

The Relationship Between Venous Location and Chemotherapy Extravasation Incidence in Cancer Patients

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ABSTRACT

Cancer is a general term for a large group of diseases that can affect any part of the body. Other terms used are malignant tumors and neoplasms. This study aimed to determine the relationship between venous location and the incidence of chemotherapy extravasation in cancer patients. The research method uses a descriptive analytic method. The study population was all cancer patients undergoing intravenous chemotherapy at one-day chemotherapy care at RS X Jakarta. The sampling technique used total sampling technique, amounting to 47 patients. The research instrument used an observation sheet and a questionnaire. The results obtained from 24 respondents whose metacarpal vein locations mostly did not experience extravasation, namely 62.5% (15 people), from 15 respondents the location of the antebrachial veins did not experience extravasation, namely 100% (15 people), and from 8 respondents the location of the veins 100% (8 people) did not experience extravasation in the cephalic division. The results of the Pearson Chi-Square statistical test showed that the P-value = 0.005 ($\alpha < 0.05$), it can be concluded that there is a relationship between venous location and the incidence of chemotherapy extravasation in cancer patients at X Hospital Jakarta. Further recommendations need to be researched to see the effect of patient characteristics on the incidence of chemotherapy extravasation in cancer patients. The authors also hope that medical personnel will further improve patient safety when giving chemotherapy by proposing the use of a central venous catheter (CVC) or chemo port.

Keywords: Venous location, chemotherapy extravasation, cancer patients

1. INTRODUCTION

Cancer is a disease characterized by uncontrolled cell division and the ability of these cells to attack other biological tissues, either by direct growth in adjoining tissues (invasion) or cell migration to distant places (metastasis) [1]. Cancer is the most feared and worrying disease of all diseases. Patients suffering from cancer will experience a long treatment program, complicated examination procedures, and unpleasant effects of treatment. It takes specific and systemic drugs to kill cancer cells.

There are four general types of cancer management, namely: promotive, preventive, curative, and palliative. There are several ways to treat cancer depending on the type, location of cancer and sensitivity. There are 3 common cancer treatments, namely surgery (by removing the entire tumor and 1 cm of the area around the tumor) radiation/radiotherapy using radiation which can be given alone or in combination with other therapies, the last is chemotherapy, which is cancer treatment by giving substances- substances that can inhibit cancer proliferation [2].

Chemotherapy is a cancer treatment using anti-cancer drugs. These medications are often used as part of multimodality therapy, along with surgery and

radiotherapy. This process takes a long time, depending on the type and nature of the tumor. Chemotherapy is a therapeutic treatment that aims to reduce tumor volume and prevent tumor cells from dividing and spreading. Chemotherapy is designed to kill cancer cells through different phases of the cell cycle. Chemotherapy can be given intravenously, intraarterial, subcutaneously, intramuscularly. Administration of intravenous is mostly done [3]. Extravasation is the leakage of drug or fluid into the subcutaneous tissue from a vein or vascular tissue, especially damage to tissue and skin necrosis. Extravasation irreversibly damages progressive tissue within hours to days. Risk factors that can cause extravasation of chemotherapy drugs through intravenous are fragile blood vessels, small diameter, reduced elasticity, edema of the location of blood vessels, types of chemotherapy drugs, radiation scars. This can cause burns, pain, risk of infection, dysfunction and can cause permanent damage. Extravasation increases patient pain, medical expenses, and can extend the patient's stay in the hospital. The cost of chemotherapy treatment is very expensive. Therefore, giving cytostatic drugs must pay attention to several things such as the types of chemotherapy drugs, the knowledge of nurses in administering chemotherapy, and most importantly the

selection of venous access locations and vein patents [4].

The risk factors that can cause extravasation are the condition of the veins, the location of the veins, the type of drug given, edema, and former radiation areas so that prevention can be done in the future, and extravasation does not occur in cancer patients undergoing chemotherapy. According to Wahidin [4], symptoms of immediate extravasation are burning sensations, changes in the skin to a pink or fiery red. Symptoms of extravasation after a few weeks of skin changes become more pronounced, there is hardening, the feeling of burning increases. Symptoms of extravasation after several weeks of necrotic injury sometimes require surgery, due to enlarged ulcers. Possible permanent damage. Long-term complications resulting from the thickening of the necrotic tissue damage the nerve structures and blood vessels.

The incidence of extravasation via the intravenous line averaged 0.1% to 6%, the incidence via central venous catheter was 0.3% to 4.7% [5]. The incidence of extravasation in adults is estimated to be between 0.1% and 6% [6]. The incidence of extravasation is greater in women (56%) than men (42%), mostly in the 50-64 year age group [7].

According to research by Chusni Mubarak [8] the incidence of extravasation in the chemotherapy ward at the Regional General Hospital Dr. Sardjito Yogyakarta amounted to 12.7 percent. The incidence of extravasation in hospitals is not expected. Because the hospital must be able to provide services that are safe and without complications in accordance with the standards of the Joint Commission International. However, based on the findings, in this case, there are still findings. Extravasation in the hospital is not expected, because it can harm patients both physically, psychologically, and financially, in the form of prolonging hospitalization time. Data obtained from RS X Jakarta, based on the One Day Care chemotherapy patient register from September to November 2018, the number of cancer patients undergoing chemotherapy was 255 patients, (141 chemotherapy patients by intravenous, 100 chemotherapy patients with chemo port, 10 chemotherapy patients using a PICC, and 4 chemotherapy patients with CVC). The monthly average of patients receiving chemotherapy with intravenous is around 47 patients, and the incidence of extravasation in intravenous chemotherapy is reported to be 1% to 7% at X Hospital Jakarta.

Extravasation refers to the accidental installation or leakage of material into the perivascular and subcutaneous spaces during drug administration. The extravasation results in local reactions ranging from irritation to severe tissue necrosis of the skin, blood vessels, and surroundings [9]. Vesic type chemotherapy drugs can cause tissue necrosis. One of the risk factors affecting the incidence of extravasation is the location of the veins at the time of the insertion of the cannula, which can lead to venous inflammation caused by mechanical, chemical, and bacterial irritants. It is characterized by a red and warm area around the intravenous insertion or along the vein, pain, and swelling. To control the incidence of

extravasation of intravenous chemotherapy therapy should be given according to the SOP. Based on the existing phenomena in the field, the researchers were interested in conducting a study entitled "The relationship between venous location and the incidence of chemotherapy extravasation in cancer patients at X Hospital Jakarta.

2. METHODS

The research method used in this research is descriptive analytic. The population is all cancer patients who undergo intravenous chemotherapy in one-day chemotherapy care. The sampling technique used a total sampling of 47 respondents.

Data collection tools in the form of observation sheets and questionnaires. The questionnaire in this study is intended as a guide for observation/observation of infusion and chemotherapy drugs by referring to the hospital's standard operating procedure (SOP). Factor sheet of age, sex, chemotherapy cycle, and venous location, for extravasation incidence variables, used extravasation observation sheet chemotherapy drugs.

Data were taken and collected directly based on the results of direct observation at X Hospital Jakarta for approximately 1 month from December 2018 to January 2019. Data were analyzed using the chi-square test, if there was a p-value <0.05, then Ha was accepted, as well as on the contrary, if the p-value > 0.05, then Ho is rejected.

3. RESULTS

Univariate Analysis:

Characteristics of respondents who were tested in univariate include age, gender, and chemotherapy cycles.

Table 1. Distribution of frequencies by age, Gender and Cycle of Chemotherapy in RS X Jakarta (N = 47)

	Frequency	Percentage (%)
Age		
- 23 - 29 years	4	8.5
- 30 - 35 years	38	80.9
- > 35 Years	5	10.6
Gender		
- Girls	21	44.7
- Man	26	55.3
Chemotherapy Cycle		
- Cycle 1	8	17
- Cycle 2	12	25.5
- Cycle 3	24	51.1
- Cycle 4	3	6.4
Venous Location		
- Metacarpal Veins	24	51.1
- Antebrachial Veins	15	31.9
- Vena cephalic	8	17

Extravasation events		
- Experiencing Extravasation Event	38	80.9
- Did not experience extravasation events	9	19.1
Total	47	100.0

The results of the univariate analysis in this study indicate that in general, 38 respondents were in the 30-35 years age range (80.9%). Most of the respondents were male, namely 55.3% (26 people). Judging from the chemotherapy cycle, most of the respondents underwent the 3rd cycle of chemotherapy, namely 51.1% (24 people). Most of the venous locations of respondents who underwent chemotherapy were in the metacarpal veins, namely 51.1% (24 people). Most of the respondents did not experience extravasation, namely 80.9% (38 respondents).

Bivariate Analysis:

Table 2. The Relationship Between Venous Location and the Incidence of Extravasation of Chemotherapy in Cancer Patients at X Hospital Jakarta (n = 47)

Variable Independent	Extravasation events				Total		P-value
	Yes		No		n	%	
	N	%	N	%			
Venous location : Metacarpal	9	37.5	15	62.5	24	100	0.005
Antebrachial	0	0.0	15	100.0	15	100	
Sefalika	0	0.0	8	100.0	8	100	
Total	9	19.1	38	80.9	47	100	

Table 1 shows that of the 24 respondents whose location of the metacarpal veins mostly did not experience extravasation, 62.5% (15 people), of the 15 respondents whose location the antibrachial veins mostly did not experience extravasation, namely 100% (15 people), and Of the 8 respondents whose venous location in the cephalic region did not experience extravasation, that was 100% (8 people). The results of the Pearson Chi-Square statistical test obtained P-value = 0.005 ($\alpha < 0.05$), it can be concluded that there is a relationship between venous location and the incidence of chemotherapy extravasation in cancer patients at X Hospital Jakarta.

4. DISCUSSION

Characteristics of Age, Gender, Chemotherapy Cycles

Based on the results of this study, it shows that the characteristics of the respondents are generally in the 30-35 years age range, namely 80.9% (38 people), most of whom are male respondents, namely 55.3% (26 people), Most of the respondents underwent the 3rd cycle of chemotherapy, namely 51.1% (24 people). The results of this study are not in line with Marissa's [10] study regarding the description of the incidence of chemotherapy drug extravasation in cancer patients, the data of respondents who did chemotherapy more in the first and second cycles so that the veins found were veins that were still fit for use and were not yet brittle and not hard.

Characteristics of Venous Location

Based on the results of this study, it was shown that most of the venous locations of respondents who underwent chemotherapy were in the metacarpal veins, namely 51.1% (24 people). This is in line with the study according to Boschi & Elena [11] which states that one way to prevent extravasation is to prevent the selection of veins that are in the flexion area and veins in the arm with lymphedema or neurological damage. In this study, there was no correlation between venous location risk factors and incidence.

Characteristics of Extravasation Events

Based on the results of this study, it showed that the incidence of extravasation in respondents who underwent intravenous chemotherapy was 19.1% (9 respondents). This is related to the research of Tulia Gonzales [12], which states that the incidence of extravasation via peripheral intravenous is around 0.1% to 6%, while through the central vein it is around 0.3% to 4.7%. Meanwhile, the factors causing extravasation through intravenous peripheral veins are small, poor vascularization, have a history of diabetes, repeated venous punctures, edema, and radiation scars.

Relationship between Venous Location and the Incidence of Extravasation of Chemotherapy in Cancer Patients.

The results showed that there was a relationship between the location of the veins and the incidence, it was found that most of the 24 respondents who had metacarpal veins did not experience extravasation, namely 62.5% (15 people), of the 15 respondents whose location the antibrachial veins mostly did not experience extravasation. namely 100% (15 people), and of the 8 respondents whose venous location in the cephalic section did not experience extravasation, namely 100% (8 people)

The results of the Pearson Chi-Square statistical test showed that the P-value = 0.005 ($\alpha < 0.05$), it can be concluded that there is a relationship between venous location and the incidence of chemotherapy extravasation in cancer patients at X Hospital Jakarta. This is in line with the research of Tulia Gonzales,

[12], which states that the incidence of extravasation via peripheral intravenous is around 0.1% to 6%, while through the central vein it is around 0.3% to 4.7%. Meanwhile, the factors that cause extravasation through intravenous peripheral veins are small, poor vascularization, have a history of diabetes, repeated venous punctures, edema, and radiation scars.

Based on the research of Chusni Mubarak [8], it was stated that the relationship between risk factors and the incidence of peripheral intravenous chemotherapy drug extravasation was the location of the chemotherapy and the chemotherapy ward. This is in line with the theory put forward by research by Lisa Hartkopf Smith [13], which reveals that extravasation is an indicator of patient safety. Extravasation of chemotherapy via peripheral intravenous can be prevented by administering vesican type drugs through central venous access. When giving vesican type chemotherapy drugs through a peripheral vein, the venous access must be large, such as the location of the vein in the arm. Meanwhile, in another study conducted by Vidal [14], nurses play an important role in the prevention, detection, and management of extravasation. According to Juniati [15], there is a relationship between chemotherapy side effects on patient compliance with chemotherapy. Schulmeister [16], states that nurses must know the progress of extravasation management so that they can provide optimal care.

5. CONCLUSION

This study was conducted to determine the relationship between venous location and the incidence of chemotherapy extravasation in cancer patients at RS X Jakarta. The results of this study indicate that there is a relationship between venous location and the incidence of chemotherapy extravasation in cancer patients at X Hospital Jakarta, most of the metacarpal veins did not experience extravasation, namely 62.5% (15 people), most of the antebrachial venous locations did not experience extravasation, namely 100% (15 people), and the location of the cephalic veins did not experience extravasation, namely 100% (8 people).

Researchers hope that this research can be additional information and as basic data for further research to develop this research by looking at the effect of patient characteristics on the incidence of chemotherapy extravasation in cancer patients. The authors also hope that medical personnel will further improve patient safety when giving chemotherapy by proposing the use of a central venous catheter (CVC) or chemo port.

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