

ENHANCE FACTORS INFLUENCE THE HAPPENING OF PHLEBITIS IN APORAL INSTALLATION CHILDREN'S IN HOSPITAL ROYAL PRIMA

Amanda Irnandita Harahap¹

Post Graduate Student Public Health, Faculty Public Health Universitas Prima Indonesia, North
Sumatera Indonesia

Ermi Girsang²,

Lecture Of Magister Public Health, Faculty Public Health Universitas Prima Indonesia, North
Sumatera, Indonesia.

Sri Lestari Ramadhani³,

Lecture Of Magister Public Health, Faculty Public Health Universitas Prima Indonesia, North
Sumatera, Indonesia.

Tan Suyono⁴

Lecture Of Magister Public Health, Faculty Public Health Universitas Prima Indonesia, North
Sumatera, Indonesia.

Abstract

Complications infection from access devices IV are still a major concern. A number of important factors for the development of infection, including host susceptibility, device composition, duration of implantation, and exposure to colonized organisms. The purpose of this study was to determine the incidence and factors that influence the occurrence of phlebitis in the Inpatient Installation section of the Royal Prima Medan Hospital in January 2019. This study was a cohort prospective study conducted on 72 pediatric patients hospitalized at home. Pain of Royal Prima Medan in December 2018 - February 2019 as the research sample chosen by simple stratified random sampling. Data from this study were analyzed by chi square to assess the risk factors studied. From the results of this study found phlebitis rates of 5.7%. The risk factors that statistically affect the occurrence of phlebitis are nutritional status (P value = 0.00), length of stay (P value = 0.039), average length of installation (P value = 0.039), and place of IV catheter insertion (P value = 0.039) which is seen from the value of $P < 0.05$. From the results of this study it can be concluded that the risk factors that cause phlebitis are nutritional status, length of stay, average length of installation, and place of insertion of catheter IV.

Keywords: Phlebitis, IV Catheter, Risk Factor

I. INTRODUCTION.

Almost of the human body is liquid. The percentage of human body fluids is influenced both by sex, age and body weight. The percentage of children's body fluids is much higher than in adults. Just born babies have a percentage of body fluids of around 75% which along with increasing age will decrease, especially during puberty where body fluids will be replaced by fat and muscle (Greenbaum, 2016). Seeing this fact, fluid therapy in patients who are hospitalized, especially pediatric patients, is fundamental considering that most of the children's bodies are fluid so they have a higher risk of dehydration.

The innovation of various synthetic and prosthetic devices in humans has revolutionized medical practice, one of which is the use of IV catheters to access veins (Wolf & Flynn, 2016). Through venous access by an IV catheter, the body can receive fluids, blood products, drugs, and other therapies through venous blood (Ho & Spry, 2017). However, the infectious complications of using this device are still a major concern. This infection is associated with the formation of biofilms, a community of organized microorganisms that protect themselves from the host's immune system and antimicrobial therapy, on the surface of the device. A number of important factors for the development of infection, including host susceptibility, device composition, duration of implantation, and exposure to colonized organisms. Infections that occur can be local and soft tissue infections such as infections in the infusion area, pathways, and sacs that are passed by the intravenous catheter, and catheter-related blood stream infections (Wolf & Flynn, 2016).

Phlebitis is inflammation of the inner wall of the vein (tunica intima) (Macklin, 2003). Catheterous catheter hooks are more common (1-6% of CRBSI events) but are rarely infective and can be treated conservatively (Wolf & Flynn, 2016). Phlebitis affects 27 % to 70% of all patients receiving intravenous therapy. The Intravenous Nurse Society states that the rate of phlebitis received is 5% or less in a given population (Macklin, 2003).

There is still no record of the incidence of phlebitis globally. The note regarding phlebitis incidence in the form of research results conducted separately in various places such as the results of Urbanetto et al., (2016) which states that the incidence of phlebitis in one hospital in Brazil is 1.25% when infused and 1.38 % after the infusion is released.

II. LITERATURE REVIEW.

Systemic and pulmonary circulation each consists of a closed vessel system. The vascular circuit is composed of a continuum of different types of blood vessels that start from the heart and end at the heart. In the systemic circulation, arteries that carry blood from the heart to the organs, branching out form a "tree" of smaller blood vessels with various branches delivering blood to various bodies. When it reaches the organ it is bleeding, the small arteries branching form many arterioles. The volume of blood flowing through an organ can be adjusted by adjusting the caliber arterioles of the organ. Arterioles then branch in the organs into capillaries, small vessels, where there is an exchange between the cells and the surrounding cells. Measurements in these capillaries are the main goal of the circulatory system; all other activities of the system are intended to ensure

the distribution of blood to the capillaries for exchange with all cells. The capillaries converge to form small venules, which further fuse to form small veins that come out of the organ. Small veins progressively converge or converge to form large veins that eventually drain their contents to the heart. Collective arterioles, capillaries and venules are referred to as microcirculation, because these vessels can only be seen with a microscope. All microcirculation vessels are located within an organ (Sherwood, 2011).

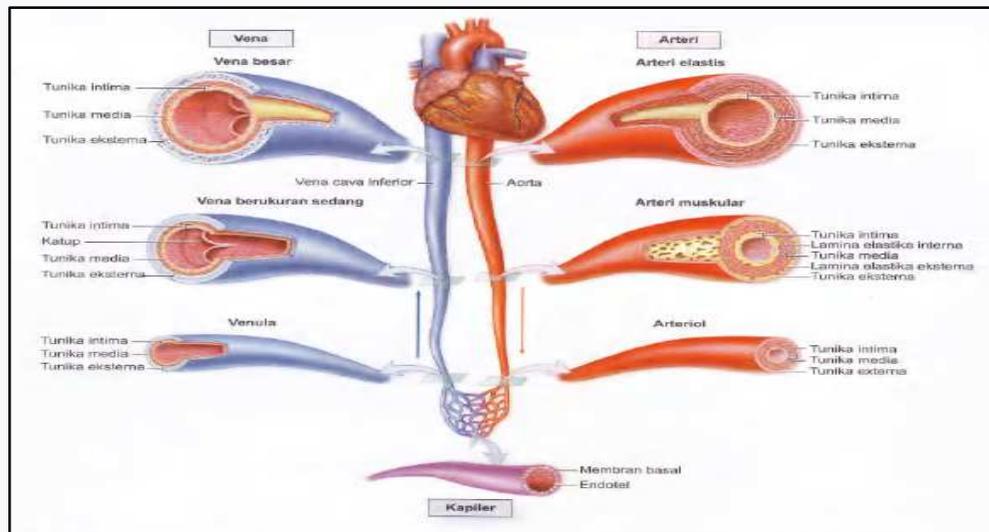


Figure 2.1. Description of Blood Vessels and Hearts as Part of the Vascular System

- a. The tunica intima, has a single layer of endothelial cells, which is supported by a thin layer of subendothelial connective tissue that sometimes contains smooth muscle cells. In arteri, the intima is separated from the tunica media by an internal lamina elastica, the outermost component of the intima. This lamina, which consists of elastin, has a gap (fenestra) that allows the diffusion of substances to provide nutrients to the inner cells of the vessel wall.
- b. The tunica media, namely the middle layer, consists mainly of concentric layers of smooth muscle cells arranged in a twist. Among the smooth muscle cells, there are various fibers and lamea elastin, type III reticular collagen fibers, proteoglycans, and glycoproteins which are all produced by these cells. In the arteries, the media has a thinner lamina elastic externa, which separates it from tunica adventitia.
- c. Tunica adventitia or tunica externa consists mainly of type I and elastin collagen fibers, the adventisia layer gradually merges with the stromal connective tissue in which the arteries are located (Mescher, 2009).

Large vessels generally have vasa vasorum, which is in the form of capillary arterioles or venules, which branch out on the tunica adventitia and the outer media tunica. Because it carries deoxygenated blood, large veins usually have more vasa vasorum than in arteries (Mescher, 2009).

2.1. Factors Causing the occurrence of Phlebitis

Various studies on the factors that influence the occurrence of phlebitis include the research conducted by Rizky in 2016 in patients who installed IV catheters in the operating room of Ar Hospital. Mother Prabumulih, where there is a statistically significant relationship between the occurrence of phlebitis and age and type of intravenous fluid,

There are also other studies conducted with the cohort research model conducted by Jacinto, et al. in 2014 stating that there was no link between demographic factors and aspects of therapy, which is a risk factor is a condition that predisposes to the occurrence of puncture failure, previous complications, drugs and fluids that are included with extreme pH and osmolarity.

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2.2. Intravenous Peripheral Catheters

Peripheral intravenous catheter is a catheter (flexible small tube) that is placed in the peripheral vein for intravenous therapy such as liquid medicine, and taking blood samples. An IV catheter is usually placed on a vein in the hand or arm. Peripheral IV catheters are different from central venous catheters performed in central veins such as the jugular vein or subclavicular vein in the chest, or arterial catheters that are installed in peripheral arteries or central arteries (Roberts & Hedges, 2013).

The IV catheter is inserted through the vein by a needle (such as in taking blood), then the needle is pulled out and leaves a small tube from the cannula. Then the catheter is lubricated on the patient's skin. In pediatric patients the use of lidocaine gel can help insertion of peripheral IV catheters (Roberts & Hedges, 2013)

Table 1, Kanula Size.

Gauge	Diameter External (mm)	length (mm)	Average Range Maximum flow rate (ml/menit)	Colour
14G	2,1	45	290	Orange
16G	1,7	45	172	Gray
18G	1,3	45	76	Green
20G	1,0	33	54	Pink
22G	0,8	25	25	Blue

III. METHOD OF RESEARCH.

All data analysis carried out in this study was carried out with IBM SPSS Statistics 25 Software. After the results of the research data were obtained, several analyzes were carried out, namely:

a. Descriptive Analysis

Descriptive analysis carried out in this study is the central tendency analysis and dispersion of each research data. To assess the incidence of phlebitis in this study researchers estimated the incidence of phlebitis in an affordable population through phlebitis incidence in an affordable population by calculating the confidence level by using a formula (Sastroasmoro, 2018; Sujarweni, 2015):

$$IK = p \pm Z\alpha \sqrt{\frac{pq}{n}}$$

p = Proporsi

q = 1 - (p)

n = Jumlah Sampel

Z α = Deviat baku normal for k α ; if $\alpha = 0.05$, else Z $\alpha = 1.96$

IV. ANALYZE AND RESULT.

This research was conducted at Royal Prima Hospital, located on Jl. Father No. 58 A, Medan Petisah, with an area of 16,364 m² is the largest private-owned teaching hospital and will become a reference center for the community, especially Medan and the people of North Sumatra in general. A proud moment on May 17, 2011, the Indonesian Deputy Minister of National Education Prof. Dr. Fasli Jalal, PhD, laid the first stone in the construction of the Medan Royal Prima General Hospital. Inaugurated on February 16, 2014 by the North Sumatra Provincial Health Office No. 440,442 / 1641 / II / Year 2014.

Tables 2. Characteristics of IV Catheter Instruments Used in Pediatric Patients at Royal Prima Medan Hospital from December 2018 to February 2019

Characteristic	Frequensi	Perentase
1. Cateter Materia		
Silikon	67	95.7
Teflon	3	4.3
2. Sized Kateter		
22 G	42	60
20 G	28	40
3. Inseri Placed		
Cephalic Veins of the Forearm Metacarpal vein Veins of Legs	58	82.9
Cephalic Veins of the Forearm Metacarpal vein Veins of Legs	6	8.6
Cephalic Veins of the Forearm Metacarpal vein Veins of Legs	6	8.6
4. Closing the Insertion Area		
Transparent Material	45	64.3
Hipavic	25	35.7
5. Infusion fluid		
Isotonis liquid	70	100
6. Average Length of Installation Instruments		
≤ 5.5 days	35	50
> 5.5 days	35	50
Instrument Installation Frequency		
≤ 1 times	42	60
> 1 times	28	40

From tables 2 above can be seen the characteristics of the instruments used in pediatric patients, namely:

a. Catheter Material

The majority of intravenous catheter instruments used in this study were instruments made of silicon which were used in 67 people (95.7%) while the remaining 3 people (4.3%) used instruments made of Teflon.

b. Catheter Size

The majority of intravenous catheter instruments used in this study were 22 gauge (22 G) in 42 people (60%) while the remaining 28 were installed with a 20 gauge intravenous catheter instrument (20 G).

c. Insertion Place

The majority of intravenous catheter instruments used in this study were placed in the forearm cephalic vein in 58 people (82.9%) while the remaining 6 individuals (8.6%) were attached to the instrument on the metacarpal vein and vein in the leg.

d. Closing of the Insertion Area

The majority of the insertion area cover in this study were transparent materials as many as 45 people (64.3%) while the remaining 25 people (35.7%) used hypavic.

e. Infusion fluid

All respondents in this study received isotonic fluid in this study (100%).

f. Average Length of Instrument Installation

From the results of the descriptive analysis on the average length of instrument installation, the average length of instrument placement in phlebitis patients ranged from 3 days to 12 days. From the data it was found that the median value of the instrument installation length was 5.5 days, which means that there were 50% of respondents who were fitted with instruments less than or equal to 5.5 days and the rest were fitted with instruments more than 5.5 days.

g. Instrument Installation Frequency

From the results of the descriptive analysis on the frequency of instrument installation, the frequency of instrument installation in phlebitis patients is 1-3 times during one treatment period. From these data, the median is used as a limitation of the instrument installation frequency category value so that 42 people were found with the frequency of instrument installation ≤ 1 time during one treatment period and the remaining 28 people with the frequency of instrument placement > 1 time during one treatment period.

V. CONCLUSIONS.

The conclusions that can be drawn from the results of this study are as follows:

- a. The incidence of phlebitis in pediatric patients hospitalized at Royal Prima Medan Hospital during December 2018 to February 2019 is 5.7%.
- b. Risk factors originating from patients that affect the occurrence of phlebitis in pediatric patients hospitalized at the Royal Prima Medan Hospital during December 2018 to February 2019 are nutritional status and length of stay
- c. Risk factors originating from intravenous instruments that affect the occurrence of phlebitis in pediatric patients hospitalized at Royal Prima Medan Hospital during December 2018 to February 2019 are insertion sites and the average length of time for intravenous catheter instruments.

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