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Nurse's Actions Regarding Chemotherapy Induced Phlebitis: Suggested Nursing Guidelines

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Abstract:
Background: *Peripheral venous catheter-associated phlebitis is caused by inflammation to the vein at a cannula access site. It can have a mechanical, chemical or infectious cause* ***(Higginson & Parry, 2011).*** *The present study* ***aimed*** *to identify nurse's actions regarding chemotherapy induced phlebitis.* ***Setting;*** *data were collected from medical oncology department at Assiut University hospital.* ***Research design;*** *a descriptive study was utilized in this study.* ***Sample:*** *adult of 100 patients male and female patients (age between 18-65 years), free from chronic diseases as diabetes and hypertension, or vascular diseases, and patients with peripherally inserted catheters.* ***Tools:*** *data were collected through chemotherapy induced phlebitis assessment sheet and Phlebitis - Daily Nursing Assessment scale: (Developed by Infusion Nurses Society, US; 2012).* ***Results;*** *more than half of patients (62.0 %) were females, and (55.0%) their ages more than 50 years. The highest percentage of possibly early phlebitis (32 %) at the 1st day.* ***Conclusion;*** *the majority of the sample (86.0 %) nurse's actions toward phlebitis were re-site cannula.* ***Recommendations;*** *All nurses working in oncology hospital are a need for continued education and training programs about observe and care of cannula to decrease the incidence of phlebitis.*

Key wards: *Chemotherapy, Nurse's actions, Phlebitis, Suggested guidelines.*

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I. Introduction

Cannulation of the peripheral veins is a commonly used procedure in hospitals to allow for rapid and accurate medication administration **(Endacott, 2009).**

Phlebitis related to peripherally inserted catheters is caused by inflammation of the superficial vein's tunica intima. This inflammation is related to tunica intima irritation either by mechanical, chemical or bacterial sources. If the inflammation is left without treatment, it can lead to infection or formation of a thrombus **(Royal College of Nursing, 2010).**

Phlebitis is an inflammation of the vein and is caused by inflammation to the vein at a cannula access site. Phlebitis can have a mechanical, chemical or infectious cause. Microorganisms gain access to patients through different methods; these organisms are not able to move freely between hosts by themselves. These organisms require either direct physical contact with a new host, or indirectly from another person, animal or inanimate object, to gain access. Understanding the direct and indirect modes of transmission is important for effective infection control **(Dougherty and Lister, 2008)**.

The most common symptoms of any type of phlebitis are; erythema (redness) and swelling along the venous track, which will lead to hardened, cord like veins **(Endacott, 2009).** The area in which inflammation has occurred will feel warm and patients will experience pain and / or discomfort during administration of the medication. Other suggestive symptoms of phlebitis are; exudate or oozing from the insertion site, especially in cases of infective phlebitis **(Macklin, 2003).** Fever along with hemodynamic deterioration of an unknown origin should be suggestive for investigation of cannula infection and the possibility of systemic sepsis **(Higginson & Parry, 2011).**

Nurses as they are in close physical contact with patients can act as a portal for disease-causing organisms through facilitating their spread between patients and the clinical environment. The fight against disease-causing microorganisms and the delivery of a high quality, effective healthcare service requires the strict adherence to infection control measures **(Randle, 2009)**.

When performing any clinically invasive procedure, the nurse must follow strict aseptic technique **(Burke, 2003, Randle et al., 2009).** As this can help prevent the micro-organisms' transmission to wounds and other high risk sites as intravenous cannulas, and reduce the cross-infection risk **(Hart, 2007).** Inappropriate catheter use and poor infection control standard play a part in the development of phlebitis. For proper treatment and prevention of phlebitis; infection control and hygiene standards are essential **(Uslusoy and Mete, 2008).**

Fortunately complications of phlebitis are rare; early phlebitis usually resolves after the cannula is removed or re-sited **(Rickard, 2010).** Complications can include; infection, thrombosis, and recurrent superficial thrombophlebitis **(Loewenstein, 2011).** The most serious complication is septic thrombophlebitis, a condition which is characterized by venous thrombosis and inflammation in the presence of bacteremia **(Mermel, 2009).**

Aim of the study:

The aim of this study was to identify nurse's actions regarding chemotherapy induced phlebitis, and develop suggested nursing guidelines regarding this problem.

Research question:

What are the nurse's actions regarding chemotherapy induced phlebitis?

II. Sample and methods

Research design:

A descriptive design was utilized in this study.

Setting:

Data were collected from medical oncology department at Assiut University hospital

Patients:

A sample of 100 patients who admitted in the medical oncology department was included in this study.

Inclusion criteria:

Adult male and female patients (age between 18-65 years), free from chronic diseases as diabetes and hypertension, or vascular diseases, and patients with peripherally inserted catheters.

Tools:

Tool 1: Chemotherapy induced phlebitis assessment sheet:

This sheet was used to assess demographic and medical patient data

Demographic and medical patient variables; name, age, gender, level of education, occupation, duration of diagnosis and duration of chemotherapy

Tool 2: Phlebitis - Daily Nursing Assessment scale: (Developed by Infusion Nurses Society, US; 2012):

This tool was used daily for 5 consequent days to assess the occurrence of phlebitis and nurse's action regarding it. The tool contains 6 parts to determine the occurrence of phlebitis. Scoring from 0 – 5 (0 = No phlebitis, 1 = possibly early phlebitis, 2 = early stage of phlebitis, 3 = medium phlebitis, 4 = advanced phlebitis or possibly thrombophlebitis, and 5 = advanced thrombophlebitis).

Scoring system:

- If IV site is healthy = 0 (No phlebitis)
- If one of the following is evident (slight pain near IV site, or slight redness near IV site) = 1 (Possibly early phlebitis)
- If two of the following are evident (pain at IV site, erythema, or swelling**) =** 2 (early stage of phlebitis).
- If all of the following are evident (pain at IV site, erythema, and induration) = 3 (medium phlebitis).
- If all of the following are evident and extensive (pain along the cannula, swelling, induration, and palpable venous cord) = 4 (advanced phlebitis or possibly thrombophlebitis).
- If all of the following are evident and extensive (pain along the cannula, swelling, induration, palpable venous cord, and pyrexia) = 5 (advanced thrombophlebitis).

Suggested nursing guidelines:

The use of simple measures and nursing guidelines can play an important role in reducing the incidence of phlebitis. This can be represented in the form of a guide for nurses including good practices when inserting a cannula as appropriate selection of the cannula for the vein. Careful selection of the site; keep away from any bony prominences, joints and venous valves that would cause cannula movement within the vein lumen. Follow good infection control practices. Wash hands thoroughly, wear gloves and aprons, adequately clean the patient's skin, establish a clean environmental field, and use sterile equipment. When administering intravenous drugs; observe for good clinical practice. Dress the cannula after insertion to minimize its movement in the vein lumen,

which can lead to mechanical phlebitis. Dispose contaminated or soiled equipment and linen appropriately, and dispose sharps safely. Check all patients with an intravenous access device every shift for signs of phlebitis at the access site.

III. Methods

- Approval of the research was obtained from the faculty of nursing, Assiut University ethics committee-
- An approval from the head of oncology department was obtained to collect the data.
- Tools were prepared after reviewing related literature.
- Tool testing was done by five experts from nursing and medical fields.
- A pilot study was carried out during August 2017 on 10 patients to test clarity and applicability of the tools; no changes were done, so that patients included in the pilot study were included in the main study.
- Patients were followed up daily for 5 consequent days during the period of study for assessing their condition.

Ethical considerations:

The study took the approval of an institutional ethics committee. A patient's informed written consent was obtained ensuring their willingness to participate in the study after explaining the nature and purpose of the study. The researcher initially introduced herself to all patients and they were assured data confidentiality. Patients were told that their participation in the study is voluntary and they can withdraw from the study any time.

IV. Results

Table (1): Frequency distribution of the studied patients according to their demographic and medical variables (n=100):

Items		N	%
1.	**Age**		
-	18-28	8	8.0
-	29-39y	19	19.0
-	40-50	18	18.0
-	More than 50	55	55.0
Mean ± SD		47.49 ± 12.65	
2.	**Sex**		
-	Male	38	38.0
-	Female	62	62.0
3.	**Education**		
-	Educated.	23	23.0
-	Un educated	77	77.0
4.	**Occupation**		
-	Working	34	34.0
-	Un working	66	66.0
5.	**Duration of diagnosis**		
-	Less than one years	65	65.0
-	One to three years	19	19.0
-	More than three years	16	16.0
6.	**Duration of chemotherapy**		
-	Less than one year.	71	71.0
-	One to three years	17	17.0
-	More than three years	12	12.0

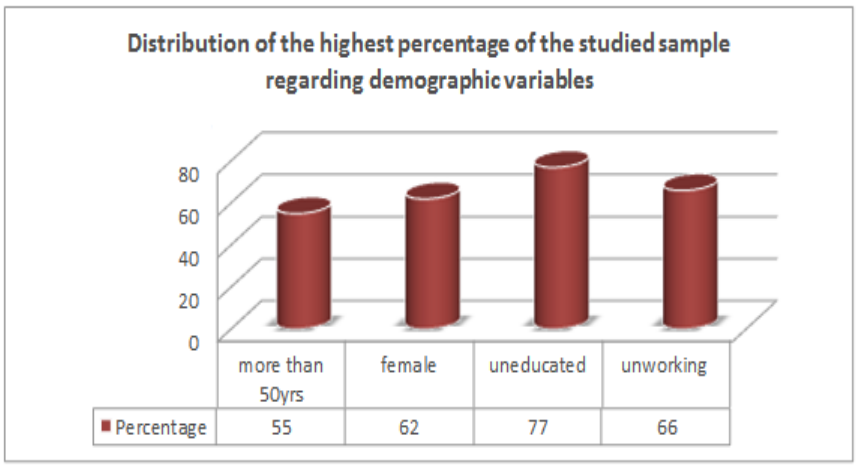

Figure (1): Distribution of the highest percentage of the studied sample regarding demographic variables

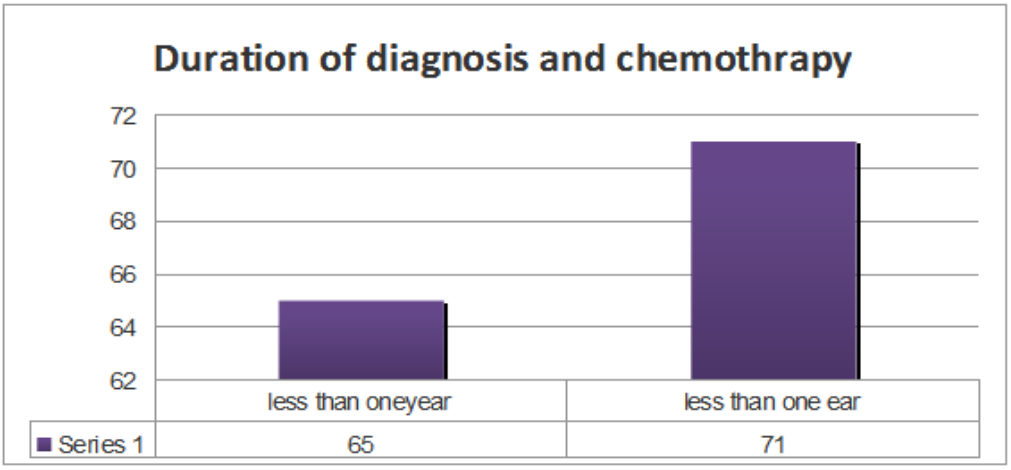

Figure (2): Percentage distribution of the highest percentage of the studied sample regarding duration of diagnosis and chemotherapy

Table 1, figure 1 & 2: illustrated that, more than half of patients (62.0 %) were females, and more than half of patients (55.0%) their ages more than 50 years. Regarding education; (77.0 %) of patients were un educated. Regarding occupation; two-thirds of patients (66.0 %) were not working. Regarding duration of diagnosis & chemotherapy more than two thirds (65.0%, 71.0%) of patients were less than one year.

Table (2): Distribution of the studied patients according to Phlebitis - Daily Nursing Assessment scale (n=100):

Phlebitis manifestations	**1st day**		**2nd day**		**3rd day**		**4th day**		**5th day**	
	N.	**%**	**N.**	**%**	**N.**	**%**	**N.**	**%**	**N.**	**%**
- **0** (No phlebitis)	5	5	4	4	8	8	8	8	12	12
- **1 (**Possibly early phlebitis)	32	32	26	26	18	18	18	18	16	16
- **2 (**Early stage of phlebitis)	63	63	68	68	72	72	72	72	72	72
- **3 (**Medium phlebitis)	0	---	0	---	2	2	2	2	0	---
- **4 (**Advanced phlebitis, or possible thrombophlebitis)	0	---	2	2	0	---	0	---	0	---
- **5 (**Advanced thrombophlebitis)	0	---	0	---	0	---	0	---	0	---

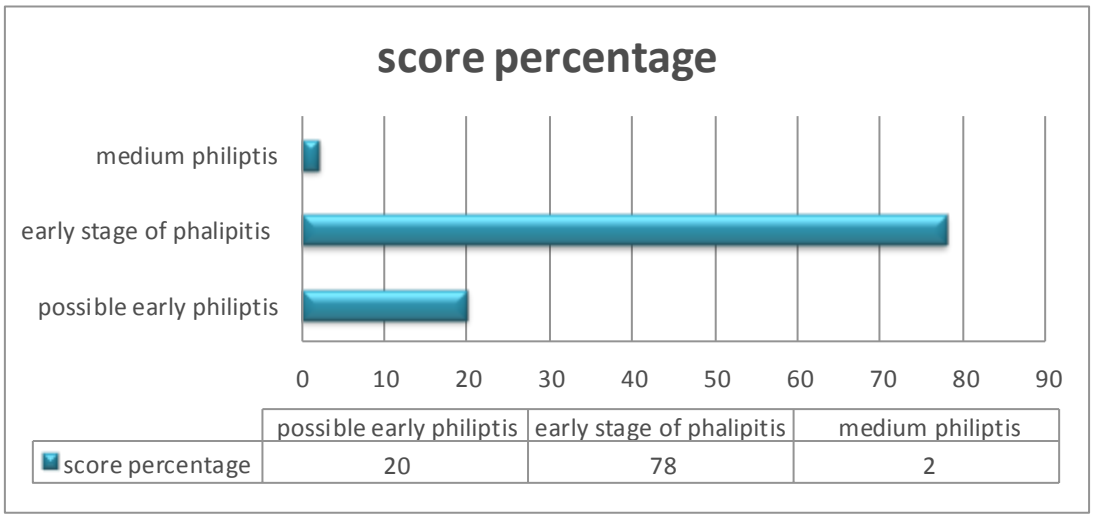

Figure (3): Score percentage of phlebitis manifestations

Table 2 |& figure 3: Shows the phlebitis manifestations for 5 consequent days. As regard percentage of no phlebitis the highest percent at the 5th days were 12 %, while highest percentages wear at the stage of possibly early phlebitis (32 %) at the 1st day. As regards percentage of medium phlebitis they were equally in both 3rd & 4th days (2 %). Regarding percentage of advanced phlebitis, or possible thrombophlebitis (2 %) occurred at the 2nd day.

Table (3): Distribution of the studied sample regarding nurse's actions toward phlebitis (n=100):

Nurse's actions	Frequency	Percent
Observe cannula	14	14.0
Re-site cannula	86	86.0
Total	100	100.0

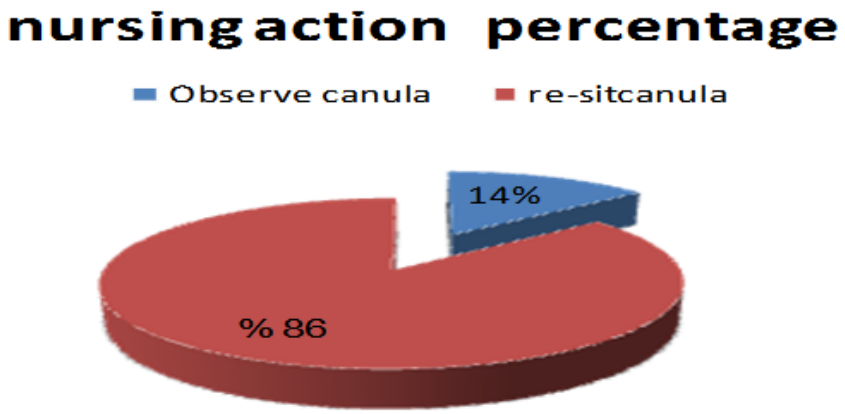

Figure (4): Distribution of the studied sample regarding nurse's actions toward phlebitis

Table 3 & Figure 4: revealed that the majority of the sample (86.0 %) nurse's action toward phlebitis was to re-site cannula.

V. Discussion

Infective phlebitis is caused by the introduction of bacteria into the vein. It may start as an inflammatory response to cannula insertion, allowing bacteria to colonise the "inflammatory debris" **(Malach , 2006).** Poor practices during drug administration and a higher frequency of drug administration have been found to increase the risk of infective phlebitis **(Uslusoy and Mete, 2008).**

The current study presented that more than half of patients were females, this study finding disagree with **(Joan et al., 2015)** who reported that (62.6%) were males. As regard, the ages more than half of patients their ages were more than 50 years. This result was in the same line with **(Joan et al., 2015)** who mentioned that the mean age of participants was 55.1 (SD 18.5).

The current study showed that, more than two thirds of patients wear un educated, two-thirds of patients were not working. Regarding duration of diagnosis & chemotherapy more than two thirds of them were less than one year.

Ray-Barruel et al., (2014) reported that one of the complications of peripheral intravascular catheterization (PIVC) is phlebitis, diagnosed by one or more signs or symptoms of pain, tenderness, swelling, induration, erythema, and a palpable, cord-like vein.

The current study followed up that the phlebitis manifestations for 5 consequent days. According to **(Gillies et al., 2003)** frequency of phlebitis assessment ranged from every cannula access, to twice daily, daily or even second daily assessment.

As regard no phlebitis the highest percent at the 5th day was 12 %, while the highest percentage of possibly early phlebitis (32 %) was at the 1st day. As regards percentage of medium phlebitis they were equally in both 3rd & 4th days (2 %).

According to **(Gillian et al., 2014)**who stated that frequency of reported assessment ranged from every PIVC access for medication or infusion, to twice daily, daily or second daily assessment.

Also, **(Boyce & Yee 2012, Rickard et al., 2012.)** reported that; a handful of studies reported continued phlebitis assessment after cannula removal up to 24 hours, 48 hours and 3 days. One study reported follow up of patients until the phlebitis resolved; in one case of phlebitis, pain lasted for 5 months.

The data illustrate that, the percentage of advanced phlebitis, or possible thrombophlebitis (2 %) occurred at the 2nd day. **Joan et al., (2015)** was also in the same line and reported that; Post infusion phlebitis at 48 hours was diagnosed in 59 (1.8%) patients.

As regard, the nurse's actions toward phlebitis the majority of the sample re-site the cannula. This result from the researchers opinion was due to that the patient must take his/ her medication through intravenous cannula. The nurse must be re-site the cannula, remove infected cannula, observe and care the phlebitis

Also, **(Joan et al., 2015) stated** that it is important for the health care staff to provide patients with information about what to look for after an intravascular device has been removed. Advice about reporting any persistent problem to a nurse or medical practitioner or, following hospital discharge, to their general practitioner is also essential.

VI. Conclusion

The majority of the sample nurse's actions toward phlebitis were re-siting of the cannula.

Recommendations

All nurses working in oncology unite at Assiut University hospital are a need for continued education and training programs about good observe and care of cannula after insertion, to decrease complication rates of phlebitis and improve patient outcome

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