapy, and direct and indirect costs. Thus, there may be a need to change the probe, interrupting the nutritional and drug therapy, besides the additional work of the nursing team¹³, discomfort and stress in the infant and his companion. It should be noted that in all obstructions of the jejunal probes of the infants studied, all of them used the medication clarithromycin by the catheter.

It should be noted that this medication may have undissolved particles, which can cause catheter obstruction. Therefore, it is necessary to irrigate the drug after the administration of the drug in order to maintain the

permeability and reduce the adherence of drugs to the wall of the tube, with the care of evaluating the amount of fluids administered, according to the Body area of the child.

A study on the preparation of medications for catheter administration found that when preparing solid drugs it is important that the nursing professional know how to grind, how to dilute and the volume of the diluent. Such aspects should be prioritized to ensure patient safety with regard to the administration of medicaments, since insufficient milling of the drug (residues) may obstruct the fine caliber catheters by aggregation with the diet in the probe lumen. Therefore, rinsing the probe before and after drug administration is a preventive measure of catheter obstruction.¹⁴

The amount of 11.2% of probe withdrawal events due to unknown cause was found. This result points us to the importance of the health team's annotations, especially of nursing, in the child's medical records. This result reflects the quality of care in the care process by the Nurse and his/her team. In addition, it is the assignment of this health professional to ensure the clear and accurate record of information related to diet administration, patient evolution, and also to detect and record any intercurrentence.⁵

Registration, when not performed, entails risks to the child, implies the discontinuity of the care and safety of the patient, it has ethical implications for the professional who has as responsibility and must record in the medical record the information inherent and indispensable to the care process.¹⁵ The complete, clear and precise notes regarding the procedures performed with the patient should be considered to contribute to an improvement in the quality of care, favoring the continuity of care and the legitimation of nursing work.¹⁶

CONCLUSION

The study shows that more than 60% of the infants who were hospitalized in the period from 04/20/2011 to 06/18/2012 without a probe for nutritional therapy were submitted to the gastric/jejunal catheterization procedure after 48 hours of hospitalization. During the week and in the day shifts was the period in which the highest frequency of catheter loss occurred, due to the greater frequency of manipulation of the child for physical examination, body hygiene, collection of biological material for examination and other technical procedures. More than 70% of the infants who lost the probe were motivated by accidental losses.

Of the 61 infants in the sample, 98 loss procedures were identified, indicating that infants are submitted to the sampling procedure at least twice during hospitalization. The main reasons that lead to the loss of the probes are the withdrawal by the child, inappropriate fixation / dressing, obstruction and ignored causes.

This study has the limitation of the quantity of the sample and of the annotations of the health professionals in medical records that indicate the ignored causes and that

interferes in the motivations for the losses of the probes. It is recommended the training of health professionals regarding medical records and new studies that may reveal the use of clarithromycin by probe, its adequate dilution and volume of irrigation in order to avoid obstructions.

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Received on: 24/10/2016

Reviews required: No

Approved on: 04/01/2017

Published on: 10/04/2018

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