Incidence of Phlebitis Among Adult Patients with Peripheral Intravenous Catheter in an East Coast Hospital Malaysia

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ABSTRACT

Objective: This study aims to determine the incidence rate of phlebitis among patients with peripheral intravenous catheter. **Methods**: An observational study was conducted in one of the hospitals in East Coast Malaysia. There were 321 data collected among patients who had peripheral intravenous catheter in medical, gynecology and orthopedic wards. The incidence of phlebitis was evaluated using modified Visual Infusion Phlebitis score checklist. **Results**: The incidence of phlebitis, was found out to be 36.1% (n=116/321). Most patients who developed phlebitis had visual infusion phlebitis, with a score of two (34.9%) and the rest developed phlebitis with a score of three (1.2%). **Conclusion**: This high incidence of phlebitis indicated a worrying outcome. Therefore, the study findings suggested that a specific guideline on post insertion management of peripheral intravenous catheter should be revised which may help in reducing more incidence of phlebitis, subsequently reduce infection in ward, and provide more safety environment in hospital and reducing cost in managing infection control.

KEYWORDS: Phlebitis, Adult Patients, Intravenous, Peripheral Intravenous Catheter

INTRODUCTION

Peripheral intravenous catheter (PIVC) is a short catheter inserted into vein on peripheral area (1). The insertion of PIVC has become the most common invasive procedure performed to patients in hospitals which aims to infuse fluids, administering intravenous (IV) medication, transfuse blood products, and deliver nutrients to patients (2,3). However, this procedure usually fails before the end of therapy due to many complications either local or systemic, such as phlebitis, extravasations, infiltration, hematoma, infection and embolism (4). One of the most complications occurred is phlebitis (5). Patients inserted with PIVC were very synonym to get phlebitis. The IV catheterization has been associated with the increasing rate of phlebitis (6). The increasing rate of phlebitis has drawn an attention compared to other complications (7).

Phlebitis is an inflammation at wall of vein with sign and symptoms of pain, erythema, warmth, swelling, along the site of PIVC insertion (5). Based on the Phlebitis Assessment Scale from Infusion Nursing Standard, (8), phlebitis can be classified into six grades; from zero to five grades, whereby each grade have different criteria. The incidence of phlebitis varies from the range of 1.3% to 61.2%. A study by Gonza et al. (9), found out 18.9% phlebitis developed from 952 PIVCs assessed in adult patients. Besides, in a study conducted in Turkey, 439 catheters inserted in 103 adult patients, the occurrence of phlebitis was 41.2% (10). In Malaysia, there is lack of study regarding phlebitis being identified. However, there are few studies regarding thrombophlebitis (an advanced stage of phlebitis) conducted in Malaysia. Tan, Yeap, & Sulaiha (11) identified 32.5% incidence of thrombophlebitis among patients with PIVC in tertiary hospital located in central region of Malaysia. Therefore, this observational study will identify the incidence of phlebitis among adult patients with PIVCs.

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MATERIALS AND METHODS

An observational study was conducted in one of the government hospitals located in East Coast Malaysia. There were 321 data collected among patients who had PIVC in medical, gynecology and orthopedic wards, used purposive sampling. Approval from the Institutional Research Committee Board was obtained prior to data collection process.

The data collection was from November 2016 until May 2017. The participants were chosen according to the inclusion criteria needed in the study which were adult patients inserted with PIVC, aged 18 years old and above, conscious, agreed to participate in the study. When participants agree, a written informed consent was obtained. The study excluded patients that were not on the first day of PIVC during the first day of assessment, critical patients, patient on IV chemotherapy drug, and patients with current infection. The incidence of phlebitis were evaluated using modified Visual Infusion Phlebitis (VIP) score checklist adopted from Royal College of Nursing (12). The score has 5 stages which are; stage zero – The IV site appears healthy and clean; stage one – There is slight pain or slight redness near the IV site; stage two – There are two of the following evident: pain near the IV site, erythema, or swelling; stage three – There is pain along the path of the catheter, erythema, and induration; stage four – There is pain along the path of the catheter, erythema, induration, and palpable venous cord; and stage five – Pain is evident along the path of the catheter, erythema, induration, the palpable venous cord, and pyrexia (12). The data was analyzed using descriptive analysis.

RESULTS

There were 321 PIVCs inserted towards 321 patients in medical (55.5%), orthopedic (16.8%), and gynecology (27.7%) wards. The participants consisted 52.0% of female and 48.0% of male patients, with mean age 47 (±17.9) years, with most of the patients aged 60 and above (30.2%). Most of patients also do not have a history of phlebitis (50.5%) previously. In this study, 56.7% patients were diagnosed without chronic disease, such as, diabetes mellitus (DM), hypertension (HPT), chronic kidney disease (CKD), and heart disease (HD). The details of the socio-demographic characteristics of patients participating in this study are exhibited in Table 1.

Table 1: Socio-demographic data of patients.

Characteristics	Patients with PIVC N (%)	Mean (SD)
Age (Categorical)		47 (±17.9)
18-29	72 (22.4)	
30-39	63 (19.6)	
40-49	32 (10.0)	
50-59	57 (17.8)	
≥60	**97 (30.2)**	
Gender		
Male	154 (48.0)	
Female	**167 (52.0)**	
History of phlebitis		
Yes	64 (19)	
No	**162 (50.5)**	
Unknown	95 (29.6)	
Type of admission		
Medical	**178 (55.5)**	
Orthopaedic	54 (16.8)	
Gynaecology	89 (27.7)	
Presence of chronic disease		
Yes	139 (43.3)	
No	182 (56.7)	

There were 36.1% patients with PIVCs found with phlebitis, which was the second highest reason for PIVC removal other than being discharged, dislodged, completion of treatment, leakage, request from patients. Most patients who developed phlebitis had visual infusion phlebitis (VIP), with a score of stage two (34.9%) and the rest developed phlebitis with a VIP score of stage three (1.2%). The incidence rate of phlebitis among patients with PIVC, and other details related to incidence rate of phlebitis in this study, are reported in Table 2.

Table 2: The incidence rate of phlebitis among patients with Peripheral Intravenous Catheter (PIVC) (n=321)

Variables	Frequency (n)	Percentage (%)
Phlebitis		
Yes	116	36.1
No	205	63.9
Reasons of PIVC Removal		
Phlebitis	116	36.1
Discharged	121	37.7
Dislodged	44	13.7
Completion of treatment	3	9.0
Leakage	19	5.9
Patient request	5	1.5
Not removed/Not changed	13	4.0
VIP score on PIVC removal		
0	192	59.8
1	13	4.0
2	112	34.9
3	4	1.2

DISCUSSION

The current study had highlighted a 36.1% incidence of phlebitis among patients admitted with PIVC. Globally, the incidence rate was reported as low as 0.5% and as high as 59.1%. In previous studies, Danski, Oliveira, Johann, Pedrolo, and Vayego, (13) discovered a 36.5% incidence rate of phlebitis in Spain, and Maria, Enes, and Opitz , (14) discovered a 31.1% incidence rate in Brazil. These incidence rates of phlebitis were similar to the rate reported in our study. However, both studies had a smaller sample size compared to this study, which were 92 and 122 respectively. On the contrary, the incidence rates of phlebitis in this study are also higher than those reported by Salgueiro-Oliveira, Parreira, and Veiga, (15) at; 11.09%, Nassaji-Zavareh and Ghorbani, (16) at; 26%, Abolfotouh et al., (17) at; 17.58%, Lee et al., (18) at; 3.25%, Wallis et al., (4) at, 4.62%, Urbanetto and May, (19) at; 1.25%, Saini et al., (20) at; 29.8%, Roca et al., (21) at; 9.7%, and Arias-fernández et al., (22) at 5.6%. However, in studies by Salgueiro-Oliveira et al., (15), Lee et al., (18), and Wallis et al., (4) the incidence rate appeared lower because the sample sizes were bigger than this study: 1,244, 3,165, and 5,907 respectively. In addition, the findings of the incidence rates of phlebitis in this study were lower than the incidence rates of phlebitis reported by Singh et al., (23), Kaur et al. , (24), Uslusoy and Mete, (6), and Abdul-hak and Barros, (5). However, the sample size of studies by Singh et al., (23), Kaur et al., (24), and Abdul-hak and Barros, (5) were lower than the sample sizes in our study, which

making the incidence rate of phlebitis in their study appeared high.
This enormous disparity in the of incidence rates of phlebitis between other studies, may be due to differences in the total of sample sizes of each study as mentioned above, but could also be due to different tools used to score phlebitis and the slightly different definitions and grades of phlebitis used by other studies. When Arias-fernández et al. , (22) define phlebitis in their study as grade two and above based on the VIP score, which is similar to the definition of phlebitis in this study, they calculate a 5.6% (n = 10) incidence of phlebitis, much lower when compared to this study. On the other hand, Kaur et al., (2011) used similar VIP score tools to identify phlebitis, but found a higher incidence rate of phlebitis (56%; n = 112/200). Maria et al., (14) used the phlebitis scale proposed by the Infusion Nursing Society (INS), which included grade 1 as the beginning of phlebitis, and the result of phlebitis was 31.1%. From the studies mentioned above, the rates of phlebitis tend to vary between 5.6% and 56%, which is in line with the current findings by the researcher (36.1%). We could consider that the incidence of phlebitis in this study is relatively high, although the recommended rates of phlebitis, by according to the INS, is 5% or below.

The findings of this study provide evidence on the incidence of phlebitis. This finding will help to inform clinical practice and healthcare policy to improve patient outcomes related to post insertion management of PIVC.

CONCLUSION

Overall, phlebitis was the most frequent reason of PIVC removal this study. As reducing the incidence of infection related to PIVC is one of the main objectives of Ministry of Health (MOH) Malaysia, the study findings suggested that a specific guideline on post insertion management of PIVC should be revised which may help in reducing more incidence of phlebitis, subsequently reduce infection in ward, and provide more safety environment in hospital and reducing cost in managing infection control (25). Moreover, further study within the same scope need to be carried out to provide new data to serve as indicators to assist the improvements in post insertion management of PIVC.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research authorship, and publication of this article.

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