Implementation of Intravenous Catheter Treatment to Prevent Phlebitis: A Cross-Sectional Study

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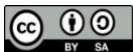
ABSTRACT

Peripheral vein cannulation is commonly performed for rapid and accurate administration of medications. Phlebitis is the most common complication of intravenous catheter insertion. This study aims to investigate the implementation of intravenous catheter care to prevent phlebitis that was implied in a patient's cannulation conditions. This study was a cross-sectional observational study conducted on patients at a hospital in Bali. The study was conducted on 35 patients who were admitted to the inpatient ward of the hospital in April 2022. The factors studied were age, gender, site of insertion, the precision of dressing, dressing integrity, the date on dressing, the administration set integrity, the date on administration set, and VIP score documentation. The results show that the mean age of the patient was 45.31 years old and 60% of the patients were men. 48.6% cannula was inserted in the movement area (wrist and ankle) while only 51.4% dressing was used properly so cannulation sites can be observed. All dressings were intact, dry, and clean, but only 48.6% cannulation date was documented on the dressing. Most of the administration sets were in a good performance (94.3%) but there was only 31.4% with the installation date. The monitoring of peripheral vein cannulation using the VIP score has not been widely applied (11.4%). Further intervention is needed to improve adherence to peripheral vein cannulation care so that phlebitis can be prevented optimally. The educational strategy must be applied to increase the quality of infusion therapy for patients and maximal prevention of phlebitis events.

Keywords: peripheral vein cannulation; phlebitis; prevention

INTRODUCTION

Installation of a peripheral intravenous catheter (infusion) is one of the invasive procedures performed in hospitals (Lopez et al., 2004). The rate of infusion in patients who come to the hospital reaches 50%. The purpose of this procedure is to administer drugs, fluids and biologic products to the patient (Turnidge, 1984).

Although infusion is often used and is believed to be a low-risk procedure in patients, the use of infusions is associated with several complications that may interfere with the administration of therapy and the patient's health condition (Abolfotouh et al., 2014; Rickard et al., 2010). Phlebitis has been reported as the most common complication of infusion. It was reported that the incidence of phlebitis reached 31.4% of all patients who were infusions (Mandal & Raghu, 2019).

Nurses have a broad role in preventing phlebitis. Nursing interventions to prevent phlebitis and ensure appropriate catheter use include intravenous therapy, asepsis techniques, and the selection of dressings (Guanche-Sicilia et al., 2021). This study aims to investigate the implementation of peripheral intravenous catheter treatment to prevent phlebitis which can be observed from the patient's cannulation condition.

METHOD

This study is a descriptive quantitative study using the cross-sectional approach. The study was conducted on 35 patients at a hospital in Bali who were admitted to the inpatient ward of the hospital in April 2022. All patients who were administered intravenous therapy using peripheral intravenous catheters were observed. Data collection was carried out

using the implementation of intravenous catheter treatment to prevent phlebitis in a Hospital in Bali observation sheet which has been transferred to an online form. The variables observed in this study include age, gender, site of insertion, the precision of dressing, dressing integrity, the date of dressing; the administration set integrity, the date on administration set, and VIP score documentation. Observations have been carried out once for each patient. The data were analyzed using univariate analysis. This research received an ethical conduct certificate from the Health Research Ethics Commission, Faculty of Medicine, Udayana University.

RESULT

Data were collected from 35 patients with peripheral intravenous catheters. The implementation of intravenous catheter treatment to prevent phlebitis in a Hospital in Bali is presented in table 1 below.

Table 1. Implementation of Intravenous Catheter Treatment to Prevent Phlebitis in a Bali Mandara Hospital in Bali (n=35)

Variables	Frequency	Percentage
Site of Catheter		
Upper arm	2	5.70
Wrist	15	42.85
Ankle	2	5.70
Back of the hand	15	42.85
Foot	1	2.90
Cannulation site can be observed		
Yes	18	51.4
No	17	48.6
Dressing condition		
Good	35	100
Bad	0	0
Cannulation date on dressing		
Yes	17	48.6
No	18	51.4
Good Administration Set		
Yes	33	94.3
No	2	5.7
Administration Set Installation Date		
Yes	11	31.4
No	24	68.6
VIP Score Documentation		
Yes	4	11.4
No	31	88.6

The mean age of the patients in this study was 45.31 years (minimum 0 and maximum 89 years), 60% of the patients were male, and 40% were female. The wrist and the back of the hand are the locations for infusions, respectively, at 42.85%. 48.6% of the cannulation area was unobservable due to improper dressings. All dressings were intact, dry, and clean, but only 48.6% of the cannulation date was written on the dressing. Most administration sets (infusions) (93.4%) were in good condition and only 32.4% of the infusion dates were documented. VIP scores have not been assessed and have yet to be used for routine monitoring, where only 11.4% of VIP scores were documented.

DISCUSSION

Each patient with an intravenous catheter has a different risk of developing phlebitis. Factors that cannot be changed that can increase the risk of developing phlebitis include age and gender. Age and gender are intrinsic factors of phlebitis and have a significant relationship with the incidence of phlebitis (Laudenbach et al., 2014; Nyika et al., 2018). A study showed a higher risk of developing phlebitis in the age group 41-50 years in the male sex (64.66%) (Singh et al., 2018). Men may have a higher risk of developing phlebitis, in the case of obesity, and smokers who trigger the accumulation of fat and nicotine compounds in the blood vessels. This causes blood vessels to be more fragile and more prone to inflammation (Atay et al., 2018; Mandal & Raghu, 2019; Nyika et al., 2018). Thus, according to the result

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of this study that the average of the patients was 45.31 years; the majority of patients have a high risk for suffering from phlebitis so action to prevent phlebitis is required.

In infusion, nurses need to have good skills so that they can determine the area of infusion that can minimize the occurrence of phlebitis. When determining the location, nurses must choose an appropriate area to reduce phlebitis risk (Cicolini et al., 2014). The location of the infusion that is often applied is on the wrist and back of the hand. In adults, intravenous infusions in the lower extremities are associated with a higher risk of infection than areas in the upper extremities. In addition, the veins of the back of the hand have a lower risk of developing phlebitis than veins of the wrist or upper arm (O'Grady et al., 2011). According to this study, most infusions have placed in the lowest risk of phlebitis locations, but there was an infusion site in the lower extremities. Further study is needed to observe why nurses prefer infusion on the lower extremity.

Infusion is the act of inserting a foreign object, namely an intravenous catheter, into the patient's blood vessel so that it may cause discomfort for the patient and can be a risk for the entry of microorganisms into the patient's bloodstream. Assessment of the state of the cannula and intravenous therapy must be carried out daily and accurately documented to ensure patient safety, thus enabling auditing and investigation of infection outbreaks (Lulie et al., 2021). Accurate documentation of infusion therapy must include the date and time of insertion, including catheter type, gauge, length of time from insertion and removal, site of insertion, skin surface disinfection fluid used, operator name, results of observations of the cannulation area, and details of catheter removal and reinsertion (Barruel et al., 2014). The cannula should be checked as a daily baseline and removed if it has been in place for more than 96 hours (Lulie et al., 2021). This study shows 48.6% of the patient's cannulation sites cannot be observed. The use of non-transparent dressing and failure to put the transparent dressing on the cannulation site was the factors that affected this situation. Therefore, there were no observations or documentation of the VIP score.

Using transparent dressings is an appropriate way to fix the intravenous catheter insertion area. Fixation with transparent dressings has several advantages, namely making it easier for officers to assess the cannula insertion area, dressing changes are rarely done compared to using standard gauze, the use of this dressing also saves staff time in carrying out procedures, and patients can take a shower without worrying about the insertion area getting wet due to the material of semipermeable dressings. Intravenous catheter placement can cause a risk of phlebitis infection, so to prevent this, replacement or transfer of intravenous catheter installation is carried out within a distance of not less than 72-96 hours. Administration sets and other enhancements may be changed no more often than 72 hours unless there is a documented suspicion of infection (O'Grady et al., 2011). According to this study, all patients have intact and good dressing conditions, but the cannulation date was not documented on the dressing. There were two patients with bad conditions of the administration set which were not changed after pack red cell (PRC) transfusion, and the majority still needed an installation date put on the administration set. Inadequacy documentation of cannulation and installation administration sets date might increase the risk of phlebitis because the cannulation dan administration set time is prolonged, causing bacteria colonization.

The results of observations in the insertion area must be carried out and documented carefully on an ongoing basis. Appropriate measurement tools are needed in uniform documentation to make it easier for officers to intervene on intravenous cannula attached to patients. VIP scores are recommended in the Infusion Nursing Standards of Practice for early identification and early management of phlebitis (Tzolos & Salawu, 2014). Implementing intravenous catheter care must be carried out continuously and continuously improved to prevent complications. The proportion of healthcare personnel who do not comply with the guidelines should receive more attention to intervene (Cicolini et al., 2014). This study found that VIP score documentation was not applied well and might be the factor that leads to the phlebitis event in the hospital. Thus, further actions to apply VIP score in hospital is necessary.

Providing education to patient care professionals is an important thing that can be done, namely by targeting important components of intravenous catheter care, including dressings, documentation, duration of catheter use, infusion care, VIP score assessment, and infection control. This is associated with a significant improvement in the process and outcome of intravenous catheter care and includes reducing the rate of complications from intravenous catheter insertion such as catheter-associated blood infections of (Peripheral Intravenous Cannulation (PIVC) Insertion, Care and Removal (Adults), 2021). Staff must be aware that in a busy environment such as a hospital, they need constant improvement to optimize working conditions and minimize potential hazards. One of them is to apply an assessment with a VIP score on installing an intravenous catheter (Tzolos & Salawu, 2014).

CONCLUSION

Infusion is the act of inserting a foreign object, namely an intravenous catheter, into the patient's blood vessel so that it may cause discomfort for the patient and can be a risk for the entry of microorganisms into the patient's bloodstream. Although infusion is often used and is believed to be a low-risk procedure for patients, the use of infusions is associated with several complications that may occur in patients—mentioned that men may have a higher risk of developing phlebitis, in the case of obesity, and smokers who trigger the accumulation of fat and nicotine compounds in the blood vessels. In infusion, nurses must have good skills to minimize the occurrence of phlebitis. Providing education to patient care professionals is an important thing that can be done to prevent phlebitis, namely by targeting important components of intravenous catheter care, which include dressings, documentation, duration of catheter use, infusion care, VIP score assessment, and infection control. At the time of infusion, fixation with a transparent dressing is the right choice because it makes it easier for officers to assess the cannula insertion area. Staff must know that working in a hospital environment requires constant improvement to optimize working conditions and minimize potential hazards. Further educational strategies must be applied to increase the quality of infusion therapy for patients and maximal prevention of phlebitis events.

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