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INCIDENCE AND CHARACTERIZATION OF ELECTRONICALLY NOTIFIED PHLEBITIS IN A TEACHING HOSPITAL

INCIDÊNCIA E CARACTERIZAÇÃO DAS FLEBITES NOTIFICADAS ELETRONICAMENTE EM UM HOSPITAL DE ENSINO

INCIDENCIA Y CARACTERIZACIÓN DE LA FLEBITIS NOTIFICADA ELECTRÓNICAMENTE EN UN HOSPITAL DE ENSEÑANZA

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Objective: to analyze the incidence and notifications of phlebitis in a teaching hospital. Method: retrospective observational study, held in Salvador, Bahia, Brazil. The data was collected based on the notifications of incidents related to health assistance, which occurred in the period from January/2016 to December/2017. A descriptive analysis was conducted. Results: 277 cases of phlebitis were notified, with incidence ranging from 1.45% to 26.09% in the study period. Most phlebitis occurred in adult individuals (63.27%); black race (66.06%); and with low schooling level (53.43%). Prolonged use of medication and/or use of irritant medication (52%) were cited as the main causes of the event; 95.31% were classified as non-serious. Conclusion: the incidence of phlebitis varied during the study period, and the reports at a teaching hospital pointed to damage to the health of most patients with phlebitis reported.

Descriptors: Adverse Events. Phlebitis. Patient Safety.

Objetivo: analisar a incidência e as notificações de flebite em um hospital de ensino. Método: estudo observacional retrospectivo, realizado em Salvador, Bahia, Brasil. Os dados foram coletados com base nas notificações de incidentes relacionados à assistência à saúde, ocorridas no período de janeiro/2016 a dezembro/2017. Realizou-se análise descritiva. Resultados: foram notificados 277 casos de flebite, com incidência variando entre 1,45% e 26,09% no período do estudo. A maioria das flebites ocorreu em indivíduos adultos (63,27%); raça negra (66,06%); e com

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baixo nível de escolaridade (53,43%). O uso prolongado de medicamentos e/ou uso de medicamento irritante (52%) foram citados como principais causas do evento; 95,31% foram classificados como não graves. Conclusão: a incidência de flebite variou no período de estudo, e as notificações em um hospital de ensino apontaram para danos à saúde da maioria dos pacientes com flebites notificadas.

Descritores: Eventos Adversos. Flebite. Segurança do Paciente.

Objetivo: analizar la incidencia y las notificaciones de flebitis en un hospital de enseñanza. Método: estudio retrospectivo de observación, realizado en Salvador, Bahía, Brasil. Los datos se reunieron sobre la base de los reportes de incidentes relacionados con la asistencia de la salud, que ocurrieron entre enero/2016 y diciembre/2017. Se realizó un análisis descriptivo. Resultados: se notificaron 277 casos de flebitis, con una incidencia que oscila entre el 1,45% y el 26,09% en el período de estudio. La mayoría de las flebitis ocurrieron en individuos adultos (63,27%); de raza negra (66,06%); y con bajo nivel de escolaridad (53,43%). El uso prolongado de medicamentos y/o el uso de medicamentos irritantes (52%) fueron citados como las principales causas del evento; el 95,31% se clasificó como no grave. Conclusión: la incidencia de la flebitis varió durante el período de estudio, y los reportes en un hospital de enseñanza señalaron el daño a la salud de la mayoría de los pacientes con flebitis reportados.

Descriptores: Eventos Adversos. Flebitis. Seguridad del Paciente.

Introduction

Adverse events, understood as damage caused by health care, constitute a world order problem, requiring preventive actions due the financial repercussions and the morbimortality.

On a worldwide scale, one in ten hospitalized patients suffers an adverse event. Annually, approximately 421 million hospitalizations occur worldwide, with around 42.7 million adverse events[1-2]. In Brazil, if the adverse events associated with hospital care were a group of death cause, the mortality associated with these would be among the first positions[3].

It is also important to discuss the costs of adverse events for the health sector. In Brazil, adverse hospital events consume from R$ 5.19 billion to R$ 15.57 billion[3]. In addition to the financial costs, the consequences of patient insecurity include death, morbidity, and more subtle forms of harm such as loss of dignity, respect, and psychic suffering[4].

Phlebitis is part of the group of adverse events and is one of the local complications related to the use of peripheral venous catheter. It consists of the inflammatory process of the inner layer of veins, having as main clinical manifestations: pain, edema, hyperemia and heat[5]. Concerning the origin, phlebitis are classified as: chemical, influenced by the infusion speed or osmolarity of drugs; mechanical, related to the puncture or inadequate manipulation of the catheter; bacterial, which is related to the contamination of the catheter during the venous puncture or in the manipulation of the intravenous therapy system; and post-infusion, when phlebitis manifests from 48 to 96 hours after the catheter removal[6-7].

International research discusses the seriousness of this problem, investigating the incidence of phlebitis in health services, following the example of an observational study conducted in a hospital in Peru, which identified an incidence of 53%[8]. Another international survey, conducted in Colombia, revealed an incidence of approximately 10%[9]. On a national level, an integrative review study of the literature shows a variation of phlebitis incidence between 3% and 59%[10].

Nursing professionals are principally responsible for the selection, insertion and maintenance of the peripheral venous catheter[11]. Thus, a critical reflection on the part of this professional category is necessary regarding its role in the care of patients using peripheral intravenous devices, since phlebitis can be an initial route for more complex illnesses, such as thrombophlebitis and sepsis, for example[10].

Considering the complexity and magnitude of adverse events for the health system, scholars are dedicated to expanding the production of knowledge regarding the characteristics of this issue[10,11] in order to fill the knowledge gaps about the profile of these events in different health spaces, such as teaching hospitals. In this sense, investigating phlebitis notifications may bring information about their profile in educational institutions and contribute to decision making and investment in actions that prevent the harm. To do so, the objective is to analyze the incidence and notifications of phlebitis in a teaching hospital.

Method

This is a retrospective observational study, conducted in a teaching hospital, located in the city of Salvador, Bahia, Brazil. The field of the investigations is a hospital and outpatient unit, public, general, large, reference in average and high complexity in the state of Bahia.

This institution has a surveillance sector in health and patient safety, which works with safety protocols. Among these, the monitoring of the occurrence of phlebitis is highlighted. Such monitoring is performed based on the electronic notifications made by health professionals in the Hospital Surveillance application (VIGIHOSP). The application is a system used by the network of hospitals managed by the Brazilian Hospital Services Company (EBSERH), to receive notifications of technical incidents and complaints, and can be used by all professionals working in the organization. This device was implanted in the Teaching Hospital (TH) in 2015.

The data collected referred to the phlebitis notifications received by the application from January/2016 to December/2017. The choice of the research period was made since the application was deployed in mid-2015. The inclusion criteria used were: all phlebitis notifications that occurred in the units of the research field and were made by the professionals during the mentioned period. It was excluded from the study those notifications with incomplete data that made it impossible to identify the case and those that were duplicated, totaling 2 exclusions. The data collection was carried out by a scientific initiation fellow duly trained by the responsible researchers. The data was collected between September 2018 and May 2019, using a structured instrument designed to guide the search for information recorded in the spreadsheet generated by VIGIHOSP.

The variables investigated were: incidence of phlebitis monthly; sociodemographic variables (gender, age, race, marital status, degree of schooling and origin); characteristics of the notification (nature of the occurrence, professional category reporting); characterization of phlebitis (occurrence during hospitalization, location of phlebitis, material used for venous puncture, relation with use of medication, previous identification of the risk of phlebitis, degree of damage, possible causes of the incident and conduct adopted).

The data were organized in the Microsoft Excel 2013 program, which was later transported to the Stata version 12 program, which was used to process the data. These were descriptively analyzed in absolute and relative frequencies and presented in tables. The incidence of phlebitis was calculated by the ratio of the number of cases of phlebitis, in the period of one year, divided by the number of cases of each month.

The research respected the ethical principles contained in Resolution n. 466/2012 of the National Health Council, and was reviewed by the hospital's Research Ethics Committee through Opinion number 2,780,752.

Results

In the two years of the study 277 cases of phlebitis were reported in the VIGIHOSP system of the research field. Of these, 69 (24.90%) were registered in 2016, with the highest incidence in August (26.09%) and September (17.39%), and 208 (75.10%) in 2017, with a highlight for the month of April (13.46%), according to Table 1.

Table 1 – Incidence of phlebitis notified in the Hospital Surveillance application. Salvador, Bahia, Brasil – 2016/2017. (N = 277)

2016			2017		
Month	**n**	**%**	**Month**	**n**	**%**
January	1	1,45	January	10	4,81
February	2	2,90	February	15	7,21
March	1	1,45	March	20	9,62
April	6	8,70	April	28	13,46
May	4	5,80	May	15	7,21
June	6	8,70	June	20	9,62
July	4	5,80	July	22	10,58
August	18	26,09	August	17	8,17
September	12	17,39	September	19	9,13
October	5	7,25	October	17	8,17
November	2	2,90	November	18	8,65
December	8	11,59	December	7	3,37
Total	69	100	**Total**	208	100

Source: Created by the authors.

Most phlebitis occurred in adult (63.27%) and elderly (27.64%) individuals; female (50.90%); black race (66.06%); single (49.10%); with low schooling (53.43%) and residents of the city of Salvador, the state capital (55.60%). Table 2 presents the sociodemographic characterization of these patients.

Table 2 – Sociodemographic characterization of patients with phlebitis notified in the Hospital Surveillance application. Salvador, Bahia, Brazil – 2016-2017 (N=277) (continued)

Variables	**n**	**%**
Age		
Up to 9 years old	9	3,27
10 to 19 years old	10	3,64
20 to 59 years old	174	63,27
60 years or older	76	27,64
No Registration	6	2,18
Sex		
Woman	141	50,90
Man	133	48,01
No Registration	3	1,08
Race		
Black	183	66,06
Non black	58	20,94
Marital status		
Single	136	49,10
Married/stable union	83	29,96
Separated	16	5,78
Widowed	25	9,03
No Registration	17	6,14
Schooling		
None	24	8,66
Elementary school	124	44,77
High school	76	27,44
College Degree	12	4,33
No Registration	41	14,80

Table 2 – Sociodemographic characterization of patients with phlebitis notified in the Hospital Surveillance application. Salvador, Bahia, Brazil – 2016-2017 (N=277) (conclusion)

Variables	n	%
Origin		
Salvador	154	55,60
Other cities	116	41,88
No Registration	7	2,53

Source: Created by the authors.

Concerning the characterization of the nature of notifications, most were identified (67.15%). Among the notifying professionals, nurses distinguished themselves with a percentage of 93.14%.

Regarding the variables related to the characteristics of phlebitis, the majority occurred during the hospitalization of individuals in the institution (91.34%), mostly in the cephalic veins (21.66%), median (21.30%), basilic veins (20.22%) and veins located in the dorsal arch of the hand (16.97%). The most used devices for punctures were the Abocath (64.98%). Among the phlebitis, 34.30% may be related to the use of vesicant medicaments.

With regard to the previous identification of phlebitis risk, approximately half of the patients had been evaluated by the unit nurse as patients at risk for the development of phlebitis. This evaluation is carried out on the basis of clinical risk criteria, without the use of a specific scale. Regarding the resulting damage, 95.31% were classified as mild damage, characterized by minimal or short duration interventions (small treatment or observation), and approximately 5% resulted in prolonged hospitalization or temporary disability.

In addressing the possible causes of the event, there was reference to prolonged use of medication and/or use of irritant medication by 52% of the notifying professionals. The lack of institutional protocol for the prevention of the harm was cited in 28.18% of the notifications and 21.30% mentioned capillary fragility and/or some basic pathology as possible causes.

The principal behaviors of professionals in cases of phlebitis were: removal of venous access (63.27%), use of cold or hot compress (40.51%) and use of antibiotic and/or anti-inflammatory (3.61%). Only 3.25% of professionals cited in-service education with the health team.

Table 3 – Characterization of phlebitis notifications made in the Hospital Surveillance application. Salvador, Bahia, Brazil – 2016-2017. (N=277) (continued)

Variables	n	%
Nature of occurrence		
Identified	186	67,15
Anonymous	90	32,36
No Registration	01	0,36
Notifying professional category		
Nurse	258	93,14
Technician	13	4,69
Other	6	2,17
Did phlebitis occur during hospitalization?		
Yes	253	91,34
No	22	7,94
No Registration	2	0,72
Catheter insertion vein		
Cephalic	60	21,66
Median	59	21,30
Basilica	56	20,22

Table 3 – Characterization of phlebitis notifications made in the Hospital Surveillance application. Salvador, Bahia, Brazil – 2016-2017. (N=277) (conclusion)

Variables	n	%
Catheter insertion vein		
Dorsal arch of the hand	47	16,97
Upper limbs (no vein specification)	33	11,91
Radial	17	6,14
No Registration	5	1,81
Material used		
Abocath	180	64,98
Scalp	24	8,66
Intimate catheter (vialon)	18	6,50
Others	38	13,72
No Registration	17	6,14
Was there previous identification of phlebitis risk to the patient?		
Yes	138	49,82
No	139	50,18
Degree of damage		
Not serious	264	95,31
Temporary disability / Extended hospitalization	13	4,69
Possible causes of the incident		
Prolonged use of medication and/or use of irritant medication	143	51,62
Lack of phlebitis prevention protocol	78	28,16
Capillary fragility and/or pathology	52	21,30
Conduct adopted		
Removal of the access	174	63,27
Used cold/warm compress	111	40,51
Use of antibiotic and/or anti-inflammatory	10	3,61
Educational action with the team	9	3,25

Source: Created by the authors.

Discussion

During the research period, the number of phlebitis presented an average of 11.54 cases per month. The proportion of phlebitis reported ranged from 1.45% to 26.09% in the months of the study. National and international researches point out variations in the incidence of phlebitis between 3% and 59.1%[8,10,12-14]. These variations are influenced by sample differences, methods of patient selection, study design, and also by distinctions in the standardization of definitions and diagnostic criteria for phlebitis. It is important to note that the recommendation of the Infusion Nurses Society, an international reference organization of nursing in intravenous therapy, is that the incidence should not exceed 5%[15].

The study corroborates the results of other studies, which point to a higher incidence of phlebitis in the adult population[7,10]. However, the high proportion of elderly people (27.64%) among the notified cases stands out. Such evidence may have a relation with the higher capillary fragility of this public, a characteristic intrinsic to the aging process[16]. The elevated proportion of phlebitis in the elderly was also identified in other Brazilian studies, such as a research carried out in São Paulo, which identified, among the notifications of phlebitis, that 35.79% occurred in elderly people between 61 and 80 years of age[12]; and in a study carried out at a university hospital in Espírito Santo whose proportion of occurrence in elderly people over 65 years old was 30.08%[6].

The study points to individuals of the black race, with low schooling and female among those who had higher frequency of phlebitis. Regarding the racial issue, the profile of the Bahian population, composed mostly by black people, stands out[17]. A research conducted in Rio Branco, capital of Acre, with 122 patients with phlebitis hospitalized at a university hospital, also identified a higher proportion of the harm in black people[18]. The higher proportion of blacks, as well as the low schooling among study individuals, is possibly related to the fact that the hospital is exclusively affiliated with SUS, and that blacks are less favored socioeconomically, besides being the main users of public health services. With respect to sex, the data differ from those presented in other researches, which reveal a higher incidence of phlebitis in males[7,12].

Regarding the characterization of notifications, it should be noted that most were identified and, among the notifying professionals, nurses were predominant. The notification of an incident, so that the notifier can be identified, may indicate a process of maturing institutional safety culture[19]. However, it is believed that it is still necessary to invest efforts to extinguish the culture of fear, so that professionals feel comfortable in making the notifications without worrying about safeguarding their identity.

Bibliographic study, with the purpose of analyzing the notifications of adverse events by the nursing team, also points out the punitive culture as the main factor that leads to the underreporting of professionals' errors[20]. In organisations with an incipient safety culture, the identification of incidents is hampered due to under-notification[19]. In this sense, it is important to refer that national and international guidelines[21] point to the need to strengthen the organizational culture that does not value individual punishment, as a way to improve quality processes in health care. It is necessary to value the culture of patient safety within the institutions, as well as actions that aim to sensitize professionals to the need to notify, understanding the importance of this act to improve the quality of care.

The identification of the nurse as the main notifier ratifies the importance of this professional category for the quality of health care, since notification can be performed by any member of the team. A study conducted at a university hospital located in the state of São Paulo also identified that the notifications were centered on the figure of the nurse, deducing that responsibility for patient safety is not shared equally by all teams. Notifications of undesirable facts should be made by front-line professionals such as doctors, nurses, technicians and nursing auxiliaries[22], without excluding the responsibilities of the other members of the multiprofessional team.

Most of the phlebitis occurred during the patient's hospitalization in the institution, with the veins located in the upper limbs, especially the cephalic, median and basilica veins, which had the highest incidence. The predominance of exposure of these veins may be related to the preference of professionals in puncturing them, since puncturing the veins of the lower limbs in adults should be avoided, due to the increased risk of phlebitis and thrombosis[23-25].

Regarding the device used for venous puncture, the most cited peripheral venous catheters were of the abocath and intimate catheter types. It is important to note that these devices are the most used for peripheral puncture, as they present less risks for long-term intravenous therapies[26].

It draws attention to the fact that almost 50% of the cases notified are classified as phlebitis risk, which refers to the importance of preventive actions for the risk group in order to avoid and/or minimize the damage resulting from the harm. It is also important to discuss that the prior identification of risk should "ignite an alert" to be considered in the health professional's care practice, since phlebitis is an adverse event that is susceptible to prevention. It is incumbent on the health team, especially the nursing team, to know the technologies used, the drugs and their interactions with other drugs, time and volume of infusion recommended, to adopt aseptic techniques, to choose adequately the catheter

caliber and the puncture site, and to use the best scientific evidence[13].

The strategies described will contribute to reduce phlebitis events and consequent repercussions on the health of patients, since the damage of the adverse event is variable, ranging from mild to permanent disability and/or death of the individual. Among the phlebitis notified, 95% had slight repercussions, characterized by minimal interventions, and 5% caused temporary disability and/or prolonged length of stay of patients. A survey conducted in the southeastern region of the country identified a proportion of 67.9% of mild damages, and 6.85% led to the individual's death[22]. It is important to consider the under-notification of events, which masks the real dimension of the problem[19-20]. In this sense, the adverse events damages may be even higher than those revealed.

The notifying professionals cited the prolonged use of medication and/or the use of vesicant medication as one of the main causes of phlebitis. Similar findings are pointed out in national and international researches[9-10,27]. It also appears that the prolonged use of medication is directly related to the need to use the catheter for a longer period of time, which has been pointed out as a factor associated with the development of phlebitis[7].

It is highlighted the proportion of professionals who related the event to the lack of institutional protocol for its prevention (28.16%). In fact, the implementation of institutional care protocols is essential to ensure a safer care[13]. However, it is important to emphasize that, although HE has not yet made available the protocol for prevention of phlebitis, other protocols, such as the one related to the standard of exchange of devices and materials for hospital use, are directed to the care of venous catheters and may contribute to reduce the risk of phlebitis. It is also important to discuss the professional's responsibility to seek knowledge for safe practice.

After installation of phlebitis, corroborating other studies, the removal of venous access was the most cited professional conduct[12]. Attention is drawn to the little reference to the educational activity with the health team in view of the occurrence of the event (3.25%), although there is scientific evidence that educational intervention directed to nursing professionals has the potential to reduce by up to 50% the occurrence of phlebitis in peripheral intravenous therapy[28].

The educational process with health workers is an important instrument for confronting problems and everyday situations. The transformation of professional practices and the organization of work itself may result from the processes of permanent education in health[29]. In this sense, there seems to be a paradox between recognizing the importance of permanent education for changing assistance practices[29] and not referring to it as a strategy to guarantee safer care and/or prevent new cases of phlebitis.

The limitation of the study is that it was conducted on the base of data from voluntary notifications made by professionals involved in the care of hospitalized patients. In this way, it may not reliably express the actual scenario of phlebitis occurrence in the research field. However, it is argued that the study contributes to the knowledge about phlebitis reported in the institution. Such information is essential for decision making regarding prevention and consequent decrease of the incidence, which directly impacts on the patients' quality of life, as well as on the reduction of costs with prolonged hospitalizations.

Conclusion

The study points to a variation in the incidence of phlebitis between 1.45% and 26.09% over the months of study. The highest exposure to the diseases occurred in adult and elderly individuals, females, self-declared blacks, with low education and residents in the state capital. The phlebitis resulted from puncture by abocath type devices and was related to prolonged use of vesicant drugs, capillary fragility and lack of institutional protocol for the prevention of the harm; approximately 5% resulted in prolonged hospitalization or temporary disability. In face of

the event, the main conduct of the professionals was the removal of the venous catheter.

These findings contribute to give visibility to the phlebitis profile and constitute indicators for intervention. In this sense, the importance of permanent education emerges as a strategy to sensitize professionals about the importance of notification, as well as for educational actions aimed at the prevention of harms in the most exposed groups.

Collaborations:

1 – conception, design, analysis and interpretation of data: Rosana Santos Mota and Valdenir Almeida da Silva;

2 – writing of the article and relevant critical review of the intellectual content: Rosana Santos Mota, Valdenir Almeida da Silva, Andreia Santos Mendes, Ângela de Souza Barros, Olga Maria Brito dos Santos and Bruno Pereira Gomes;

3 – final approval of the version to be published: Rosana Santos Mota, Valdenir Almeida da Silva, Andreia Santos Mendes, Ângela de Souza Barros, Olga Maria Brito dos Santos and Bruno Pereira Gomes.

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