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EPIDEMIOLOGICAL PROFILE OF NEWBORNS USING PERIPHERALLY INSERTED CENTRAL CATHETER[1]

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ABSTRACT
The objective was to describe the epidemiological profile of newborns using peripherally inserted central catheter (PICC). This is a retrospective documentary study, with records review in the Neonatal Intensive Care Unit of a University Hospital. There were PICC in 99 newborns, with an average birth weight of 1496.05 kilograms; average parkin of 30,65 weeks; average Apgar score of 4,94 and 6,84 in the first and tenth life minutes; 47,48 configured the average of hospitalization days. The PICC permanence was approximately 13 days, with majority insertion on the first hospitalization day (85,86%), in the upper limbs (72,45%). The predominant indications for insertion were prematurity (59,60%) and intravenous therapy (54,55%). It appears as a profile of the Neonate: Apgar and parkin with low score, being in critical medical conditions; premature; and extreme lower birth weight when born. The insertion of the catheter is brief, mostly on the first day of life, used primarily for total parenteral nutrition, antibiotic-therapy and analgesia.

Keywords: Neonatal nursing. Newborn. Catheterization central venous. Technology.

INTRODUCTION

The intensive care and neonatology are two major areas of nursing activities that are worth highlighting the specificity that accompanies them. Corresponds to the newborn child from the moment of birth until the 28thday of life, and neonatology is the science dedicated to the care during this period[(1)]. Neonates may require intensive care after birth due to physiological immaturity or pathological changes that compromise the correct functioning of the body.

Currently, in the hospital environment there is a widespread use of intravenous therapy, this field with extensive technological advances. In Neonatal Intensive Care Unit (NICU) intravenous therapy is widely used because of the presence of high-risk neonates in need of secure venous access for specific treatment.

Among the different venous access technologies has become peripheral and central, as classified according to the location of the tip of the device. It is noteworthy that in neonatology no need for venous access for long time, a fact that leads to the need for insertion of central venous catheters (CVC)[(2)].

Central venous access is inserted directly into the central circulation, ie in large vessels and blood flow. It is a facilitator factor of a long intravenous therapy, they are indicated by increased length of stay, and infusion of vesicant and/or irritant solutions[(3)]. Can be performed through the umbilical catheterization, venous dissection and peripherally inserted central catheter (*Peripherally Inserted Central Catheter*-PICC).

PICC is a recent technology, characterized by a device inserted intravenously through a peripheral vein surface, with the assistance of

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an introducer needle progresses to the vena cava (upper or lower), with the central access features[4].

However, for the insertion, maintenance and proper use of the device, it is necessary to know the profile of newborns, closely linked to complications arising from the use of technology as well as continued professional development in order to employ the best evidence on care catheter.

It is noteworthy that the customers know where intravenous therapy is used facilitates the proper choice of device to be used as well as the insertion site, always aiming at achieving the best possible outcomes for the clinical condition of the individual.

By tracking the admissions of high-risk neonates and the use of PICC technology, whose insertion is performed by a professional nurse (or doctor) duly qualified; ask: "What are the epidemiological characteristics of neonates who have entered during hospitalization PICC?". Thus, this article aims to describe the epidemiological profile of neonates using PICC.

MATERIALS AND METHODS

The research was approved by the Ethics Committee in Research of the Department of Health Sciences of UFPR, under Registrant Postal CODE/SD: 935.060.10.06 and CAAE 0036.0.091.000-10. This is documentary retrospective study, which was part of the master's thesis entitled "related to use of Peripherally Inserted Central Catheter Complications in neonates"[5].

It was held at the Service of Statistics and Medical Archive (SAME) of a teaching hospital in medical records of 99 neonates in the NICU who had PICC inserted during hospitalization.

The data collection occurred in August 2010, by knowledgeable staff (faculty, graduate student and nursing students), referring to the records of newborns who had PICC inserted between July 2009 to June 2010. The inclusion criteria were: medical records available for inspection during the period of data collection.

The instrument for data collection aims to identify the socio-demographic and clinical profile of the newborn, as well as the use of the catheter and the reasons for removing the PICC. There were collected the variables: gender, date of birth, gestational age, Parkin (method used for determination of gestational age at birth in the Unit searched), birth weight, type of birth, apgar, duration of hospitalization, infection, pre-existing day insertion, insertion site, indication, infused solutions, on-call time and reason for withdrawal of the catheter. Data analysis occurred through Excel® spreadsheet, where the data were tabulated and analyzed quantitatively using descriptive statistics.

RESULTS AND DISCUSSION

All the 99 records (100%) were available for collection at the designated period. Sample values (n) varied due to lack of information recorded in the medical records. PICC were inserted in 99 neonates born between 1st July, 2009 and 30th June,2010; of which 51,52% were male (Table 1). Studies show almost equal variability among male or female neonates [6-7].

The type of delivery was mostly occurring segment transverse cesarean section (74,23%) and event pre-existing infection among neonates was 39,39% (Table 1). The infection rate is measured by blood test, which considers low ($\leq$ 2) or high ($\geq$3) degree of infection as the appearance of factors: 1 - leukopenia or leukocytosis; 2 - neutropenia or neutrophilia, 3 - increased neutrophils immature, 4 - increase of immature neutrophils/total neutrophil; 5 - immature neutrophils/segmented neutrophils> 0,3; 6 - neutrophils with toxic granulation or vacuolization; 7 - thrombocytopenia. The hematologic score assigns one point for each factor changed, the presence of one or two factors indicates minimal or non-existent degree of infection, the sum of three or more factors characterizes infectious blood count[8].

It is noteworthy that 85,86% of PICC were inserted on the first day of admission of neonates (Table 1). The severity of the clinical condition of the newborns in the NICU leads to the need for reliable venous access for implementation of prescribed therapies.

Table 1 – Socio-Demographic and Clinical characteristics of neonates in use of PICC. Curitiba, 2012.

Variables	n	Percentage
Gender (n=99)		
Female	48	48,48
Male	51	**51,52**
Typoofbirth (n=97)		
Transverse Segmental CesareanSection	72	**74,23**
Normal	24	24,74
Forceps	01	1,03
Infection index (n=99)		
Low	60	**60,61**
High	39	39,39
Day of insertion (n=99)		
1stDay	85	**85,86**
1stweek	14	14,14
Local of insertion (n=98)		
Upperlimbs	71	**72,45**
External Jugular	13	13,27
Lowerlimbs	07	7,14
Cephalic	07	7,14
Indication* (n=99)		
Prematurity	59	**59,60**
IntravenousTherapy	54	**54,55**
Antibioticotherapy	43	43,43
NPT	33	33,33
MechanicalVentilation	18	18,18
Surgical	12	**12,12**
Other	22	22,22

Source: The authors (2011). *Occurrence of the indication of one or more variables.

It highlights the complexity of the clinical picture of neonates studied by observing that most of the PICC inserted on the first day of hospitalization. Study shows median catheter insertion in days of hospitalization[6].

Lower the weight of newborns were observed at birth and on the day of insertion, with minimum values of 440 and 450 grams, respectively, and the maximum observed weight at birth was 3640 grams and 3560 grams of weight on the day of catheter insertion (Table 2).

The upper limbs were the sites of choice for puncturing the PICC in 72,45% of the cases (Table 1). Corroborating the findings, the literature highlights that in pediatric patients, the upper and lower limbs are first choice but the cephalic region; inserted into the basilic, cephalic or brachial veins[9]. Another study showed the insertion site in the safin vein as the most frequent, however, it was stressed that this finding was contrary to what the literature calls [10].

Table 2 – Variables related to the use of PICC in neonates. Curitiba, 2012.

Quantitativevariables	n	Minimu	Maximu	Average	Median	Standard
Birth weight (grams)	99	440	3640	1496,05	1280	768,32
Insert weight (grams)	92	450	3560	1466	1265	830,52
Parkin (weeks)	97	23	40	30,65	30	30,65
Apgar score in the 1st minute	98	0	9	4,94	5	2,74
Apgar score in the 5thminute	98	1	10	7,62	8	2,25
Apgar score in the 10thminute	25	1	9	6,84	7	3,15
Catheterdwell time (days)	93	1	79	12,98	10	11,27
Hospitalization time (days)	99	1	174	47,48	37,5	35,87

Source: The authors (2011).

The predominant indications for insertion of the device were prematurity (59,6%) and intravenous therapy (54,55%), and the lowest percentage (12,12%) indicated the insertion due to surgical procedure. The was data shown in Table 01

The insertion of the PICC is indicated when peripheral venous access is limited to extreme; difficult of success, mainly in oncology, intensive care and neonatology, to be considered safe and useful access[3]; prolonged intravenous therapy, infusion of TPN; administration of vesicant and irritant drugs, and monitoring of central venous pressure [10]. In a study conducted in 2010, the main indication was prematurity (43,2%) and related to it (17,6%) complications, totaling 60,8%[11]. The highest prevalence, in another study, pointing to antibiotic therapy in 54,1% of the votes [12]. Note that the use of PICC infusion of TPN (33,33%) stood out from the other solutions, but also emphasizes the administration of antimicrobials, analgesics and sedatives (Table 1).

The extremely low birth weight is responsible for high rates of morbidity and mortality in neonates, the leading cause of hospitalization in the NICU. Studies cite the weight between 652 and 2826 grams in neonates undergoing the insertion of PICC [10-11], still exceeding the lower limits found in this study. When considering the average birth weight, studies show average weight (in grams) of 1639,5 ± 632,7g[10]in neonates; in a study analyzing PICC and CVC, the mean birth weight was 1993,4[6]. The data corroborated by this research, in which the mean birth weight was 1496,05 grams.

Consider themselves neonates born alive after 22 weeks of gestation, values below this gestational age are considered abortions. The color and texture of the skin, breast development and cartilage of the ear of neonates relate to assign scores for gestational age at birth, so it is classified parkin[13]. NBs related studies indicate that PICC used gestational ages between 28 to 32 weeks[7]and averaged: 33,6[6]; 31,9 weeks[10]. The parkin observed in this study presents of 30,65 weeks and lower borderline values below the values found in the literature (23 weeks), and close to the value considered abortion (Table 2).

The Apgar score expresses the clinical condition of the neonate's birth by assigning values (zero to ten) for heart rate, respiratory effort, reflex activity, muscle tone and skin coloring[14], evaluated at the first and fifth minute and in severe cases, also in the tenth minute. It is noteworthy that the neonates showed low values of Apgar score in the first, fifth and tenth minutes, and average 4.94 and 6.84 in the first and tenth minutes. These data indicate poor clinical condition at birth; also value expressed in average number of days exceeding 47 days (Table 2) admission.

The permanence of the PICC was approximately 13 days, ranging between one and 79 days. The mean length of NICU stay was 47,48 days, with a maximum of 174 days, as shown in Table 2. The permanence of the PICC observed is below that indicated by the literature, it is recommended that the residence time of the device is at least six days, with an

average duration of eight weeks [9,15]. Study of children (n = 50) and neonates (n = 126) shows the mean residence time of 14,5 days[11]; only in neonates, mean time of 20 days [11]; above the values found in this study (12,98 days). Change hum the 79 days reported in the results, but studies have obtained minimum and maximum of 72[11]days of stay. There is no indication preset exchange device[15]in order to minimize and prevent catheter-related infections[9].

Maintain the permeability of the PICC gave largely (49.46%) with heparin solution. The PICC permeability maintenance can be performed with the washing of the catheter lumen, named flush. Recommends, on the drive on which study the flush is performed with isotonic saline solution every six hours in order to meet the institutional norm, but this information has not been recorded in the records reviewed. The washing took place largely with heparin solution, which prevents the formation of thrombus formation and subsequent obstruction of the catheter. Study recommends the use of heparin solution to prolong the permeability of the catheter without increasing side effects in newborns (9) (table 3).

Table 3 – Use variables, maintenance and removal of PICC in neonates. Curitiba, 2012.

Variables	n	Percentage
Flushing **(n=93)**		
Physioçogicalserum0,9%	47	50,64
Heparinesolution	46	**49,46**
Parenteral solutions		
Total parenteral nutrition (n=99)	90	**90,91**
Glucose solution5% (n=93)	80	86,02
Physioçogicalserum0,9% (n=93)	32	34,41
Medications		
Antimicrobials (n=93)	89	**95,70**
Analgesicsandsedatives (n=93)	86	**92,47**
Anticoagulants (n=93)	9	9,68
Other (n=96)	85	88,54
Reasons for withdrawal (n=92)		
Elective	25	**27,17**
Medical application	19	**20,65**
Traction	16	**17,39**
Extravasation	15	16,30
Edema	13	14,13
Positive bloodculture	12	13,04
Death	11	11,96
Hyperemia	9	9,78
Fracture	8	8,7
Spontaneous	5	5,43
Obstruction	4	4,35
Transference	3	3,26

It is noted that the use of PICC infusion of TPN stood out from other solutions, with a percentage of 90,91%, meeting the study on the theme[2]. We emphasize the high incidence of administration of antimicrobials (95,70%), as well as painkillers and sedatives (92,47%) through the catheter (Table 3).

Regarding the reasons for catheter removal, elective (when the infant does not require venous access for more than 24 hours) showed a higher rate (27,17%), followed by physician request (request for suspected infection) in 20,65% of the cases and draw (17,39%). Other data presented in Table 3. Studies indicate reasons for higher elective withdrawal to that found in this study, with variability of 44,3%[11] 77,2%[2]. Among the catheters were removed by complication study differ because in one study, traction was the main complication (13,9%)[11], while in another study, predominance of rupture of the catheter (23%)[2].

CONCLUSION

It is noteworthy that the profile of patients in the NICU using PICC is: infant in critical clinical conditions, low Apgar and parkin score; premature; extreme lower birth-weight. The insertion of the catheter is brief, mostly on the first day of life, used primarily for TPN, antibiotics and analgesia.

The data imply for the nursing staff, since the knowledge of the population that is assisted allows better planning of actions and selection of the most suitable devices for performing intravenous therapy, aiming for excellence of care.

PERFIL EPIDEMIOLÓGICO DE NEONATOS QUE UTILIZAM CATETER CENTRAL DE INSERÇÃO PERIFÉRICA

RESUMO

O objetivo foi descrever o perfil epidemiológico de neonatos que utilizam cateter central de inserção periférica (PICC). Estudo retrospectivo documental, com revisão de prontuários em Unidade de Terapia Intensiva Neonatal de um Hospital Universitário. Houve PICC em 99 neonatos, com peso médio ao nascer de 1496,05 gramas; parkin médio de 30,65 semanas; Apgar com média de 4,94 e 6,84 no primeiro e décimo minutos; 47,48 configurou a média de dias de internação. A permanência do PICC foi aproximadamente 13 dias, com inserção majoritária no primeiro dia de internação (85,86%) em membros superiores (72,45%). As indicações predominantes para inserção foram prematuridade (59,60%) e terapia intravenosa(54,55%). Configura-se como perfil do neonato: estar em condições clínicas críticas; apgar e parkin baixos; prematuro; e extremo inferior de peso ao nascer. A inserção do cateter é breve, em sua maioria no primeiro dia de vida, utilizado primordialmente para nutrição parenteral total, antibioticoterapia e analgesia.

Palavras-chave: Enfermagem neonatal. Recém-nascido. Cateterismo venoso central.Tecnologia.

PERFIL EPIDEMIOLÓGICO DE NEONATOS QUE UTILIZANCATÉTER CENTRAL DE INSERCIÓN PERIFÉRICA

RESUMEN

El objetivo fue describir el perfil epidemiológico de neonatos que utilizan catéter central de inserción periférica (PICC). Estudio retrospectivo documental, con revisión de registros médicos en Unidad de Cuidados Intensivos Neonatales de un Hospital Universitario. Hubo PICC en 99 neonatos, con peso promedio al nacer de 1496,05 gramos; Parkin promedio de 30,65 semanas; Apgar con promedio de 4,94 y 6,84 en el primero y décimo minutos; 47,48 configuró el promedio de días de internación. La permanencia del PICC fue de aproximadamente 13 días, con inserción mayoritaria en el primer día de internación (85,86%) en miembros superiores (72,45%). Las indicaciones predominantes para inserción fueron prematuridad (59,60%) y terapia intravenosa (54,55%). Se configura como perfil del neonato: estar en condiciones clínicas críticas; Apgar y Parkin bajos; prematuro; y peso extremamente inferior al nacer. La inserción del catéter es breve, en su mayoría en el primer día de vida, utilizado primordialmente para la nutrición parenteral total, antibiótico-terapia y analgesia.

Palabras clave: Enfermería neonatal. Recién nacido. Cateterismo venoso central. Tecnología.

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