





Swallowing and feeding outcomes associated with orotracheal intubation and tracheostomy in pediatrics

Desfechos de deglutição e alimentação associados à intubação oro-traqueal e à traqueostomia em pediatria

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ABSTRACT

Purpose: To verify the swallowing and feeding outcomes of pediatric patients undergoing prolonged OTI, considering those who progressed to tracheostomy afterward. **Methods:** Retrospective cohort study, carried out by analyzing the medical records of patients admitted to the Pediatric ICU and followed up until hospital discharge, between 03/2017 and 12/2018. **Results:** Of the 51 patients included, 64.7% were male and the median age 6.7 months. Patients undergoing OTI for a median of 7 days had mild dysphagia and when submitted for more than 14 days had moderate/severe dysphagia and PFD with characteristics of food refusal, with contraindication to oral feeding at hospital discharge. 74.5% of the patients underwent OTI only and 25.5% progressed to tracheostomy afterward. Tracheostomized patients had a higher occurrence of hospital discharge with moderate/severe oropharyngeal dysphagia, pediatric feeding disorder (PFD) with characteristics of food refusal and alternative method of feeding compared to patients without tracheostomy ($p=0.001$). Non-tracheostomized patients had a final diagnosis with milder degrees of dysphagia when compared to the initial diagnosis ($p<0.001$). **Conclusion:** The time of OTI and the presence of tracheostomy are factors associated with the speech-language pathology diagnosis of moderate/severe oropharyngeal dysphagia, presence of signs of PFD with characteristics of food refusal and the need for an alternative method of feeding that persists until hospital discharge, being frequent findings among the swallowing/feeding outcomes in pediatrics.

Keywords: Speech, language and hearing sciences; Deglutition disorders; Intratracheal intubation; Tracheostomy; Pediatrics

RESUMO

Objetivo: verificar os desfechos de deglutição e alimentação de pacientes pediátricos submetidos à intubação oro-traqueal (IOT) prolongada, considerando aqueles que evoluíram para traqueostomia após. **Métodos:** estudo de coorte retrospectivo, realizado por meio da análise de prontuários de pacientes admitidos em Unidade de Terapia Intensiva Pediátrica e acompanhados até a alta hospitalar, entre março de 2017 e dezembro de 2018. **Resultados:** dos 51 pacientes incluídos, 64,7% eram do gênero masculino e a mediana de idade foi de 6,7 meses. Pacientes submetidos à IOT por mediana de sete dias apresentaram disfagia orofaríngea (DOF) leve e, quando submetidos a mais de 14 dias, apresentaram DOF moderada/grave, distúrbio alimentar pediátrico (DAP) com características de recusa alimentar e contraindicação de alimentação por via oral na alta hospitalar. Dentre os pacientes, 74,5% foram submetidos apenas à IOT e 25,5% evoluíram para traqueostomia, após. Pacientes traqueostomizados apresentaram maior ocorrência de alta hospitalar com DOF moderada/grave, DAP com características de recusa alimentar e uso de via alternativa de alimentação, em comparação a pacientes sem traqueostomia ($p=0,001$). Comparado ao diagnóstico inicial, pacientes não traqueostomizados tiveram diagnóstico final com graus mais leves de disfagia ($p<0,001$). **Conclusão:** o tempo de IOT e a presença de traqueostomia são fatores associados ao diagnóstico fonoaudiológico de DOF moderada/grave, à presença de sinais de DAP com características de recusa alimentar e à necessidade de via alternativa de alimentação, persistentes até a alta hospitalar, sendo achados fonoaudiológicos frequentes entre os desfechos de deglutição/alimentação em pediatria.

Palavras-chave: Fonoaudiologia; Transtornos de deglutição; Intubação intratraqueal; Traqueostomia; Pediatria

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INTRODUCTION

Advances in neonatal and pediatric intensive care have resulted in a growing population of children dependent on prolonged orotracheal intubation (OTI). Despite the universally recognized benefits of mechanical ventilation in children, the permanence of invasive support is directly associated with a series of complications^(1,2). The impact of these complications on pediatric health and well-being is significant and is essentially linked to the feeding outcome and prognosis of these patients, since the need for nasogastric tube and gastrostomy feeding in children has already been shown to be associated with a higher frequency of food refusal, oropharyngeal dysphagia (OPD) and the frequency of consultations in pediatric emergencies and hospital admissions related to alternative methods of feeding⁽³⁾.

Patients who are admitted to a Pediatric Intensive Care Unit (PICU) and who require a speech-language pathology assessment are usually referred due to swallowing difficulties, previous history of oral feeding difficulties, chronic respiratory symptoms, among other reasons, being that many of these patients require prolonged OTI and are submitted to tracheostomy⁽¹⁾. The literature indicates that one in three pediatric patients admitted to the PICU will require respiratory support for an average of five days⁽²⁾ and, among these, more than 50% will have been extubated 48 hours after admission, but the remnants will often require prolonged ventilatory support⁽⁴⁾.

In childhood, mechanical ventilation can affect the biomechanics of swallowing and alter the sensory processing of food due to OTI. OTI, when longer than 48 hours, can cause lesions in the oral cavity, pharynx and larynx, with reduced motricity and sensitivity of the oropharyngeal tract, which compromise the swallowing mechanisms, consequently increasing the risk of aspiration^(1,5).

Both in neonatology and in pediatrics, studies on the influence of the orotracheal tube and tracheostomy over oral sensorimotor development are still scarce⁽⁵⁾. Although the cause of dysphagia in hospitalized pediatric patients is multifactorial and with significant differences in relation to the adult population, it is clear from the literature available for the latter group that common intensive care procedures, such as OTI and tracheostomy, interfere with the ability to perform efficient and safe swallowing, being that patients on prolonged ventilation compose a group at increased risk for oropharyngeal dysphagia⁽⁶⁾.

Post-intubation swallowing alterations are mostly temporary⁽⁷⁾. However, children who persist with these alterations, despite the use of adaptations such as change of food consistency, positioning, changes in flow rate and use of utensils, may maintain the need for alternative feeding methods⁽⁸⁾, presenting other feeding outcomes that are not exclusive oral feeding.

Considering the growing importance of swallowing disorders in the pediatric population in the hospital scenery, the impact of the problem on children's health, the high economic cost and the socio-emotional repercussions associated with the use of alternative feeding methods, becomes essential to improve the studies in order to identify and minimize the difficulties related to feeding in children with a history of invasive ventilatory support and its impacts on the process of child development and feeding outcome.

This research aimed to verify the swallowing and feeding outcomes at hospital discharge of pediatric patients undergoing prolonged OTI, also considering those who progressed to tracheostomy afterward.

METHODS

This is a retrospective cohort study, carried out through the review and analysis of medical records of patients admitted to the PICU and who had speech-language pathology follow-up until hospital discharge at Hospital de Clínicas de Porto Alegre (HCPA), with dates of consultation request between March 2017 and December 2018.

This study was approved by the Research Ethics Committee of the HCPA, under feedback number 5.193.925. Based on Normative Resolution 466/2012 on the use of data from patient records, with anonymous analysis of retrospective data, the Free and Informed Consent Term (TCLE) was waived. To access the medical records, the researchers involved signed the Term of Commitment for the Use of Data (TCUD).

Individuals aged from 0 to 11 years and 11 months were included in the research, who were followed up by the Speech-Language Pathology team during the PICU follow-up, through a request made by the medical team, and who remained in OTI for a long time. The cutoff point for defining prolonged use of OTI was considered, based on the literature, as equal to or greater than 48 hours^(1,5).

At this stage of the study, were excluded hospitalized patients whose consultations were not answered in a timely manner before discharge, patients who were followed up in other hospital units other than the pediatric inpatient unit and/or transferred to other hospitals and patients who did not meet the criteria for admission in speech therapy at the time of the evaluation request.

For patients with more than one admission to the unit, when there was a complete speech-language assessment and intervention in the first admission, that was the admission considered.

The variables related to the characterization of the sample were: gender, age on the date of the first evaluation, history of prematurity (considered when a gestational age of less than 37 weeks was recorded), days of hospitalization, number of speech-therapy visits during hospitalization; clinical variables: time of OTI, previous OTI history, evolution to tracheostomy after OTI during hospitalization, reason for tracheostomy indication, feeding method at the time of the first evaluation and feeding method at hospital discharge.

The speech-language assessment was based on the following aspects:

- 1) Classification of Pediatric Feeding Disorder (PFD), which proposes, as a concept, impaired oral intake that is not age-appropriate and is associated with medical, nutritional, feeding skill, and/or psychosocial dysfunction⁽⁹⁾.
- 2) Initial diagnostic clinical impression and reassessment close to hospital discharge based on the Clinical Evaluation Protocol of Pediatric Dysphagia (PAD-PED)⁽¹⁰⁾, whose opinion considered up to three consecutive assessments, when necessary, to conclude the diagnosis. The presence of signs suggestive of feeding refusal was added to the PAD-PED impressions, when the child showed signs that he did not want to eat, such as turning its face, refusing to open its mouth, not allowing the utensil to be introduced into the oral cavity and nausea to the offer^(11,12).

With regard to medical diagnosis, the International Code of Diseases (ICD) was taken into account, as recorded in the hospital's electronic medical record system⁽¹³⁾.

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 18.0. Quantitative variables were described by median and interquartile range (25 and 75 percentiles) and categorical variables by absolute and relative frequency. To verify the associations between variables, Fisher’s Exact Test was applied, followed by the Z-Test of comparing proportions with Bonferroni adjustment and, to verify the difference between paired variables, the Wilcoxon Test was used, with a significance level of 5% ($p < 0.05$).

RESULTS

The study was developed from a retrospective analysis of a period of 19 months. During this period, 82 patients had consultations requested from the Speech-Language Pathology team at the PICU. After applying the criteria defined for the study, the records of 51 patients were analyzed.

Of the 51 patients in the sample, 33 (64.7%) were male and 19 (37.3%) had a history of prematurity. The median age was 6.7 months and ranged from 23 days of age to 8.4 years. There was a predominance of diseases of the respiratory system, observed in 33 patients (64.7%), compared to the occurrence of other ICDs (Figure 1). The mean length of hospital stay for the study patients was 4 months and 15 days.

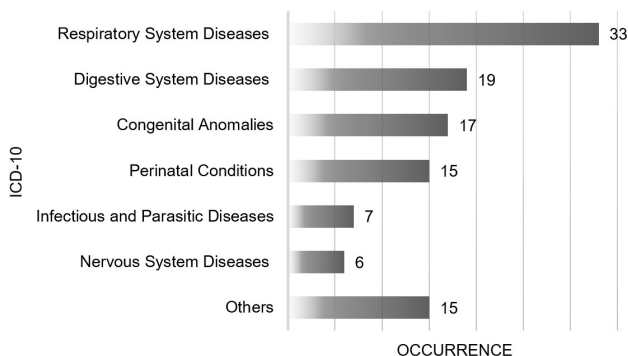


Figure 1. Characterization of the sample's medical diagnoses
Subtitle: ICD = International Classification of Diseases

All patients in the study were on OTI for more than 48 hours, among these 38 (74.5%) underwent OTI only and 13 (25.5%) progressed to tracheostomy afterwards. The most common reasons for indication for tracheostomy were: failure to wean from supportive ventilation (46.1%) and failure to extubate (38.4%). The mean time of OTI was 10 days and 29 patients (56.9%) had a history of previous OTI. The period between extubation and evaluation of oral feeding was, on average, 3.5 days.

According to PFD classification, 38 (74.5%) patients in the sample would be classified as acute PFD and 13 (25.5%), as chronic. All patients had at least one medical dysfunction as a proposed diagnostic criterion for pediatric feeding difficulties, associated with other factors: 43 (84.3%) had feeding skill dysfunction, 24 (47.1%) had nutritional dysfunction and 24 (47.1%) also had psychosocial dysfunction.

When were done the association between the initial speech-language pathology diagnosis and the one at hospital discharge, it was observed that non-tracheostomized patients had a final speech-language pathology diagnosis with milder degrees of dysphagia, when compared to the initial diagnosis. For tracheostomized patients, it was not possible to identify a statistical difference between the diagnoses (Table 1).

When the speech-language pathology diagnosis and the feeding method at hospital discharge was associated with the use of tracheostomy, it was observed that non-tracheostomized patients had a higher occurrence of discharge with a diagnosis of mild OPD and exclusive oral feeding and tracheostomized patients, with a diagnosis of moderate or moderate to severe OPD and food refusal and with an exclusive alternative feeding method (Table 2).

The association of the speech-language pathology diagnosis and the feeding method at hospital discharge with the classification proposed for the diagnosis of pediatric feeding difficulties was analyzed, and it was possible to observe a statistically significant difference between the presence or absence of nutritional, feeding skill and/or psychosocial dysfunctions, between diagnoses and feeding methods (Table 3).

It was possible to observe a statistical difference when the speech-language pathology diagnosis and the feeding method at hospital discharge were associated with some specific medical diagnoses (Table 4). For each ICD, the

Table 1. Initial speech-language pathology diagnosis and at hospital discharge of patients with and without tracheostomy

| TRACH | Variable | Initial n (%) | Discharge n (%) | P-value |
|-------|--|---------------|-----------------|---------|
| No | Speech-language Pathology Diagnosis | | | <0.001* |
| | Normal swallowing | 0* | 8 (21.1)* | |
| | Mild OPD | 12 (31.6)* | 20 (52.6)* | |
| | Moderate to severe or Severe OPD | 16 (42.1)* | 2 (5.3)* | |
| | Food Refusal associated or not to OPD | 10 (26.3)* | 6 (15.8)* | |
| | Death during hospitalization | 0** | 2 (5.3)** | |
| Yes | Speech-language Pathology Diagnosis | | | 0.157 |
| | Normal swallowing | 0 | 0 | |
| | Mild OPD | 0 | 1 (7.7) | |
| | Moderate to severe or Severe OPD | 4 (30.8) | 4 (30.8) | |
| | Food Refusal associated or not to OPD | 9 (69.2) | 5 (38.5) | |
| | Death during hospitalization | 0** | 3 (23.1)** | |

* Statistically significant values ($p \leq 0.05$) - Wilcoxon Test ** Deaths were disconsidered for the purposes of analysis in the statistical test

Subtitle: OPD = oropharyngeal dysphagia; TRACH = tracheostomy; n = number of patients % = percentage

Table 2. Speech-language pathology diagnosis and feeding method at hospital discharge of patients with and without tracheostomy

| Variable | Without TRACH | With TRACH | P-value |
|---|---------------|------------|---------|
| Speech-language Pathology Diagnosis – n (%) | | | 0.001* |
| Normal swallowing | 8 (22.2) | 0 | |
| Mild OPD | 20 (55.6)* | 1 (10)* | |
| Moderate to severe or Severe OPD | 2 (5.6)* | 4 (40)* | |
| Food Refusal associated or not to OPD | 6 (16.7)* | 5 (50)* | |
| Feeding Method at Hospital Discharge – n (%) | | | <0.001* |
| Exclusive Oral Feeding | 27 (71.1)* | 0* | |
| Mixed feeding | 4 (10.5) | 2 (15.4) | |
| Exclusive Alternative Feeding | 5 (13.2)* | 8 (61.5)* | |
| Death during hospitalization | 2 (5.3)** | 3 (23.1)** | |

* Statistically significant values ($p \leq 0.05$) – Fisher's Exact Test followed by the Z-Test of comparing proportions with Bonferroni adjustment ** Deaths were disconsidered for the purposes of analysis in the statistical test

Subtitle: OPD = oropharyngeal dysphagia; TRACH = tracheostomy; n = number of patients % = percentage

Table 3. Association of diagnostic criteria for Pediatric Feeding Disorders with speech-language pathology diagnosis and feeding method at hospital discharge

| Variable | Nutritional Dysfunction | | | Feeding Skill Dysfunction | | | Psychosocial Dysfunction | | |
|--|-------------------------|-----|---------|---------------------------|----|---------|--------------------------|-----|---------|
| | Yes | No | P-value | Yes | No | P-value | Yes | No | P-value |
| Speech-language Pathology Diagnosis – n | | | <0.001* | | | <0.001* | | | 0.001* |
| Normal swallowing | 0 | 8 | | 0* | 8* | | 1* | 7* | |
| Mild OPD | 3* | 18* | | 21* | 0* | | 7* | 14* | |
| Moderate to severe or Severe OPD | 6* | 0* | | 6* | 0* | | 3 | 3 | |
| Food Refusal associated or not to OPD | 10* | 1* | | 11* | 0* | | 10* | 1* | |
| Feeding Method – n | | | <0.001* | | | >0.05 | | | 0.009* |
| Exclusive Oral Feeding | 0* | 27* | | 19 | 8 | | 7* | 20* | |
| Mixed feeding | 6* | 0* | | 6 | 0 | | 4* | 2* | |
| Exclusive Alternative Feeding | 13* | 0* | | 13 | 0 | | 10* | 3* | |

* Statistically significant values ($p \leq 0.05$) – Fisher's Exact Test followed by the Z-Test of comparing proportions with Bonferroni adjustment

Subtitle: OPD = oropharyngeal dysphagia; n = number of patients

Table 4. Association of medical diagnosis with speech-language pathology diagnosis of hospital discharge

| Speech-language Pathology Diagnosis | Normal swallowing | | Mild OPD | | Moderate to severe or Severe OPD | | Food Refusal associated or not to OPD | | P-value |
|-------------------------------------|------------------------|------------|---------------|------------|----------------------------------|-----------|---------------------------------------|-----------|---------|
| | Yes | No | Yes | No | Yes | No | Yes | No | |
| ICD – n (%) | | | | | | | | | |
| Neoplasms | 0 | 8 (18.6) | 1 (16.7) | 21 (48.8) | 0 | 6 (14) | 5 (83.3)* | 8 (18.6)* | 0.018* |
| Nervous System | 0 | 8 (18.2) | 1 (20) | 21 (47.7) | 3 (6.8)* | 3 (60)* | 1 (20) | 12 (27.3) | 0.030* |
| Digestive System | 1 (5.6) | 7 (22.6) | 5 (27.8) | 17 (54.8) | 3 (16.7) | 3 (9.7) | 9 (50)* | 4 (12.9)* | 0.017* |
| Malformations | 1 (5.9) | 7 (21.9) | 4 (23.5)* | 18 (56.3)* | 4 (23.5) | 2 (6.3) | 8 (47.1)* | 5 (15.6)* | 0.011* |
| Feeding Method | Exclusive Oral Feeding | | Mixed feeding | | Exclusive Alternative Feeding | | P-value | | |
| ICD – n (%) | Yes | No | Yes | No | Yes | No | | | |
| Infections/Parasites | 1 (16.7) | 26 (59.1) | 2 (33.3)* | 3 (6.8)* | 1 (16.7) | 12 (27.3) | 0.026* | | |
| Respiratory System | 21 (65.6)* | 6 (33.3)* | 3 (9.4) | 2 (11.1) | 7 (21.9) | 6 (33.3) | 0.056* | | |
| Digestive System | 4 (22.2)* | 23 (71.9)* | 2 (11.1) | 3 (9.4) | 9 (50)* | 4 (12.5)* | 0.003* | | |
| Malformations | 3 (18.8)* | 24 (70.6)* | 3 (18.8) | 2 (5.9) | 9 (56.3)* | 4 (11.8)* | 0.001* | | |

* Statistically significant values ($p \leq 0.05$) – Fisher's Exact Test followed by the Z-Test of comparing proportions with Bonferroni adjustment

Subtitle: ICD = International Classification of Diseases; OPD = oropharyngeal dysphagia; n = number of patients % = percentage

occurrence of speech-language pathology diagnosis and feeding method were highlighted, and the other ICDs whose statistical significance was not observed were not described in the table.

When the time submitted to OTI was compared to the speech-language pathology diagnosis and the feeding method at hospital discharge, it was possible to observe a relation between longer periods of OTI and worse outcomes (Table 5).

Tabela 5. Comparison between days on invasive mechanical ventilation with speech-language pathology diagnosis and feeding method at hospital discharge

| Variable | Days under OTI md (P25-75) |
|--|----------------------------|
| Speech-language Pathology Diagnosis | |
| Normal swallowing | 6 (5.25-6.75) |
| Mild OPD | 7 (5.5-12.5) |
| Moderate to severe or Severe OPD | 14 (3.5-38.5) |
| Food Refusal associated or not to OPD | 18 (8-28) |
| Feeding Method | |
| Exclusive Oral Feeding | 7 (5-9) |
| Mixed feeding | 15 (8.75-34.75) |
| Exclusive Alternative Feeding | 19 (7-43) |

Subtitle: OTI = orotracheal intubation; OPD = oropharyngeal dysphagia; md (P25-75) = median and percentiles 25 and 75

DISCUSSION

In this research, involving the pediatric population submitted to invasive mechanical ventilation for more than 48 hours, it was possible to observe a significant association between the time of OTI and the presence of tracheostomy on the speech-language pathology and feeding method findings and their swallowing and feeding outcomes at hospital discharge. The assessment of post-extubation dysphagia and in the presence of tracheostomy is essential for a better understanding of the factors that influence the biomechanics of swallowing.

In the literature, there is a consensus among the adult population that hospitalized patients with dysphagia have a longer hospital stay and increase hospital costs per admission by 40.36%, compared to patients without dysphagia⁽¹⁴⁾. Many publications have tried to establish the intubation time associated to risks and bad prognoses, however, these data vary from one study to another. One of them showed that the risk of developing post-extubation dysphagia is 1.8 times higher in patients intubated for seven days⁽¹⁵⁾. Another study observed increased risk of aspiration, by 5.5 times, in patients who remained intubated between eight and 14 days⁽¹⁶⁾. Another research suggests that the highest frequency of predictive signs of aspiration risk is present even earlier, with only six days of intubation⁽¹⁷⁾, and the intubation time was also considered an independent predictor of dysphagia in other publications⁽¹⁸⁻²¹⁾.

Although the association between the duration of OTI and the severity of dysphagia has been widely documented in adults, there are few studies that contribute to the establishment of this association when addressing the pediatric population. One of these publications presented post-extubation dysphagia in pediatric patients as a common finding, with 29% incidence, being that the age of 0-24 months increased the chance of dysphagia by 2.63 times and each hour of intubation increased the odds of dysphagia by 1.7%, or around 50% per day of intubation. It was also possible to observe that post-extubation dysphagia was associated with negative results of increased total length of stay in the ICU and greater chances of alternative feeding methods at hospital discharge⁽³⁾. Another publication presented post-extubation dysphagia in pediatric patients with 84% incidence⁽²²⁾.

The data presented above agree with the results of the present research, since it was possible to establish an association

between longer periods of OTI and worse swallowing and feeding outcomes. Patients who remained on OTI for a median of six days had a higher occurrence of normal swallowing diagnosis; at seven days, a higher occurrence of mild OPD and, between 14 and 18 days, a higher occurrence of moderate to severe and severe OPD, as well as the presence of signs suggesting PFD with characteristics of food refusal. Regarding the need for an alternative feeding method, it was possible to observe that, with a median of more than 15 days in OTI, most patients were discharged from the hospital with a mixed feeding method; at 19 days, the occurrence of discharge with an exclusive alternative feeding method increased. OTI duration was also identified as a factor strongly associated with moderate and severe dysphagia in another study with the pediatric population⁽²³⁾.

In addition to the OTI time, the presence of tracheostomy was also observed, in the present study, as a factor associated with worse speech-language pathology and feeding method outcomes at hospital discharge. Among tracheostomized patients, there was a higher occurrence of diagnoses of moderate to severe, severe OPD and presence of signs suggesting PFD with characteristics of food refusal with contraindication for oral feeding, compared to non-tracheostomized patients.

In this research, it was not possible to observe a significant difference between the initial speech-language pathology diagnoses and those at hospital discharge of tracheostomized patients. These findings can be explained by the history of reintubation of these patients, extubation failures and laryngopharyngeal structural alterations, as well as the invasive procedure of placing a tracheostomy cannula and postoperative, which increase the risk of impaired airway protection, as data already documented in a publication⁽²⁴⁾, in addition to promoting negative experiences in relation to feeding, often associated with manipulation and discomfort, which directly affect the feeding prognosis of these children.

The data found in the present study regarding the presence of signs suggestive of PFD with characteristics of food refusal in patients submitted to OTI for a period greater than or equal to 48 hours are of paramount importance for the discussion of interventions and prognoses.

A study has already shown that the reduction in sensitivity of the entire upper airway can cause the food bolus, saliva and secretions to remain in the oral cavity and hypopharynx, due to changes in chemoreceptors and mechanoreceptors caused by orotracheal intubations for more than seven days⁽¹⁵⁾. For these reasons, patients are submitted to enteral tube feeding and their dependence for a long time is also shown to be a factor associated with the development of food refusal. In general, food refusal arises from a decrease in motivation to eat, due to poor perception of hunger, satiety through tube feeding, negative experiences such as extreme manipulation during hospitalization and procedures, impaired child-caregiver interaction, and reduced positive oral stimulation due to lack of experience⁽²⁵⁾.

The present research also proposed the association between the speech-language pathology diagnosis and the feeding method with previous medical diagnoses and referring to hospitalization. There was an association of ICDs of neoplasms, diseases of the nervous and digestive system and congenital malformations with higher occurrences of moderate/severe OPD and food refusal. It was also possible to observe an association of the ICDs with diseases of the digestive system and congenital malformations with higher occurrences of use of the exclusive alternative feeding method. These data can be explained by the criticality

of these diagnoses, with unstable clinical conditions, and by the fact of constant manipulation and submission to invasive procedures during hospitalization, which directly impact the patients' swallowing and feeding conditions.

Published research has shown that patients with heart disease, liver disease and neurological diseases with prolonged mechanical ventilation and malnutrition are more likely to undergo tracheostomies⁽²⁴⁾. Thus, patients with these diagnoses have risk factors related to the underlying disease and the presence of a tracheostomy to develop dysphagia and an alternative feeding method. Another study documented that 40% to 70% of children with chronic medical problems, such as congenital or acquired respiratory, cardiac and gastrointestinal problems, have swallowing and feeding difficulties, confirming the findings of this study⁽²⁶⁾.

It is also worth noting that a previous study showed that severe post-extubation dysphagia was significantly associated not only with prolonged hospital stays, but also with other negative outcomes at patient discharge, such as pneumonia, reintubation, in-hospital mortality, state of discharge and use of alternative feeding methods⁽²⁷⁾. Although these variables were not directly verified in this study, a considerably high average length of stay was observed, of four months and 15 days for pediatric patients undergoing prolonged OTI, with a frequency of 11.6% of patients diagnosed with persistent moderate to severe and severe oropharyngeal dysphagia until hospital discharge, and 25.5% with oral feeding contraindication. In-hospital mortality was observed in 9.8% of the sample.

Finally, this research established a direct association between the speech-language pathology diagnosis and the feeding route with the proposed classification for PFD. Like the authors of the classification, it is believed that the proposed diagnostic criteria for PFD use a conceptual framework that goes beyond the unilateral or disease-oriented diagnostic paradigms, considering dysfunction in at least one of the four complementary domains intimately related, as it was possible to observe in the findings. The adoption of this definition in care and research will establish common terminology that can have a broad impact on clinical practice.

The present study has limitations due to its retrospective nature, since possible losses of information must be considered. In addition, because it was a research that considered a medical prescription for speech-language pathology assessment, part of the selection of subjects had a higher clinical probability of having some finding related to the outcome of the research. Furthermore, due to the small number of patients in the sample and the fact that they were from a single institution, the results may have been biased due to the therapeutic approaches adopted in the specific protocols. Despite such limitations, the data analyzed are in line with the current literature.

CONCLUSION

In the pediatric population undergoing invasive mechanical ventilation for 48 hours or more, it was observed that the duration of orotracheal intubation and the presence of tracheostomy were factors associated with the speech-language pathology diagnosis of moderate to severe and severe oropharyngeal dysphagia, with the presence of signs suggestive of PFD with characteristics of food refusal and the need for an alternative feeding method, persistent until hospital discharge.

This study confirms the current evidence already documented for the adult population and which is still under construction in pediatrics, expanding the look at specific intervention in swallowing and feeding in this population, aiming at swallowing safety and the prevention of feeding difficulties in childhood.

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