

PROFILE OF NEWBORNS SUBMITTED TO SURGERY IN THE INTENSIVE CARE UNIT

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ABSTRACT

Introduction: Improvements in pediatric surgical outcomes are partly attributable to major advances in better understanding of neonatal physiology, specialized pediatric anesthesia, neonatal intensive care, including sophisticated cardiopulmonary support, use of parenteral nutrition and adjustments in fluid management, refinement of surgical technique and advances in surgical technology, including minimally invasive options, which further reduced operative mortality in neonates. **Objective:** To analyze the profile of patients undergoing surgery in a neonatal intensive care unit. **Method:** Retrospective analytical cross-sectional study with survey of all cases of surgery performed on newborns admitted to the Neonatal Intensive Care Unit of the Hospital and Maternidade Dona Íris (HMDI). **Results:** We analyzed 523 medical records that correspond to the number of patients admitted to the Neonatal ICU of HMDI in 2018 and 2019 and of these 78 underwent some type of surgery corresponding to 14.9% of NBs. The profile of these patients is of gestational age between 33 to <37 weeks 31 (40%), weighing > 2500g 35 (45%), male 45 (58%), born by cesarean section 49 (63%), without post complications - surgical 41 (53%). The predominant type of surgery was a thoracostomy with a drain 21 (27%) followed by a gastrostomy 11 (14%). In the comparison between gestational age and type of surgery, we found: <28 weeks thoracostomy with drain, 29 to <32 weeks thoracostomy with drain and herniorrhaphy, 33 to <37 weeks gastroschisis, > 38 weeks thoracostomy with drain. The main complication found was sepsis 17 (42%) and death 16 (40%). It is worth noting that there was a higher occurrence of deaths in NBs with gestational age <28 weeks 8 (50%). Of the patients who underwent surgery, 20.5% died. **Conclusions:** The profile of patients undergoing surgery in the neonatal ICU was male NB, gestational age between 33 to <37 weeks, weighing > 2500g, born by cesarean section and without post-surgical complications. The rate of surgeries performed in the neonatal ICU was 14.9%. The main complication found was sepsis 42%. Post-surgical death rate was 20.5%.

KEYWORDS: NEWBORN, NEONATAL ICU, SURGERIES.

INTRODUCTION

The Neonatal Intensive Care Unit is an inpatient service responsible for comprehensive care for seriously or potentially serious newborns, endowed with assistance structures that have adequate technical conditions to provide specialized assistance, including physical facilities, equipment and human resources. With the advancement of medicine and technical-scientific development, the profile of children hospitalized in intensive care units (ICU) can change, demanding from professionals more complex care and invasive procedures that can effectively guarantee the survival of these patients^{1,2}.

The neonatal period is extremely vulnerable and constitutes a major component of infant mortality. It is estimated that about 25.0% of deaths occur in the first twenty-four hours of life and most of these neonatal deaths are related to prematurity, asphyxia and infections³.

Neonatal surgery emerged as an incipient in the 1930s and 1940s in restricted regional centers around the world where pioneering pediatric surgeons were located. It became a genuine pediatric surgical subspecialty during the 1950s, led by those children's hospitals that developed neonatal surgical units. Technological developments such as ultrasound, computed tomography (CT), sophisticated ventilators and advances in parenteral nutrition have revolutionized diagnosis and treatment. Magnetic resonance imaging, ECMO increased the scope and expanded the horizons of neonatal care in the 1980s, improving treatment performance and reducing morbidity and mortality.

The improvements in pediatric surgical outcomes are partly attributable to major advances in better understanding of neonatal physiology, specialized pediatric anesthesia, neonatal intensive care, including sophisticated cardiopulmonary support, use of parenteral nutrition and

1. HMDI
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adjustments in fluid management, refinement of surgical technique and advances in surgical technology, including minimally invasive options, which further reduced operative mortality in neonates⁵.

However, short- and long-term complications after neonatal surgery continue to have profound and sometimes lasting effects on patients, families and society⁶.

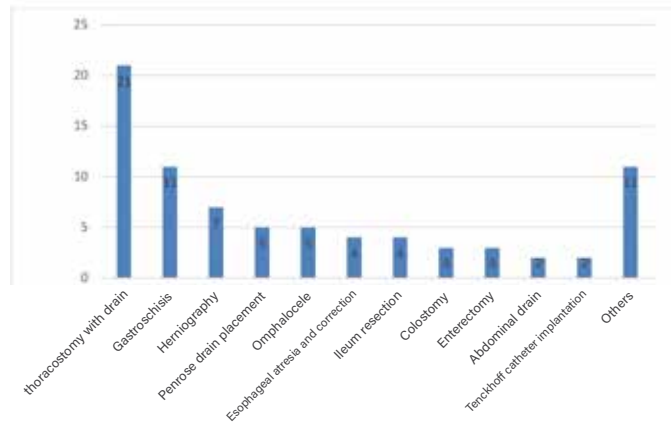
Therefore, the aim of this study is to analyze the profile of patients undergoing surgery in a neonatal intensive care unit.

METHODS

A retrospective analytical cross-sectional study was carried out with a survey of all cases of surgery performed on newborns admitted to the Neonatal Intensive Care Unit of the Hospital and Maternidade Dona Íris (HMDI). All discharge records of neonates admitted to the NICU from January 2018 to December 2019 were analyzed. The variables studied were gestational age, weight, sex, type of delivery and the surgical procedure performed, frenotomies and laser eye surgeries were excluded. The descriptive analysis of the data was performed and presented in the form of tables, with the categorical variables being described by absolute and relative frequencies.

RESULTS

A total of 523 medical records were analyzed, corresponding to the number of patients admitted to the Neonatal ICU of HMDI in 2018 and 2019, and of these 78 were submitted to some type of surgery corresponding to 14.9% of NBs.



Graph 1: Distribution of the main surgical procedures performed on patients admitted to the Neonatal ICU of HMDI in 2018/2019.

GESTATIONAL AGE	TYPE OF SURGERY	N	
< 28 weeks	omphalocele	1	
	thoracostomy with drain	8	
	placement of penrose drain	3	
	herniorrhaphy	2	
	ileum resection	3	
	enterectomy	3	
29 to < 32 weeks	correction of duodenal atresia	1	
	herniorrhaphy	2	
	thoracostomy with drain	1	
	placement of penrose drain	1	
	thoracostomy with drain	2	
	33 to < 37 weeks	esophagostomy	1
		omphalocele	2
		polydactyly	1
		repair surgery of imperforate anus	1
		gastrostomy	1
		herniorrhaphy	1
		exploratory laparotomy	1
		paracentesis	1
		abdominal drain	2
tenckhoff catheter implant		1	
> 38 weeks	placement of penrose drain	1	
	ileo resection	1	
	colostomy	1	
	esophageal atresia correction	1	
	accessory pancreas exeresis	2	
	gastrostomias	8	
	inguinal herniorrhaphy	1	
	thoracostomy with drain	4	
	thoracostomy with drain	6	
	colostomy	2	
	esophageal atresia correction	3	
	gastrostomias	3	
	dialysis catheter insertion	1	
omphalocele	1		
tracheostomy	2		
enterectomy	2		
herniorrhaphy	1		
correction of anorectal anomaly	1		
tenckhoff catheter implant	1		

Source: Research data, 2020

Table 2: Distribution of the characteristics of the type of surgery x gestational age of patients admitted to the Neonatal ICU of the HMDI in 2018/2019

	N	%
Gestational age		
< 28	18	23
29 to < 32	7	9
33 to < 37	31	40
>38	22	28
Weight		
< 1500	27	35
1501 to 2499	16	30
> 2500	35	45
Gender		
Female	33	42
Male	45	58
Type of Childbirth		
Normal	29	37
Cesarean	49	63
Post-surgical complications		
Yes	37	47
No	41	53

Source: Research data, 2020

Table 1: Distribution of characteristics of patients admitted to the Neonatal ICU of the HMDI in the year 2018/2019 who underwent surgery

COMPLICATIONS	N	%
sepsis	17	42
Deaths	16	40
shock	3	7
wound dehiscence	2	5
anemia	1	2
bleeding	1	2
renal insufficiency	1	2

Source: Research data, 2020

Table 3: Distribution of the main complications that occurred in patients admitted to the Neonatal ICU of the HMDI in the year 2018/2019 who underwent surgery.

GESTATIONAL AGE	N	%
< 28	8	50
29 to < 32	2	12
33 to < 37	4	26
>38	2	12

Source: Research data, 2020

Table 4: Distribution of deaths x gestational age of patients admitted to the Neonatal ICU of HMDI in the year 2018/2019 who underwent surgery.

DISCUSSION

The Japanese Society of Pediatric Surgeons conducted a national survey of neonatal surgery every 5 years for the 50 years since its foundation. The number of neonatal surgical cases has increased 5 times during these 50 years, while the mortality rate has decreased from 60% to 15% for the main potentially fatal diseases (such as esophageal atresia, diaphragmatic hernia, omphalocele and gastroschisis). Currently, the majority of neonatal patients who undergo surgery for severe cardiac or chromosomal abnormalities survive. Endoscopic surgical procedures and incisions using natural skin creases have been developed to achieve good results and improve patients' quality of life. On the other hand, neonatal surgical cases are still serious, such as patients with diaphragmatic hernia accompanied by severe pulmonary hypoplasia, enormous sacrococcygeal teratomas and neonatal intestinal perforation⁷. Here in Brazil it was not possible to locate this type of study. When analyzing the literature, only one study was found that presents a wide systematic analysis of postoperative complications in a wide variety of neonatal surgical procedures, this being the second, so it becomes relevant because it is necessary to know and analyze information on incidence and factors predictors of severe morbidity in the neonatal surgical population. Understanding the severity and risk factors for the development of postoperative complications among operated newborns serves to guide the

prevention of the occurrence of morbidity⁸.

The profile found here was of patients with gestational age between 33 to <37 weeks 31 (40%), weighing > 2500g 35 (45%), male 45 (58%), born by cesarean 49 (63%), without post-surgical complications 41 (53%).

The predominant type of surgery was a thoracostomy with a drain 21 (27%) followed by gastroise 11 (14%). In the comparison between gestational age and type of surgery, we found that <28 weeks, thoracostomy with drain, 29 to <32 weeks, thoracostomy with drain and herniorrhaphy, 33 to <37 weeks, gastroschisis, > 38 weeks, thoracostomy with drain. The vast majority of pneumothorax in newborns is iatrogenic, secondary to inadequate ventilation for the patient, due to a subclavian vein puncture accident or in the postoperative period of thoracic pathologies. The severity of the pneumothorax will be proportional to the causative agent and the size of the patient. Premature and extremely premature babies tolerate pneumothorax poorly, especially pneumopericardium, and on several occasions it will be necessary to place more than one drain and continuous aspiration⁹. A study carried out by Catre et al., (2013) mentioned four factors with statistical significance for death after surgery, such as more than one intervention, surgical repair of congenital diaphragmatic hernia, prematurity with less than 32 weeks of gestation and abdominal surgery⁸.

The main complication found was sepsis 17 (42%) and death 16 (40%). Neonatal sepsis is a frequent cause of neonatal morbidity and mortality, especially in developing countries. Its diagnosis is difficult, since the clinical signs are nonspecific and the complementary exams have low accuracy. Continuous observation of the patient, knowing how to value clinical signs and observing risk factors are fundamental for a diagnostic suspicion¹⁰. It is worth mentioning that there was a higher occurrence of deaths in NBs with gestational age <28 weeks 8 (50%). Of the patients who underwent surgery, 20.5% died. The probability of death decreases significantly with increasing gestational age, it represents one third of the probability of death corresponding to the first week of life. When specifically considering live births with very low weight (less than 1,500 g), the fact that the relative risk during the first week of life is up to 165 times greater than that corresponding to those born with adequate weight is noteworthy, ratio that decreases to 132 times in the following weeks¹¹.

A study carried out in Rio de Janeiro with 193 neonates admitted in an NICU, 52.85% were male and 47.15% female, 69.95% born by cesarean delivery, while 30.05% born by vaginal delivery. 39.9% had birth weight greater than or equal to 2500g and 60.1% had low weight, very low or extremely low birth weight. 64.24% of the newborns in the study were premature, of which 21.77% were extremely premature and 78.23% were moderately premature with a death rate of 7.5%¹². The type of delivery was not associated with mortality¹³.

Knowledge of the characteristics of birth and death of newborns, the biological conditions of pregnancy and childbirth, as well as the neonates admitted to Neonatal Intensive Care Units (NICU), made available through appropriate epidemiological studies, can support health care actions, minimizing the occurrence of their injuries and planning a more appropriate treatment¹⁴.

Understanding the severity and risk factors for the development of postoperative complications among operated newborns serves to guide the prevention of the occurrence of morbidity⁸.

CONCLUSION

- ✓ The profile of patients undergoing surgery in the neonatal ICU was male NB, gestational age between 33 to <37 weeks, weighing > 2500g, born by cesarean section and without post-surgical complications.
- ✓ The rate of surgeries performed in the neonatal ICU was 14.9%.
- ✓ The main complication found was sepsis 42%.
- ✓ Post-surgical death rate was 20.5%.

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