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INCIDENCE OF PHLEBITIS FOLLOWING THE USE OF PHERPHERAL INTRAVENOUS CATHETER AMONG THE PATIENTS WITH COVID-19 BY USING VISUAL INFUSION PHLEBITIS (VIP) SCORE

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Abstract

Intravenous cannulation is commonly performed for rapid and accurate administration of medications. Phlebitis is one of the commonest complications that develop after intravenous catheter application. This prospective observational study aims to investigate the incidence of phlebitis and to evaluate factors contributing to the development of phlebitis among the 150 patients with COVID-19 disease admitted in a Tertiary care hospital Lucknow (U.P). The factors studied were age, gender, smoking habits and comorbidity. Phlebitis was graded using Visual Infusion Phlebitis Score. The incidence of phlebitis was expressed in percentage and odds ratio was calculated to estimate the effects of suspected risk factors. Incidence of phlebitis was found to be 31.4% from our study. The increased incidence rate of phlebitis was seen in the female gender. Hence the use of VIP score tool is useful for the early detection of phlebitis

Keywords: *Incidence, intravenous cannula, phlebitis, VIP score.*

INTRODUCTION

In December, 2019, Wuhan, China, became the centre of an outbreak of pneumonia of unknown cause, which raised intense attention not only within China but internationally, affecting millions of people.[i] Peripheral venous access was the most important and the commonly performed lifesaving procedure by the health workers. Main uses of a peripheral intravenous cannula are the administration of intravenous fluids, blood sampling, administration of medications and blood products.[ii]Despite many advantages, PIC insertion is associated with some complications. The most common complication associated with PIC insertion is phlebitis with reported incidence ranges from 25% to 59%. Phlebitis is not only causes patient discomfort and frequent catheter change it may also cause further complications like cellulitis, septicemia, DVT, and make the patient stay in the hospital for a longer time and increase the cost of healthcare

Phlebitis is an inflammation of the vessel wall and it manifest as localized pain, redness, edema and palpable venous cord.[iii] Factors contributing to development of phlebitis are divided into four main groups namely,[iv]patient factors such as age, gender and underlying conditions;[v] chemical factors such as type of drugs and fluids; [vi] mechanical factors such as catheter material, size and duration of cannulation [vii] and health professional practices.[viii]

OBJECTIVES

To investigate the incidence of phlebitis and to evaluate factors contributing to the development of phlebitis.

NEED OF THE STUDY

The use of cannula increases patients' predisposition for local systemic complications, such as inflammation or infection of the insertion site, catheter-related bloodstream infections, septic thrombophlebitis or endocarditis (Mermel, 2000). The insertion of a peripheral cannula is a breach of the body's natural defences, particularly the circulatory system, as it is predisposed to an increased risk of infection that is potentially lethal (Hart, 2008; Ingram and Murdoch, 2009). It has been found that 60% of all bloodstream infections are attributed to the existence of vascular access devices (VADs), and that around 67% of all patients develop complications related to VADs (Curran et al, 2000; Webster et al, 2008). Hence the use of VIP score tool for the assessment of the early signs of phlebitis has been very successful in reducing the rate of phlebitis and prevention of further associated complications.

REVIEW OF LITERATURE

Lulie.M et al (2020) conducted a hospital-based prospective, observational study to identify the Presence and severity of phlebitis by using Jackson's Visual Infusion Phlebitis (VIP) Scoring System. The incidence of phlebitis was 70% among the 364 study subjects. Mid-stage (grade 3) and advanced-stage (grade 4) phlebitis were noticed in 136/268 (51%) and 89/268 (33%) respectively. Odds of developing phlebitis were twofold higher in patients with catheter-in situ > 96 h as compared to those with catheter dwell time < 72 h. Female patients were 70% lower than male patients with risk of developing phlebitis. The study recommended the daily inspection of the cannula and it should be removed if it stayed later than 96 h.[ix]

METHODS

This was a prospective, observational study conducted at the peripheral hospital set up after taking approval from our Institutional ethical committee during the period from March 2021 to May 2021 The study involved 150 patients who were admitted to the Covid-19 ward of the hospital. Patients who were unconscious, patients who had pre-existing skin diseases, patients who had a history of allergy to any medications, burn patients and patients who refused to give written informed consent were excluded.

All patients who gave written informed consent were visited daily for three days and the catheter insertion site was examined for signs of phlebitis using visual infusion phlebitis score (VIPS)[x] [xi]Data like patient age, gender, smoking habits, co-morbidity, cleanliness at the site, duration of hospital stay and cannulation and reason of the PIVC cannula were noted.

Table: 1 VISUAL INFUSION PHLEBITIS SCORE

APPEARANCE	SCORE	STAGE
IV site appears healthy Action: observe Cannula	0	No signs of phlebitis
One of the following is evident: • Slight pain near IV site or • Slight redness near IV site Action: observe Cannula	1	Possibly first signs of phlebitis
All of the following signs areevident: •Pain along path of cannula •Erythema	2	Early stage of phlebitis

•Induration Action: Re-site cannula		
All of the following signs are evident and extensive: • Pain along path of cannula •Erythema •Induration •Palpable venous cord Action: resite cannula and consider treatment	3	Mid-stage of phlebitis
All of the following signs are evident and extensive: • Pain along path of cannula •Erythema •Induration •Palpable venous cord •Pyrexia Action: resite cannula and consider treatment	4	Advance-stage of phlebitis or start of thrombophlebitis
All of the following signs are evident and extensive: • Pain along path of cannula •Erythema •Induration •Palpable venous cord •Pyrexia Action: initiate treatment /resite cannula	5	Advance-stage of thrombophlebitis

RESULTS

One hundred fifty patients were included in the study, out of which 89 were male (59.33) and 61 were female (40.7%) [Table 2]. Majority of the patients were aged less than 60 years (54%). Catheters were inserted for the reasons such as administration of fluids, intravenous drugs, and blood products. One hundred and twenty patients (80%) were observed within 72 hours of cannula insertion while 30 patients(20%) were found with cannula remained in the vein from more than 72 hours.79 patients were smokers (52.6%) and 71 patients (47.4%) were non-smokers. Incidence of phlebitis in our study was 31.4%. Thirty percent (30%) of male patients and 32% of female patients had phlebitis during the stay in hospital. Thirty-five percent (35%) phlebitis occurred in the age group less than 60 years and 26% in more than 60 years. Of the 30 cannula remaining for more than 72 hours,17 patient (56.66) showed the symptoms of phlebitis while it is only (16.6 %)in patient observed within 72 hours of cannula insertion. Incidence of phlebitis was found to be higher in patients with co-morbidity (38%) when compared to patients without any co-morbidity (26.4%).

Table 2: Risk factors for phlebitis

Variables	Number of patients in study	Number of patients developed phlebitis	Incidence of phlebitis
Age			
<60 yrs	81	29	35.80
>60 yrs	69	18	26.08
Gender			

Male	89	27	30.33
Female	61	20	32.78
Smoking Habits			
Smokers	79	30	37.97
Non smokers	71	17	23.94
Length of time cannuala remained in the patient vein			
Less than 72 hours	120	20	16.66
More than 72 hours	30	17	56.66
Co –morbidity			
Yes	87	33	37.93
No	53	14	26.41

DISCUSSION

Peripheral intravenous catheter insertion is a common procedure that is performed by first responders to provide the care to the patients who are admitted in the hospital. It is commonly used for infusion of intravenous (IV) fluid and other important clinical interventions. Phlebitis is the most common complication of intravenous catheter insertion and in-turn causes further complication to patients. Phlebitis may range from mild form to severe thrombophlebitis. These may cause suffering which may range from mild discomfort to frank sepsis especially covid-19 situation where the patient is already in mental stress because of being alone and away from the family members. Thus, a variety of studies have been performed to investigate the characteristics of phlebitis so that risk factors can be identified which in turn helps in the development of the strategies and guidelines in management.[xiixiii] Hence we undertook a study to assess the incidence of phlebitis among the patients with COVID-19 disease and to evaluate the risk factors that are associated with phlebitis.

Incidence of phlebitis in our study was 31.4% which is comparable with incidence rates reported in other studies[xiv].The reported incidence of phlebitis ranges from 25 to 59%. We found that the risk of developing phlebitis was more in the age group less than 60 years.

Female gender is associated with a higher risk of development of phlebitis secondary to peripheral venous catheterization .Similar findings have been reported by Tagalakis *et al.* and Cicolini *et al.*[xv]. We have no satisfactory explanation for our findings, but hormonal differences may be a contributing factor for phlebitis in females[xvi] Our study also found out that the smokers had a higher incidence of phlebitis than non- smokers .We found that phlebitis is more common where the cannula remained in vein longer than 72 hours when compared to other patients We would like to recommend that all patients with peripheral intravenous cannula should be screened for complications of the peripheral venous catheter at least once daily by using VIP score.Patients with signs and symptoms of phlebitis should have their catheters replaced at a different site. Nurses should maintain the observation chart to document the development of signs of phlebitis in every hospital. This would help to detect phlebitis much earlier and decrease patient's discomfort and pain.

RECOMMENDATION

The cannula must be reviewed on daily basis, and it should be removed if it stayed later than 72 hour. Phlebitis protective measures and catheter management strategy should be improved at

the study site.

NURSING IMPLICATION

This study will help the nurses to understand the importance of assessing the early signs of phlebitis by using the VIP score tool. It is clear from the findings of the study that good nursing care may lower the incidence of phlebitis.

CONCLUSION

Incidence of peripheral vein infusion-related phlebitis among our patients was comparable with other centres in the world. We confirmed there is an increased risk of developing phlebitis among age group less than 60 years, female patients, smokers, patient with co-morbidity. Catheter dwell time > 72 hour was found to be a risk factor for increased incidence of phlebitis.

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