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Flebite in children and adolescents that used peripheral venous catheter

ABSTRACT | Objective: To identify the prevalence of phlebitis related to the use of peripheral venous catheters in children and adolescents. Method: Retrospective, quantitative study, with data from notification of phlebitis related to peripheral intravenous therapy, from January 2012 to December 2017 in a children's hospital in the city of São Paulo. Results: The prevalence of phlebitis was 0.62%, with 116 cases reported in 18,924 children and adolescents. A significant association was identified between the degree of phlebitis and the variables: "Type of infusion" ($p = 0.001$) "High osmolarity drug" ($p = 0.046$) and "Use of serum with electrolytes" ($p = 0.005$). Conclusion: It is essential that nurses evaluate the type of drug therapy, venous network and patient's clinic, indicating the appropriate device for this purpose, as well as implementing indicators of prevalence of adverse events for prevention and possible early interventions, aiming at safety and efficacy. in the quality of nursing care.

Keywords: Catheters; Child; Pediatric Nursing; Phlebitis; Prevalence.

RESUMEN | Objetivo: identificar la prevalencia de flebitis relacionada con el uso de catéteres venosos periféricos en niños y adolescentes. Método: estudio cuantitativo retrospectivo, con datos de notificación de flebitis relacionada con la terapia intravenosa periférica, de enero de 2012 a diciembre de 2017 en un hospital infantil de la ciudad de São Paulo. Resultados: La prevalencia de flebitis fue de 0.62%, con 116 casos reportados en 18,924 niños y adolescentes. Se identificó una asociación significativa entre el grado de flebitis y las variables: "Tipo de infusión" ($p = 0.001$) "Medicamento de alta osmolaridad" ($p = 0.046$) y "Uso de suero con electrolitos" ($p = 0.005$). Conclusión: es esencial que las enfermeras evalúen el tipo de terapia farmacológica, la red venosa y la clínica del paciente, indicando el dispositivo apropiado para este propósito, e implementando indicadores de prevalencia de eventos adversos para la prevención y posibles intervenciones tempranas, con el objetivo de seguridad y eficacia. en la calidad de la atención de enfermería.

Descriptor: Catéteres; Niño; Enfermería pediátrica; Flebitis; Predominio.

RESUMO | Objetivo: Identificar a prevalência de flebite relacionada ao uso de cateter venoso periférico em crianças e adolescentes. Método: Estudo retrospectivo, quantitativo, com dados provenientes de notificação de flebite relacionada à terapia intravenosa periférica, no período de janeiro de 2012 a dezembro de 2017 em um hospital infantil na cidade de São Paulo. Resultados: A prevalência de flebite foi de 0,62%, sendo 116 casos notificados em 18.924 crianças e adolescentes. Identificou-se associação significativa do grau de flebite e às variáveis: "Tipo de infusão" ($p=0,001$) "Fármaco de alta osmolaridade" ($p=0,046$) e "Uso de soro com eletrólitos" ($p=0,005$). Conclusão: É fundamental que o enfermeiro avalie o tipo de terapêutica medicamentosa, rede venosa e clínica do paciente, indicando o dispositivo apropriado para essa finalidade, bem como, implementar indicadores de prevalência dos eventos adversos para prevenção e possíveis intervenções precoces, visando a segurança e eficácia na qualidade do cuidado de enfermagem.

Palavras-chaves: Cateteres; Criança; Enfermagem Pediátrica; Flebite; Prevalência.

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INTRODUCTION

In the hospital environment, the use of peripheral venous catheters (CVP) is frequent in hospitalized children for the administration of drugs, fluids, blood and nutritional components^(1,2).

It is an invasive and complex procedure, as it involves approaching children, family members and, it is necessary technical competence, skill, knowledge of anatomy and physiology of the vascular and farm-therapeutic systems^(1,3,4). Becoming a challenge due to the specific characteristics of this population, the criteria for choosing the CVP are determined by: the child's age; quality and caliber of the device; its purpose; usage time;

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osmolarity and pH of drugs. Other indispensable factors are the characteristics of the catheter and the choice of dressing can provide comfort and safety during treatment^(3,5-7).

It is noteworthy that adverse events are unwanted complications, resulting from the care provided, being preventable^(5,7).

Phlebitis is characterized by acute inflammation in the blood vessel wall. The signs and symptoms are: edema, pain, discomfort and erythema around the vascular catheter insertion site, being one of the most common complications of intravenous therapy^(4,5,8). The classification of phlebitis can occur as follows: mechanical, chemical, bacterial or infectious and post-infusional^(5,8).

With emphasis, the importance of complying with the recommendations of the World Alliance for Patient Safety is observed in preventing the occurrence of health problems of patients⁽⁹⁾.

For greater awareness and awareness with the nursing team about patient safety⁽⁵⁾ and the creation of a protocol regarding the use of CVP in drug therapy, will promote quality management. In this light, the implementation of evidence-based practices (EBP) reduces risk factors related to phlebitis⁽¹⁰⁾.

Regarding the scales for the assessment and monitoring of the degree of phlebitis, they are tools used in various hospital services with the objective of establishing conduct by the nurse^(1,5,11). The Maddox Scale⁽¹¹⁾ it was the first to evidence the severity of clinical signs of this adverse event.

In this sense, the theme is relevant in the daily practice of the nursing team as it is challenging to seek quality and safety for the patient in care planning, and the reduction of adverse events contributes to safe drug therapy.

In light of the literature presented, we propose to answer the following



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guiding question: What is the prevalence of phlebitis in children and adolescents who used a peripheral venous catheter (CVP)? This study aims to identify the prevalence of phlebitis in children and adolescents who used CVP, using the Maddox scale to classify the degree of phlebitis.

METHODOLOGY

It is an exploratory-descriptive, retrospective and documentary case study, with quantitative clarifications. It took place in a public pediatric hospital located in the metropolitan region of the East Zone of São Paulo, with care for pediatric patients aged 0 to 18 years, exclusively by the Unified Health System (SUS). The data were collected through the phlebitis notification forms filled out by Nursing. Data collection took place between October 2014 and January 2017, being carried out by the researcher, after authorization by the Nursing Division Directorate.

All phlebitis notification forms and their respective degrees were included in children and adolescents who used CVP, from January 2012 to December 2017. There were no exclusion criteria.

Regarding the assessment of the CVP insertion site, it was performed by the institution's nurses using the Maddox scale to classify the degree of phlebitis. It was adapted by the service as follows: Grade 0: Absence of reaction; Grade 1: Sensitivity to touch on the I.V portion of the cannula; Grade 2: Continuous pain, without erythema; Grade 3: Continuous pain, with erythema and edema, palpable hard vein less than 8 cm above the I.V. site (cannula); Grade 4: Continuous pain, with erythema and edema, hardening, palpable hardened vein more than 8 cm from the I.V. ; Grade 5: Apparent venous thrombosis. All signs of 4+, plus venous flow

= 0, may have been stopped due to thrombosis^(11,12).

The prevalence of phlebitis was calculated using the following formula: number of existing cases of phlebitis/number of patients with peripheral access x 100⁽⁵⁾.

For association of qualitative variables and the degree of phlebitis, tables with crossed frequencies are presented, as well as the p-value for Fisher's exact test. A significance level of 5% was considered, that is, when the p value is less than 0.05, we have evidence of the existence of an association.

The study met ethical issues, according to the Resolution of the National Health Council (CNS) No. 466, of December 12, 2012, approved at the place of study and by the Research Ethics Committee of the Instituto de Assistência Médica do State Public Servant, under protocol No. 2,057,166.

RESULTS

In this step, the results of descriptive statistics of the variables of interest

are presented, which allows the characterization of the sample. Between 2012 and 2017, we identified 116 notifications of phlebitis, of the 18,924 children and adolescents who used CVP, with a prevalence of 0.62%.

Just over half were female 61 (52.6%), the degree of phlebitis and catheter insertion site more frequent in grade 3, were 60 (51.7%) and 97 in upper limbs (83.6%). The average age of the population was 4.4 years, ranging from 0 to 18 years, and the average number of days for phlebitis detection was 3.1.

The use of antibiotics occurred in 89 (76.7%) of children and adolescents, the majority used vesicant drug 67 (57.8%), 69 (59.5%) extreme pH. Most did not use more than two antibiotics 70 (60.3%). In contrast, 74 (63.8%) children and adolescents did not use serum with electrolytes.

The reported cases were compared according to the degree of phlebitis in three groups, low grade (1 and 2), medium grade (3) and high grade (4 and 5).

No significant evidence was identified associated with the degrees of phlebitis with the following variables: gender, catheter insertion site, catheter gauge, dressing / fixation, antibiotic, vesicant drug, irritant drug, extreme pH drug, association of two antibiotics, association above two drugs.

In Table 1, we present the statistical data regarding the significant association of phlebitis and the variables: "Type of infusion" (p = 0.001) "High osmolar drug" (p = 0.046) and "Use of serum with electrolytes" (p = 0.005).

DISCUSSION

The Infusion Nurses Society (INS) establishes a phlebitis prevalence of up to 5% in children or adults⁽⁵⁾.

When analyzing the phlebitis notification forms, in addition to the use of medical records, it was noted the lack of registration of some data. It should be noted that the low prevalence of phlebitis suggests underreporting. Such fact may be the reason for the difficulty of the nurse to identify the adverse event as harmful to the patient; the low adherence to the compliance with protocols in the work routine or even insecurity due to the culture of punishment existing in the institutions, with the omission of facts prevailing. Thinking about this problem, the nurse plays a major role in the process of managing the intervention and maintaining intravenous therapy (IVT). Therefore, in relation to registration, when performed properly, it may have a direct impact in reducing cases of adverse events related to phlebitis. In this context, it is necessary that the records are organized and complete in relation to aspects of the IVT. Thus, it is necessary to identify possible risk factors for the emergence of an adverse event, as recommended by Resolution No. 514 of the Federal Nursing Council - COFEN^(1,13).

Tabela 1. Distribuição segundo a frequências absolutas e percentuais para variáveis qualitativas significativa de acordo com o grau de flebite e resultado do teste exato de Fisher. São Paulo, SP, Brasil, 2017.

Grau de Flebite	1 - 2		3		4 - 5		P-valor
	N	%	N	%	N	%	
Tipo de infusão							
Continua	1	14,3%	1	14,3%	5	71,4%	0,001
Continua e intermitente	11	31,4%	17	48,6%	7	20,0%	
Intermitente	25	35,2%	41	57,7%	5	7,0%	
Não informado*	1	33,3%	1	33,3%	1	33,3%	
Fármaco alta osmolaridade							
Sim	2	33,3%	1	16,7%	3	50,0%	0,046
Não	36	32,7%	59	53,6%	15	13,6%	
Uso de soro com eletrólitos							
Sim	10	25,0%	18	45,0%	12	30,0%	0,005
Não	27	36,5%	42	56,8%	5	6,8%	
Não informado*	1	50,0%	0	0,0%	1	50,0%	

Nota: *As frequências "Não informado" não foram considerados no teste de Fisher.

It is also inferred that the fact that the low prevalence of phlebitis cases is due to the use of the Unit Dose Drug Distribution System (SDMDU) by the studied hospital, implemented since 1995. SDMDU is defined by the American Society Hospital of Pharmacists (ASPH) as “an ordered quantity of drugs with forms and dosages ready to be administered to a patient, as prescribed for a given time”⁽¹⁴⁾.

In the SDMDU, the drug dose is packaged, identified and dispensed ready to be administered without the need for transfers, calculations and previous handling by the nursing staff⁽¹⁵⁾.

This method increases the quality of care, reducing possible errors in the preparation, dilution and administration of drugs, since the Hospital Pharmacy fractionates the drugs using the maximum concentration and the minimum volume - pharmacokinetics and pharmacokinetics⁽¹⁴⁾.

In addition, a perfuser (syringe pump) is recommended to control the time when drugs are administered in the Pediatric and Neonatal Intensive Care Units and in children under one year of age. In the other age groups, the graduated camera respects the infusion time of each drug recommended by the manufacturer. Thinking about the local service, Nursing seeks to implement such criteria, corroborating with the recommendations of ANVISA⁽⁶⁾.

However, intermittent infusion may cause a higher occurrence of phlebitis, due to the greater manipulation of the catheter⁽¹⁶⁾.

Corroborating with a study carried out in children, it is revealed that drugs with extremes of pH, osmolarity and electrolyte infusion associated with other drugs are an increased risk factor for the development of phlebitis⁽¹⁾.

It should be emphasized that drugs or solutions with osmolarity above 900mOsm/L can also cause physiological changes in the venous endothe-

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To prevent the appearance of an adverse phlebitis event, ANVISA, INS and the Guidelines for the Prevention of Infections Associated with Intravascular Catheters (CDC) recommend routine and frequent assessment of the patient's conditions, insertion site, skin and vessel integrity, duration and type of therapy prescribed, device integrity and permeability, sterile coverage and stabilization.

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lium, and should be administered in central venous access⁽⁵⁾.

In order to minimize the risk of phlebitis, it is essential that the nursing staff know the pH, osmolarity, volume and appropriate diluent, as well as the time of infusion of drugs^(1,17).

In relation to phlebitis high grade 4 or 5, where grade 4 presents continuous pain, with erythema and edema, hardening, hardened palpable vein more than 8 cm from the I.V site and; in Grade 5 it presents apparent venous thrombosis, all signs of grade 4, plus venous flow = 0, having been interrupted by thrombosis^(11,12).

Therefore, there is a problem for nursing professionals in the pediatric hospital, as the patients were exposed to phlebitis. Thus, it is essential to implement strategies for the prevention and early identification of the signs of this complication⁽⁵⁾.

To prevent the appearance of an adverse phlebitis event, ANVISA, INS and the Guidelines for the Prevention of Infections Associated with Intravascular Catheters (CDC) recommend routine and frequent assessment of the patient's conditions, insertion site, skin and vessel integrity, duration and type of therapy prescribed, device integrity and permeability, sterile coverage and stabilization. It is also suggested the empowerment of the patient and/or family members in care, with the aim of previously identifying the first signs and symptoms of phlebitis and complications related to intravenous therapy^(5,6,18).

The early identification of pain and the removal of the catheter for this reason may decrease the evolution of the inflammatory process to clinical manifestations of greater tissue involvement, as well as the most severe degree of phlebitis⁽¹⁹⁾.

It is imperative to evaluate the risks and benefits of each type of catheter, as well as consider the patient's preferences. Such analysis may

consider the indication of other venous catheters to the patient, such as the peripherally inserted central venous catheter - PICC⁽¹⁷⁾. As limitations of the study, there was a lack of data in notifications about the underlying pathology. In addition, the records of the notifications were performed at the onset of phlebitis, with no daily monitoring of peripheral venipuncture, making it impossible to compare the prevalence between patients with and without phlebitis.

CONCLUSION

This study shows us significant evidence associated with high grade phlebitis (4 or 5) in the following variables: "Type of infusion"; "High osmolarity drug" and "Use of serum with electrolytes" in children and adolescents during the use of peripheral venous catheter. Thus, it is essential that nurses evaluate the type of drug therapy, venous and clinical network of the patient, indicating the appropriate de-

vice for this purpose, as well as implementing indicators of the prevalence of adverse events for prevention and possible early interventions, aiming at safety and effectiveness in the quality of nursing care. 🍀

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