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ORIGINAL ARTICLE

OUTCOMES OF PERIPHERALLY INSERTED CENTRAL CATHETER AND SURGICAL DISSECTION IN NEWBORNS

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ABSTRACT
Objective: to investigate the outcomes related to the peripherally inserted central catheter and surgical dissection in neonates in an intensive care unit.
Method: retrospective cross-sectional quantitative study, carried out in a children's hospital in Paraná. Data collection took place in September 2017, using records of neonates admitted from January to December 2016, who had a peripherally inserted central catheter or surgical dissection. Descriptive and association statistics were applied.
Results: A total of 165 records were analyzed, including 134 peripherally inserted catheters (81.2%) and 31 surgical dissections (18.8%). The catheters showed a lower rate of infection compared to dissections (6% and 16.1%, respectively). The following variables were associated with the type of device: insertion site ($p<0.001$), dressing fixation ($p<0.001$), standard operational protocol measures ($p<0.001$), indicators of adverse events ($p<0.001$), with emphasis on the leakage associated with surgical dissection ($p=0.006$).
Conclusion: greater benefits are suggested to neonates regarding peripherally inserted catheter.

DESCRIPTORS: Catheterization, Central Venous; Infant, Newborn; Intensive Care, Neonatal; Catheterization, Peripheral; Neonatal Nursing.

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ARTIGO ORIGINAL / ARTÍCULO ORIGINAL

DESFECHOS RELACIONADOS AO CATETER VENOSO CENTRAL DE INSERÇÃO PERIFÉRICA E À DISSECÇÃO CIRÚRGICA EM RECÉM-NASCIDOS

RESUMO

Objetivo: investigar os desfechos relacionados ao cateter central de inserção periférica e à dissecção cirúrgica em neonatos de uma unidade de terapia intensiva.

Método: estudo quantitativo transversal retrospectivo, realizado em hospital infantil no Paraná. Coletaram-se os dados em setembro de 2017, por meio das fichas referentes aos neonatos internados no período de janeiro a dezembro de 2016, que utilizaram cateter central de inserção periférica ou dissecção cirúrgica. Aplicou-se estatística descritiva e de associação.

Resultados: analisaram-se 165 fichas, sendo 134 cateteres de inserção periférica (81,2%) e 31 dissecções cirúrgicas (18,8%). Os cateteres apresentaram menor quantitativo de infecção comparado às dissecções (6% e 16,1%, respectivamente). Associaram-se ao tipo de dispositivo as variáveis: local de inserção (p<0,001), fixação do curativo (p<0,001), medidas de protocolo operacional padrão (p<0,001), indicadores de eventos adversos (p<0,001), com destaque ao extravasamento associado à dissecção cirúrgica (p=0,006).

Conclusão: sugerem-se maiores benefícios aos neonatos frente ao cateter de inserção periférica.

DESCRITORES: Cateterismo Venoso Central; Recém-Nascido; Terapia Intensiva Neonatal; Cateterismo Periférico; Enfermagem Neonatal.

RESULTADOS RELACIONADOS CON EL CATÉTER VENOSO CENTRAL DE INSERCIÓN PERIFÉRICA Y LA DISECCIÓN QUIRÚRGICA EN RECIÉN NACIDOS

RESUMEN:

Objetivo: Investigar los resultados relacionados con el catéter venoso central de inserción periférica y con la disección quirúrgica en neonatos internados en una unidad de cuidados intensivos.

Método: Se trata de un estudio transversal, retrospectivo y cuantitativo realizado en un hospital de niños del estado de Paraná, Brasil. Los datos se recolectaron en el mes de septiembre de 2017 de los registros de los neonatos internados entre enero y diciembre de 2016 con catéteres centrales de inserción periférica o que hubieran sido sometidos a disección quirúrgica. Se aplicó estadística descriptiva y de asociación.

Resultados: Se analizó un total de 165 registros, con 134 casos de catéteres de inserción periférica (81,2%) y 31% de casos de disección quirúrgica (18.8%). Los catéteres presentaron un porcentaje de infección más bajo en comparación con el de las disecciones (6% y 16,1%, respectivamente). Las siguientes variables se asociaron al tipo de dispositivo: lugar de inserción (p<0,001), fijación del vendaje (p<0,001), medidas del protocolo operativo estándar (p<0,001), e indicadores de eventos adversos (p<0,001), especialmente la extravasación asociada con la disección quirúrgica (p=0,006).

Conclusión: Se sugirió que el catéter de inserción periférica proporciona mayores beneficios a los neonatos.

DESCRIPTORES: Cateterización venosa central; Recién nacido; Cuidados intensivos neonatales; Cateterización periférica; Enfermería neonatal.

INTRODUCTION

Neonatal Intensive Care Units (NICU) have advanced over the years in knowledge, equipment, treatments and techniques, which has contributed to reducing the mortality rate of newborns (NB)[1-2]. The use of safe and long-lasting venous access, necessary for the administration of antibiotics, venous hydration, parenteral nutrition, vasoactive drugs, among others is an example of this[3-4].

Permeable intravenous devices are essential for the survival of neonates. Among them, the central venous catheter (CVC), the peripherally inserted central venous catheter (PICC), umbilical vein catheterization and surgical dissection or phlebotomy stand out. With proper care, it is expected that these devices can guarantee a lower risk for local or systemic infections[5-6]. Surgical dissection or phlebotomy is a procedure performed by a surgeon in an operating room, in which the catheter is inserted through dissection or puncture of a central vein, with the subclavian, usually the jugular or femoral joint[7].

Although the use of venous devices is extremely important in neonatal care, there is a risk of adverse events related to the devices, such as mechanical obstruction of the PICC and infection associated with surgically inserted catheters, the most frequent being clinical sepsis[8]. Even with the adverse events, the use of these venous devices is central for the improvement of the patient's clinical condition.

Thus, the aim of the study was to investigate the outcomes related to the peripherally inserted central catheter and surgical dissection in neonates in an intensive care unit.

METHOD

Retrospective quantitative cross-sectional study, carried out in a NICU of a public children's hospital in Paraná. The population included the records of newborns aged between 0 and 28 days, who required admission to the respective NICU in the sample period from January to December 2016, and who were submitted to CVC insertion, through PICC and/or surgical dissection, as well as monthly reports from the Hospital Infection Control Center (ICC) for the same period.

Inclusion criteria were: records of CVC or PICC insertion or maintenance, and/or surgical dissection, filled out by nurses in the unit, referring to patients admitted to the NICU in the sample period from January to December 2016, who underwent procedures for insertion of the PICC and/or surgical dissection.

Exclusion criteria were the records that indicated non-peripheral insertion CVC, umbilical catheters, CVC inserted in another health institution or inpatient unit and CVC not removed by the investigated unit team, at the time of transferring the patient to another unit or hospital.

Data collection took place in September 2017. A total of 281 records were analyzed for the investigated sample period, of which 116 were excluded after applying the exclusion criteria, resulting in a final sample of 165 CVC insertion and maintenance records (Figure 1).

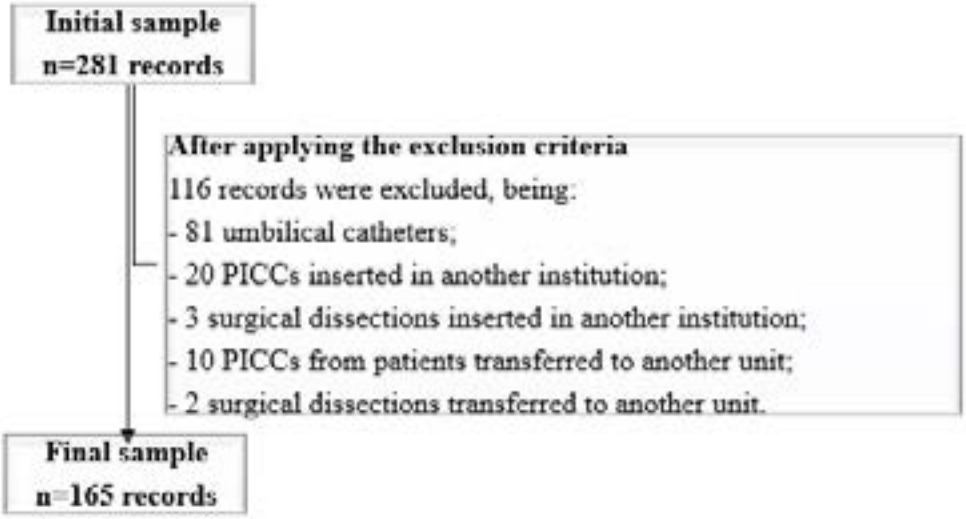

Figure 1 - Final sample of CVC insertion and maintenance records for patients admitted to the NICU, in the sample period from January to December 2016. Campo Largo, PR, Brazil, 2017
Subtitle: PICC - Peripherally Inserted Central Catheter.
Source: The authors (2016).

As for the variables investigated in the study, the following stand out: 1) CVC characteristics: a) Insertion site, b) Insertion criteria, c) Dressing, d) Stitch, e) Standard operational procedure (SOP) measures; and 2) Outcomes: a) Length of stay, b) Adverse events (indicators), c) Reason for removal and d) Infection.

The criteria for inserting the catheters indicated in the records were grouped, thus the following categories were established: a) Prematurity: gestational age <37 completed weeks and very low birth weight (<1,500g)[9]; b) Venous frailty: scarce, fragile and weak venous network; c) Infusion of fluids: need for venous access for intravenous fluids infusion, whether surgical, pre- and postoperatively, or for treatment (medication, parenteral nutrition, intravenous hydration, continuous sedation, and diseases described in the justification for catheter insertion, as an example: congenital sepsis, pulmonary hypertension, complex heart diseases, inguinal hernia, etc.).

Among the indicators for adverse events, we aimed at the following: obstruction, sepsis, infiltration, phlebitis, flush pain, catheter allergy, pleural effusion, externalization, extravasation, catheter breakage, thrombosis, group intervention, infiltration and extravasation, tip of the catheter twisted and cracked catheter. In turn, the reasons for removing the venous devices included end of therapy, damaging access due to unsuccessful puncture attempts and death. Finally, we sought to register the infection of venous devices.

The information was analyzed using the Statistical Package for the Social Sciences (SPSS) version 21.0, using descriptive statistics and association between variables. The data normality was verified through the Kolmogorov-Smirnov test, indicating non-parametric association tests, such as chi-square and Fisher's exact for the categorical variables, and the Mann-Whitney test for the quantitative variable length of stay the devices. Significant values were considered for $p \leq 0.05$.

The research was approved by the Ethics Committee on Research with Human Beings with opinion n. 2,217,275.

RESULTS

Of the 165 records analyzed, the predominance of PICC insertion (n=134; 81.2%) was compared to surgical dissection (n=31; 18.8%). Table 1 presents the characteristics related to central venous catheters associated with the type of device (PICC or surgical dissection) of the investigated patients.

Table 1 – Characteristics related to central venous catheters associated with the type of device (PICC or surgical dissection) of patients admitted to the Neonatal Intensive Care Unit, in 2016. Campo Largo, PR, Brazil, 2017 (continues)

Variables		Categories	PICC n (%)	Surgical Dissection n (%)	p-value *†	p-value*†
Insertion site	Jugular	Yes	15(11,2)	7 (22.6)	0.138*	<0.001†
		No	119 (88.8)	24 (77.4)		
	Subclavian	Yes	0 (0)	4 (12.9)	0.001*	
		No	134 (100)	27 (87.1)		
	Head	Yes	23 (17.2)	0 (0)	0.008*	
		No	111 (82.8)	31 (100)		
	Inguinal	Yes	2 (1,5)	11 (35.5)	<0.001*	
		No	132 (98.5)	20 (64.5)		
	Upper limbs	Yes	52 (38.8)	8 (25.8)	0.216*	
		No	82 (61.2)	23 (74.2)		
	Lower limbs	Yes	33 (24.6)	0 (0)	0.001*	
		No	101 (75.4)	31 (100)		
	No information	Yes	10 (7.5)	1 (3.2)	0.692*	
		No	124 (92.5)	30 (96.8)		
Criteria for insertion	Prematurity	Yes	24 (17.9)	0 (0)	0.009*	0.372†
		No	110 (82.1)	31 (100)		
	Venuous frailty	Yes	8 (6)	10 (32.3)	<0.001*	
		No	126 (94)	21 (67.7)		
	Infusion of fluids	Yes	119 (88.8)	22 (71)	0.021*	
		No	15 (11.2)	9 (29)		
Dressing fixation	Oclusive with gauze	Yes	39 (29.1)	12 (38.7)	0.388*	<0.001†
		No	95 (70.9)	19 (61.3)		
	Occlusive with transparent dres	Yes	106 (79.1)	13 (41.9)	<0,001*	
		No	28 (20.9)	18 (58.1)		
	Suture	Yes	3 (2.2)	17 (54.8)	<0.001*	
		No	131 (97.8)	14 (45.2)		
Hand antisepsis		Yes	131 (97.8)	24 (77.4)		<0.001*
		No information	3 (2.2)	7 (22.6)		

Use of PPE	Cap	Yes	132 (98.5)	24 (77.4)	<0.001*	<0.001†
		No information	2 (1.5)	7 (22.6)		
	Sterile glove	Yes	132 (98.5)	24 (77.4)	<0.001*	
		No information	2 (1.5)	7 (22.6)		
	Mask	Yes	132 (98.5)	24 (77.4)	<0.001*	
		No information	2 (1.5)	7 (22.6)		
	Surgical drape	Yes	132 (98.5)	24 (77.4)	<0.001*	
		No information	2 (1.5)	7 (22.6)		
	Sterile apron	Yes	132 (98.5)	24 (77.4)	<0.001*	
		No information	2 (1.5)	7 (22.6)		
Puncture antisepsis		Yes	129 (96.3)	24 (77.4)		0.001*
		No information	5 (3.7)	7 (22.6)		
There was barrier break		Yes	4 (3)	1 (3.2)		0.001†
		No	125 (93.3)	23 (74.2)		
		No information	5 (3.7)	7 (22.6)		
Intervention performed after the barrier break		No barrier breaks	125 (93.3)	23 (74.2)		0.001†
		Sterile glove changes	4 (3)	0 (0)		
		No information	5 (37)	8 (25.8)		
Total			134 (100)	31 (100)		

Note: * Fisher's exact test. † Chi-square test. Subtitles: PICC - Peripherally Inserted Central Catheter; Dres - Dressing; PPE: Personal Protective Equipment.

The predominance of the PICC in the upper limbs (n=52; 38.8%) and surgical dissection in the inguinal region (n=11; 35.5%) stood out regarding the insertion site. For both catheters, the need for venous access for infusion of intravenous fluids was prevalent in the newborn's clinical treatment as an insertion criterion. Occlusive fixation with transparent dressing was observed in cases of PICC (n=106; 79.1%) and to a lesser extent in dissections (n=13; 41.9%). The following variables were associated with the type of device investigated: insertion site (p<0.001), dressing fixation (p<0.001), as well as standard operational protocol measures (p<0.001) (Table 1).

Table 2 shows the outcomes associated with the type of central venous catheter used in patients admitted to the Neonatal Intensive Care Unit.

Table 2 – Outcomes associated with the type of central venous catheter used (PICC or surgical dissection) in patients admitted to the Neonatal Intensive Care Unit, in 2016. Campo Largo, PR, Brazil, 2017 (continues)

Variables		**Categ.**	**PICC n (%)**	**Surgical Dissection n (%)**	**p-value *†**	**p-value*†**
Indicators for adverse event	Obstruction	Yes	13 (9.7)	0 (0)	0.131*	<0.001†
		No	121 (90.3)	31 (100)		

	Sepsis	Yes	6 (4.5)	3 (9.7)	0.372*
		No	128 (95.5)	28 (90.3)	
	Infiltration	Yes	14 (10.4)	3 (9.7)	1.000*
		No	120 (89.6)	28 (90.3)	
	Phlebitis – Allergic reaction	Yes	2 (1.5)	0 (0)	1.000*
		No	132 (98.5)	31 (100)	
	Flush pain - False path	Yes	1 (0.7)	0 (0)	1.000*
		No	133 (99.3)	31 (100)	
	Catheter allergy	Yes	0 (0)	1 (3.2)	0.188*
		No	134 (100)	30 (96.8)	
	Pleural effusion	Yes	1 (0.7)	0 (0)	1.000*
		No	133 (99.3)	31 (100)	
	Exteriorization	Yes	5 (3.7)	1 (3.2)	1.000*
		No	129 (96.3)	30 (96.8)	
	Extravasation	Yes	0 (0)	3 (9.7)	0.006*
		No	134 (100)	28 (90.3)	
	Catheter break	Yes	1 (0.7)	0 (0)	1.000*
		No	133 (99.3)	31 (100)	
	Thrombosis	Yes	1 (0.7)	1 (3.2)	0.341*
		No	133 (99.3)	30 (96.8)	
	Group intervention	Yes	1 (0.7)	1 (3.2)	0.341*
		No	133 (99.3)	30 (96.8)	
	Infiltration and extravasation	Yes	1 (0.7)	1 (3.2)	0.341*
		No	133 (99.3)	30 (96.8)	
	Tip of the catheter twisted	Yes	1 (0.7)	0 (0.0)	1.000*
		No	133 (99.3)	31 (100)	
	Cracked catheter	Yes	2 (1.5)	0 (0)	1.000*
		No	132 (98.5)	31 (100)	
	No information	Yes	3 (2.2)	0 (0)	1.000*
		No	131 (97.8)	31 (100)	
Reason for removal	End of therapy	Yes	64 (47.8)	11 (35.5)	0.236*
		No	70 (52.2)	20 (64.5)	
	Unsuccessful attempt	Yes	11 (8.2)	0 (0)	0.128*
		No	123 (91.8)	31 (100)	
	Death	Yes	10 (7.5)	5 (16.1)	0.162*
		No	124 (92.5)	26 (83.9)	
	No information	Yes	2 (1.5)	0 (0)	1.000*
		No	132 (98,5)	31 (100)	
Infection		Yes	8 (6)	5 (16.1)	0.125†
		No	123 (91.8)	26 (83.9)	
		No inf.	3 (2.2)	0 (0)	

Total	134 (100)	31 (100)

Note: * Fisher's exact test. † Chi-square test. Subtitles: PICC - Peripherally Inserted Central Catheter; Categ. - Category; Inf. - Information.

As for the length of stay of devices, it is noteworthy that for the PICC there was a minimum of two and a maximum of 54 days, with an average of 13.66 (±10.38) days, and a median of 12 (6-19) days. The surgical dissection had a minimum of 1 and a maximum of 55 days, with a mean of 14 (±15.31) days, and a median of 8 (4.25-16) days. The length of stay of devices was analyzed according to the Mann-Whitney test, which did not indicate an association with the type of catheter investigated (p=0.299).

When analyzing the different indicators for adverse events, a predominance of infiltration (n=14; 10.4%) and obstruction (n=13; 9.7%) was observed for the PICC, while for surgical dissections, infiltration (n=3; 9.7%), leakage (n=3; 9.7%) and sepsis (n=3; 9.7%) was found. The investigated indicators were associated with the types of devices investigated (p<0.001). However, when considering the investigated categories, only the leakage indicator was statistically significant (p=0.006), with 9.7% of dissections leaking, while there was no record of this adverse event indicator for peripherally inserted catheters (Table 2).

As for the reasons for removal, 102 catheters were removed in the investigated unit, for the PICC, due to the end of therapy (n=64; 47.80%), an unsuccessful insertion attempt (n=11; 8.20 %) and death (n=10; 7.50%). For surgical dissections, the end of therapy (n=11; 35.50%) and death (n=5; 16.10%) predominated. The reason for removing the devices was not associated with the type of catheter investigated (p=0.461).

Of the 165 catheters analyzed, in 13 (7.8%) there were report of infection, being eight among 134 PICC (6%), and five among 31 dissections (16%) (p=0.125). Although this result was not statistically significant, the clinical importance is highlighted, in which there was a greater record of infection related to dissections, compared to the PICC.

DISCUSSION

Regarding the predominance of PICC insertion in the upper limbs, studies justify this site due to the path taken by the catheter to its ideal location, following the axillary vein to the superior vena cava. This is the shortest and most easily accessible route, with larger and palpable blood vessels and favorable anatomy, which facilitates maintaining access when changing dressings[10-11].

In this investigation, there was a prevalence of inguinal insertion in cases of surgical dissection. In a study with children aged 0 to 2 years, there was greater use of the basilic vein (60.8%), although the literature points to the internal jugular vein as the best implantation site due to the anatomical privilege, which favors the directing of the catheter to the right atrium, through the superior vena cava[12]. This divergence may be related to the difference between the populations investigated, as in the present study, only newborns from 0 to 28 days were included.

For both catheters, the need for access to infusion of fluids prevailed as an insertion criterion, which is in line with the literature, which points to the need for total parenteral nutrition (TPN), infusion of vesicant or irritant drugs, intravenous medications and blood components[2]. Other studies indicate intravenous hydration and vasoactive drugs as an indication for central venous access, followed by TPN[3,12].

Most PICCs presented transparent coverage as a dressing fixation (79.1%). It is observed that the use of the transparent cover brings more benefits to the NB, since it reduces number of changes during the period, favoring economy of materials used, as well as allowing the visualization of the catheter insertion site for daily inspection, to prevent infection [13].

Researchers point gauze and adhesive tape as the ideal covering when there is exudate or sweating; and the use of transparent polyurethane cover when clean and dry. As for dressing changes, it should be performed every two days for those with gauze and adhesive tape, and every seven days when using the transparent cover, except in patients whose risk of displacement of the catheter is greater than the benefit offered by dressing change[13].

As for indicators of adverse events, 14 cases of infiltration (10.4%) were observed among the PICCs, followed by 13 obstructions (9.7%); among the dissections, three cases (9.7%) of extravasation were observed. In a study carried out in a neonatal and pediatric ICU in Blumenau-SC, of 176 PICC catheters evaluated, 41% had an adverse event, with a predominance of obstruction (n=18; 25%), infiltration (n=13; 18%) and suspicion of contamination (n=12; 16.6%). Infiltration may be related to PICC traction, as well as obstruction may be linked to the absence of flushing of the catheters (flush), which ensures permeability and prevent the formation of clots and fibrin in the catheter lumen[14].

As for the general complications associated with the use of PICC in NB, an integrative literature review highlights obstruction, rupture, phlebitis, limb edema, infection, leakage and accidental traction. The outcome of the involuntary PICC removal is frequent. Some rare complications are also mentioned, such as diaphragmatic paralysis, oliguria due to a poorly positioned catheter tip that blocks the renal vein, use of hypertonic solution and TPN directly into the renal vein, migration of the catheter to the pulmonary artery due to its rupture, pericardial effusion , cardiac tamponade, pleural effusion and ascites. The results also showed a high percentage (41.1%) of complications related to care[3].

A study carried out in a neonatal ICU of a university hospital found obstruction in 17% of the 52 PICCs implanted in newborns, followed by infiltration in 12%[8]. It is worth noting that different studies point to considerable data for the early removal of PICC associated with rupture[10-14]. This data was different from that found in this investigation. The rupture of the catheter may be related to handling by the team, with inadequate pressures during infusion therapy[10].

As for the amount of days using the PICC, in the present study there was a minimum of two and a maximum of 54 days, with an average of 13.66 (±10.38) days. The study corroborates the data that aimed to describe the use of PICC in a Pediatric and NICU in terms of insertion, maintenance and removal, and to identify the profile of children who received PICC, in which its permanence time varied from one to 72 days, with an average of 14.5 days[14]. Another study that investigated 73 PICCs stands out, in which 44 (60.2%) remained 10 days or less and 23 (31.5%) between 11 and 20 days[10].

The surgical dissection permanence time found in this study had a minimum of one and a maximum of 55 days, with an average of 14 days. Corroborates the results found in a study that investigated hospitalizations of patients aged between 0 and 2 years in Pediatric and NICU, in the period between November 2001 and November 2015, which presented an average length of stay of 15 (±14.91) CVC days, ranging from zero to 110 days[12].

Although not clinically significant, it is important to highlight sepsis as an adverse event related to surgical dissections (n=3; 9.7%), compared to PICC (n=6; 4.5%). According to the literature, sepsis contributes to an increase in the neonatal mortality rate, being one of the main causes of death in this population. The most affected are low birth weight newborns, submitted to invasive procedures during their stay in the NICU. The infection presents nonspecific signs and symptoms, often silent, being confused with the very conditions of prematurity, such as respiratory changes. It can start early, with manifestation in up to 48 hours of life, and after that time, it is considered as a late event, due to contact

with pathogens after birth[15].

Primary bloodstream infections are the main infections in the NICU, being associated with high hospital costs. There is also evidence of the growing resistance of pathogens to antibiotics, usually administered in the NICU, due to their unlimited use and the patient's contact with contaminated objects[16].

Of the 165 catheters analyzed, 13 (7.8%) evolved with infection, with no statistically significant association with the type of catheter investigated (p=0.125). Even so, the discussion from the clinical perspective is considered relevant, in which surgical dissection presented a higher percentage of infection (16.1%) compared to PICC (6.0%). It is believed to be related to the catheter insertion site, in which the inguinal region for dissections predominated in the study, which favors the device contamination.

A study on the PICC implementation process by trained nurses in adolescents treated at a University Hospital analyzed 68 medical records. The reasons for withdrawal were recorded in 32 (47%) medical records, with termination of therapy and catheter obstruction in eight (25%) cases, followed by break of the catheter in seven (22%), displacement of the device and infectious complications in four (12.5%), and in one (3%) the catheter did not progress at the time of insertion [17].

As for infectious complications, the data found in the op cit study were higher than that found in the present investigation, possibly due to the characteristics of the investigated population, who were adolescents diagnosed with oncohematological diseases in 31 (46%) of the cases. The authors suggest infection-changing dressings with transparent coverage, aseptic and antiseptic techniques and the permanent training of the team that handles the PICC as infection prevention measures[17].

Of the 102 catheters that were removed in the investigated unit, the predominance of the end of therapy was observed for the PICC (n=65; 48.50%), a reason found in different studies, corresponding to 44.3%[14] and 48.0%[11] of the PICC, respectively. For surgical dissections, in this investigation, the end of therapy predominated (n=11; 35.48%), followed by death (n=5; 16.12%), a result also identified in a study that evidences the end of therapy in 39.2%, followed by death in 30.8% of cases[12].

These data can assume that patients who used surgical dissection had a more severe clinical picture compared to those who used PICC. This reflects the need of the individual assessment of the NB, in order to properly choose the ideal device for each patient.

The study's limitation is the retrospective design and the small number of surgical dissections performed in 2016, compared to the quantity of PICC, which implies statistical analysis; as well as the lack of studies in the literature that address surgical dissections, limiting the comparison of results. It is suggested that further research be carried out, in order to extend the sample period of analysis of retrospective data, and also the development of longitudinal research to monitor the intravenous devices used in newborns in the NICU.

As a contribution of this study to nursing, the nurse's fundamental role in the care of NBs stands out, as they are fragile patients, who need intensive, delicate care, creative, effective and less invasive alternatives.

CONCLUSION

As for the outcomes related to the investigated catheters, it is noteworthy that surgical dissections had a higher number of infections compared to the peripherally inserted catheter, and showed an association with the adverse event indicator for extravasation. Infusion of fluids into the newborn, necessary for surgical procedures, drug treatment, parenteral nutrition, intravenous hydration and continuous sedation of newborns, prevailed

as insertion criteria for both catheters. As for the reason for removing the PICC, the end of therapy predominated, whereas for surgical dissection, the end of therapy followed by death prevailed.

In view of the results, greater benefits are suggested to neonates regarding to the peripherally inserted catheter. It is expected that the present investigation will encourage nurses to train for the insertion and maintenance of PICC in neonates, in order to reduce the number of venous dissections in the NICU. It is believed that the insertion of PICC by qualified nurses will bring greater benefits to critically ill patients in the NICU.

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