

## Characterization of Dysphagia in Congenital Cardiopathic Infants Admitted to the Intensive and Intermediate Care Unit

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### Abstract

**Objective:** To investigate the correlation between infants diagnosed with congenital heart disease and dysphagia.

**Methods:** Hospitalized in Intensive and Intermediate Care Units from 2017 to 2020, infants up to 60 days of life diagnosed with congenital heart disease and full-term controls were compared for dysphagia.

**Results:** Sixteen patients and forty-eight controls were included. Comparing them, the group of patients with heart disease showed correlation for dysphagia.

**Conclusion:** Infants diagnosed with congenital heart disease have a greater tendency to present dysphagia.

**Keywords:** Speech Therapy; Dysphagia; Congenital Cardiopathy; Infant; Rehabilitation

### Introduction

Congenital Heart Disease is an abnormality in cardiocirculatory structure or function that occurs before birth, even if diagnosed later. This disease varies according to severity, with changes occurring from communications between cavities that regress spontaneously to major malformations [1]. Its etiology is multifactorial and may result from the interaction between genetic predisposition and intrauterine environmental factors, or between postnatal factors and hemodynamic abnormalities [2,3].

Children born with congenital heart disease may present anatomical abnormalities and aggravating symptoms, such as dysphagia, malnutrition and difficulty in gaining weight [4]. In view of the literary findings, this article aims to describe the correlation of infants with diagnosis of congenital heart disease and dysphagia.

### Methods

#### Study design

This observational study was conducted in one reference centers in Northeastern Brazil. The sample was divided into two

groups: infants up to 60 days of age, with congenital heart disease treated and the control group admitted to intensive and intermediate care units.

The study was approved by the Institutional Review Board and conducted according to the guidelines of the Declaration of Helsinki. A written informed consent was obtained prior to patient participation in the study.

**Sample of participants**

All included subjects were infants at term, hospitalized in intensive care units (ICU) and intermediate care units (NICU), from 2017 to 2020, regardless of the delivery route. Were selected for the exposure group, infants diagnosed with congenital heart disease, regardless of the degree, who were fed by oral and/or alternative routes, and who used oxygen therapy. Control subjects were infants with an Apgar above 8, without a diagnosis of TORCHS - Toxoplasmosis, Rubella, Cytomegalovirus, Herpes Simplex 1 and 2 and other infections (Coxsackie, Syphilis, Varicella Zoster Virus - VZV -, Human Immunodeficiency Virus - HIV -, Parvovirus B19, Hepatitis B Virus - HBV -, Lymphocytic Choriomeningitis Virus - LCM), with a maximum stay of 14 days in the ICU. All subjects (between cases and controls) who had neurological deficits, syndromes and/or malformations were excluded.

**Clinical assessment**

For the evaluation of dysphagia through medical records, the validated protocol Assessment Of Motor-Oral Abilities And Deglutition Instrument For Children (AMORA-DI) [5] was used. In this study protocol, the following components were analyzed for the assessment of thin liquid and thick liquid swallowing consistency: type of utensil used, color change, change in breathing pattern, coordination of sucking, swallowing, and breathing of infants. The evaluation was applied according to the defined protocol, with lower scores being attributed to better performances.

**Statistical analysis**

As the studied population did not exhibit a normal distribution according to the Shapiro-Wilk test, non-parametric tests such as Mann-Whitney U were performed for comparison of the groups. Confidence interval was established at 95%. Statistical analysis was performed using IBM SPSS v26.

**Results**

A total of 64 individuals were included, including 16 patients and 48 controls, with two deaths recorded. Demographic characteristics of the participants are shown in table 1. Cases and controls had similar baseline characteristics, except for Weight at birth (p < 0.01).

Variables	Population				
	Group with heart disease		Control group		p-value
	N	(%)	N	(%)	
<b>Weight at birth</b>					
Adequate (≥2500g)					<0.01
Low (<2500g)	11	68.75%	41	85.42%	
Very low (<1500g)	03	18.75%	07	14.58%	
<b>Gestational week</b>					1.00
02	02	12.50%	00	0%	
Early term	00	0%	00	0%	
At term	16	100%	48	100%	
<b>Initial food supply route</b>					0.25
01	01	6.25%	20	41.70%	
Oral	14	87.50%	28	58.30%	
Nasogastric/Orogastric Tube	01	6.25%	00	0%	
Gastrostomy					

**Table 1:** Demographic and gender characteristics.

When comparing the control and exposure groups, infants with heart disease tend to stay longer with alternative feeding pathways (p < 0.001). It was also verified that there was no difference between the groups of infants diagnosed with congenital heart disease who used the orogastric tube (p = 0.8) and those fed orally using oxygen therapy (p = 0.5) (Graph 1).

**Discussion**

Our study suggests that infants with heart disease may have greater difficulty in feeding than the control group. In addition, we observed that there was no difference between the groups of infants diagnosed with congenital heart disease who used the orogastric tube and those fed orally using oxygen therapy.

Although several articles emphasize complications common to heart disease in infants, especially after congenital heart surgery

**Graph 1:** Description between the groups of infants diagnosed with congenital heart disease who used the orogastric tube and those fed orally using oxygen therapy.

(such as gastrointestinal complications, dysphagia and growth failure), these infants require urgent and emergency care to improve the prognosis of these children [6,7].

Jadcherla, *et al.* [8] in their study, they described 76 infants with congenital heart disease (29 of them acyanotic and 47 cyanotic) showing significant delays in feeding readiness, due to difficulties in maintaining adequate respiratory support. The data cited confirm our findings when it is verified that these infants tend to stay longer with alternative routes for nutrition due to the difficulty of eating orally.

The prolonged time with an orogastric tube may cause changes in the development of oral motor skills, hindering the transition to the oral pathway, in addition to further increasing the incoordination of sucking-deglutition and breathing (SxDxR) due to lack of training and stimulus. For this process to be safe, without risk of bronchoaspiration, it is important to ensure the proper development of the structures and the maintenance of the defense and feeding reflexes. In this sense, infants with congenital heart disease have a predisposition and great potential for bronchoaspiration and also to cyanosis, fatigue, and incoordination of the SxDxR [9,10].

In our study, there was no significant difference between infants using oxygen therapy associated with oral supply and orogastric/nasogastric tube. No articles were found in the literature that performed this type of comparison, demonstrating how respiratory support directly interferes with food intake. On the other hand, Indramohan, *et al.* [9] demonstrated that oral motor intervention exercises in infants, stimulating their gums, cheeks and lips [11,12] had a reduction in the average length of stay in infants with heart disease. The divergence found can be justified by the fact that these infants were operated on and intubated for long periods, with risks of vocal fold paralysis and/or needing exercises for muscle strengthening.

During the preparation of this study, several limitations were found, such as small sample size, loss of follow-up and death during the study. In addition, the use of narcotics and vasopressors were not measured, nor was the degree of heart disease verified. However, the results found show that infants with heart disease need to perform high respiratory effort in an attempt to capture the milk offered, swallowing and pause for breathing, resulting in a loss of energy, promoting stability and maximizing caloric consumption. Thus, support with oxygen therapy can influence the prognosis of dysphagia during the hospital stay. However, further studies are needed in order to expand the statistical power of the results found in the present study.

## Conclusion

There is a correlation between infants diagnosed with congenital heart disease and dysphagia.

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