



## **Factors Associated with Extravasation Incident of Cancer Patients with Chemotherapy at RSUP Dr. Mohammad Hoesin Palembang**

**Feri Atmajaya<sup>1\*</sup>, Mat Sakar<sup>1</sup>, Desti Elza Muslimah<sup>1</sup>**

<sup>1</sup>Inpatient Installation of Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia

### **ARTICLE INFO**

#### **Keywords:**

Cancer  
Chemotherapy  
Extravasation

#### **Corresponding author:**

Feri Atmajaya

E-mail address:

[feriatmajaya4@gmail.com](mailto:feriatmajaya4@gmail.com)

All authors have reviewed and approved the final version of the manuscript.

<https://doi.org/10.37275/JRP.v3i2.55>

### **ABSTRACT**

Cancer is currently the second leading cause of death in the world after heart disease. Global number of deaths from cancer in 2020 reached 10 million people. In Indonesia, the number of cancer sufferers has reached more than 369 thousand cases. Cancer treatment consists of various types such as intravenous chemotherapy. However, intravenous chemotherapy can cause complications at the injection spot known as extravasation. The incidence of extravasation at RSUP Dr Mohammad Hoesin Palembang is quite high. In 2019 there were 11 extravasation incidents, in 2020 there were 4 incidents, in 2021 there were 17 incidents and in the period January to October 2022 there were 32 extravasation incidents. This study aimed to determine what factors are associated with the incidence of extravasation in cancer patients with chemotherapy at RSUP Dr. Mohammad Hoesin Palembang. The research design used was a cross sectional purposive sampling technique with a total sample of 78 outpatient chemotherapy (One Day Care). Data analysis was carried out using the Chi Square test (X<sup>2</sup>). Statistical test results showed that gender, age and type of medicine was not related to the incidence of extravasation, while the vein's spot where the IV catheter inserted was significantly associated with the incidence of extravasation with a p value 0.043. It can be concluded that the incidence of extravasation is related to the vein spot where the intravenous catheter is inserted.

### **1. Introduction**

Cancer currently contributes to the second most common cause of death in the world after heart disease. According to the International Agency for Research on Cancer (IARC), amount of global death from cancer in 2020 had reached 10 million people, while in 2018 there were 9.6 million people. Based on data from the Global Burden of Cancer Study (Globocan) from WHO in 2020 cancer sufferers in Indonesia reached more than 369 thousand cases with the highest number of cases being breast cancer (16.6%), cervical cancer (9.2%), lung cancer (8.8%), liver cancer (5.4%) and nasopharyngeal cancer (5%) (Indonesian Ministry of Health, 2022). Cancer

treatment consists of various types such as surgery, radiotherapy, biotherapy, immunotherapy, hormonal therapy, and chemotherapy. Chemotherapy is a cancer treatment using cytotoxic drugs to slow or destroy the growth of cancer cells. Chemotherapy treatment is systemic because it can reach cells that have spread to other parts of the body. Chemotherapy can be given orally, topically, and most commonly intravenously (Liu et.al., 2015). Giving chemotherapy intravenously can cause complications at the injection area like swell, pain, and burn which is known as extravasation.

Extravasation is a complication that occurs due to the effect of chemotherapy drugs, that is the leak of

drugs or cytostatic fluid into the subcutaneous system from veins or vascular, especially causing damage system and skin necrosis. Common symptoms and signs of extravasation include pain, a sting or burn sensation, and swell around the intravenous injection spot. In more severe cases, extravasation can cause permanent dysfunction of the tissue (Parade and Pradjoko, 2019).

Dr. Mohammad Hoesin Hospital Palembang is a national reference hospital for the Southern Sumatra region which covers four provinces, those are South Sumatra, Jambi, Bangka Belitung, and Bengkulu. The number of cancer patients who have chemotherapy at Dr. Mohammad Hoesin Hospital Palembang is increasing day by day. In 2018 the number of chemotherapy patients was 14,298 patients, in 2019 there were 15,452 patients, in 2020 there were 12,938 patients, in 2021 there were 14,636 patients, and from January to October 2022 there were 13,372 patients.

The large number of cancer patients who have chemotherapy is in line with the high incidence of extravasation. In 2019, extravasation occurred were 11 incidents, in 2020 there were 4 incidents, in 2021 there were 17 incidents and from January to October 2022 there were 32 extravasation incidents. The incidence of extravasation is caused by various factors like patient factors, procedural factors, and factors related to the products used in chemotherapy (Kim et.al., 2020).

## 2. Methods

This research design is descriptive with a cross-sectional method. The total population that filled up the inclusion criteria was 349 patients determined by the researchers, that is One Day Care (ODC) chemotherapy patients who only received one type of cytostatic drug and patients who received

intravenous chemotherapy. The sample was selected using a purposive sampling technique and the number of samples was determined using the Slovin formula with a margin of error of 10% to obtain a sample of 78 people. Data collection in this study was carried out in Rambang Room 1 (Chemotherapy) RSUP Dr. Mohammad Hoesin Palembang. The data used was secondary data obtained from extravasation incident reports at RSUP Dr. Mohammad Hoesin Palembang. The univariate analysis in this research was the frequency distribution and the bivariate analysis used was the Chi-Square statistical test ( $X^2$ ).

## 3. Results

Based on the table 1 below, most of the cancer patients' chemotherapy at Dr. Mohammad Hoesin Hospital Palembang is female, which is 69.2% and male 30.8%. Mostly, chemotherapy patients were in the 46–65-year age group with a percentage of 32.1%. The vesicant drug is a cytostatic drug mostly used which is 62.8%.

The metacarpal is the location of vein that is most commonly used as an inserted spot for IV catheters in chemotherapy patients, which is 39.7%. From 78 research subjects, 92.3% of patients did not experience extravasation. However, there were 6 patients (7.7%) who had extravasation.

Based on the table below, it is known that there is no significant relationship between gender, age, the type of cytostatic drugs used by patients in chemotherapy, and the incidence of extravasation ( $p$ -value greater than  $\alpha$  0.05). Based on the results of this study, the only factor that was significantly related to the incidence of extravasation was the inserted spot of vein IV catheter with a  $p$ -value of 0.043 is smaller than  $\alpha$  0.05.

Table 1. Patient's characteristics based on gender, age, type of medicine, inserted spot of IV catheter, and whether extravasation occurred or not.

Characteristics	Frequency	Total (%)
Gender		
Male	24	30,8
Female	54	69,2
Total	78	100,0
Age (Years)		
0-5	11	14,1
6-11	11	14,1
12-25	10	12,8
26-45	21	26,9
46-65	25	32,1
>65	0	0
Total	78	100,0
Type of medicine		
Vesicant	49	62,8
Irritant	29	37,2
Total	78	100,0
Vein's spot		
Metacarpal	31	39,7
Basilica	7	9,0
Cephalica	17	21,8
Mediana antebrachialis	9	11,5
Other veins	14	17,9
Total	78	100
Extravasation incident		
Occur	6	7,7
Not occur	72	92,3
Total	78	100

Table 2. Relation between gender, age, type of medication, and inserted spot of IV catheter with extravasation incident.

Characteristics	Extravasation incident				Total		p-value
	Occur		Not occur		n	%	
	n	%	n	%			
<b>Gender</b>							
Male	2	2,56	22	28,21	24	30,8	<b>0,887</b>
Female	4	5,13	50	64,10	54	69,2	
Total	6	7,69	72	92,31	78	100	
<b>Age (Year)</b>							
0-5	1	1,28	10	12,82	11	14,10	<b>0,616</b>
6-11	1	1,28	10	12,82	11	14,10	
12-25	0	0	10	12,82	10	12,82	
26-45	3	3,85	18	23,08	21	26,93	
46-65	1	1,28	24	30,77	25	32,05	
>65	0	0	0	0	0	0	
Total	6	7,69	72	92,31	78	100	
<b>Type of medicine</b>							
Vesicant	4	5,13	45	57,69	49	62,82	<b>0,839</b>
Irritant	2	2,56	27	34,62	29	37,18	
Total	6	7,69	72	92,31	78	100	
<b>Vein's spot</b>							
Metacarpal	6	7,69	25	32,05	31	39,74	<b>0,043</b>
Basilica	0	0	7	8,97	7	8,97	
Cephalica	0	0	17	21,8	17	21,8	
Mediana antebrachialis	0	0	9	11,54	9	11,54	
Other veins	0	0	14	17,95	14	17,95	
Total	6	7,69	72	92,31	78	100	

#### 4. Discussion

The characteristics of chemotherapy patients studied in this study included gender, age, type of medicine, spot of the vein, and whether extravasation occurred or not. The research results showed that 69.2% of chemotherapy patients were female. These results are in line with the data reported by The World Health Organization (WHO) in 2021 stated that more cancer sufferers in Indonesia are women than men. The results of this study are also in line with the results of research conducted by Sharfina & Indriawati (2021) found that more women get cancer than men. This is because gynecological cancer, especially breast cancer and cervical cancer, is currently still the highest number of sufferers in Indonesia and even the world based on the report from the Indonesian Ministry of Health in 2022 and this type of cancer only occurs in women.

The patients of chemotherapy from the results of this study showed that 32.1% was dominated in 46-65 years old. Cancer usually occurs in elderly people. Aged people are the most important risk factor for all types of cancer and continue to increase age by age (American Cancer Society, 2019).

Vesicant is a type of medicine that is mostly used in chemotherapy patients who are the subjects of this research, namely vincristine and cisplatin. These 2 vesicant drugs, are mostly used in chemotherapy patients who were the subjects of this study, which were breast cancer patients and pediatric patients with leukemia. The results of this research are in line with the data of Lufritayanti et.al. (2016) that vincristine is the drug most widely used in children with leukemia who have had chemotherapy. Cisplatin is a chemotherapy drug that is most often used as cancer therapy because it is proven to provide a better prognosis and decrease the mortality number.

The vein's spot most commonly used as an access to deliver the chemotherapy and in our study the metacarpal vein is usually utilized. This is because the location of the metacarpal vein is more superficial

so it is easier to reach. It is also the main choice for inserting an intravenous catheter. Extravasation incidents from our data are 7.7%. This result is higher than the average incidence of extravasation in the world stated by Kim et.al. (2020), which ranges from 0.01% to 6%.

Our data showed that gender is not related to the incidence of extravasation. This is in line with the result of the research conducted by Purnaningsih et.al. (2020) which states that gender is not related to extravasation. The subjects in this study were adult patients and mostly were female. These results are also strengthened by other research conducted by Marleni et.al., (2018) which examined the relationship between gender and the incidence of extravasation in children and also found that gender was not related to the incidence of extravasation.

Based on the result of this study, there is no relationship between age and the incidence of extravasation. This result is in line with Marleni et.al., (2018) who also obtained similar results. Different from the result of the study obtained by Purnaningsih et.al. (2020) which states that age is significantly related to the incidence of extravasation. However, these differences could occur due to variations in the characteristics of the research subjects. This research was conducted at all ages so that the ages of the research subjects were more diverse, while Purnaningsih et.al. (2020) have used homogeneous research subjects, those are patients over 18 years old only.

Our data also showed that there was no relationship between the type of medicine and the incidence of extravasation at RSUP Dr. Mohammad Hoesin Palembang. The result of this study is different from the results study conducted by Purnaningsih et.al. (2020) in the type of drug, which is significantly related to the incidence of extravasation. Vesicant chemotherapy drugs have 1.117 times more potential than irritant drugs to cause extravasation. The result of this research is

also different from the results study of Banjarnahor's (2018). This difference occurs due to differences in the type of chemotherapy drug given. The research subjects of Banjarnahor (2018) were patients who received only vesicant chemotherapy drugs, whereas this study examined all types of drugs, both vesicants and irritants.

From the result of this study, it is known that the spot of the vein where the intravenous catheter is inserted is closely related significantly to the incidence of extravasation. It is in line with the result of a study conducted by Purnaningsih et.al. (2020) that small and thin veins increase the risk of extravasation. Most of the time, the spot of the vein where the intravenous catheter was inserted in this study was the metacarpal vein which is located at the end of the extremity and is smaller than other veins.

## 5. Conclusion

The majority Characteristics of chemotherapy patients at RSUP Dr. Mohammad Hoesin Palembang are female (69.2%), aged 46-65 years (32.1%), received vesicants drug (62.8%), had an intravenous catheter inserted in the metacarpal vein (39.7%) and mostly did not occur extravasation incident (92.3%). Gender, age, and type of medicine were not related to the incidence of extravasation. The location of the vein where the intravenous catheter is inserted significantly related to the incidence of extravasation with a p-value 0.043.

## 6. References

1. American Cancer Society. 2019. Cancer Facts & Figures 2019. American Cancer Society Journal, p. 76, 2019.
2. Banjarnahor, S. 2018. Hubungan Pemberian Obat Kemoterapi (Vesikan) Dengan Kejadian Ekstravasasi Pada Pasien Kanker. *Journal of Midwifery and Nursing* 1(3):1-11.
3. Kementerian Kesehatan Republik Indonesia.

2022. *Buku Panduan Pelaksanaan Hari Kanker Sedunia 2022*. Jakarta : Kemenkes RI
4. Kim, Jung Tae et al. 2020. Guidelines for the Management of Extravasation. *Journal of Educational Evaluation for Health Professions* 17:1-6. doi: 10.3352/JEEHP.2020.17.21.
5. Liu, H., Lv, L. and Yang, K., 2015. Chemotherapy Targeting Cancer Stem Cells. *American Journal of Cancer Research*, 5(3), p.880.
6. Lufritayanti, A., Fadraersada, J., Masruhim, M.A. 2016. *Pola Pengobatan Pasien Leukemia Limfoblastik Akut di RSUD Abdul Wahab Sjahranie Samarinda*. Samarinda: Universitas Mulawarman.
7. Marleni, L., Novayelinda, R., Dewi, A.P. 2018. Faktor-Faktor yang Mempengaruhi Kejadian Ekstravasasi Infus pada Anak. Pekanbaru: Universitas Riau.
8. Parade, N. N. J., & Pradjoko, I. 2019. Manajemen Ekstravasasi Kemoterapi: Ekstravasasi Chemotherapy Management. *Jurnal Respirasi*, 5(1), 15-21.
9. Purnaningsih, Enggar et al. 2020. Hubungan Kepatuhan Penggunaan "Form Ayo Cegah Ekstravasasi" dengan Kejadian Ekstravasasi di RSUP Dr. Kariadi Semarang. *Jurnal Keperawatan Widya Gantari Indonesia* Vol.4 No.1
10. Sharfina, N.A., Indriawati, R. 2021. Hubungan Usia dan Jenis Kelamin dengan Kejadian Kanker di RS PKU Muhammadiyah Yogyakarta. *Journal of Innovation and Knowledge* Vol. 1 No.2
11. World Health Organization (WHO). 2021. Diakses pada 15 Desember 2022 dari <https://gco.iarc.fr/today/data/factsheets/populations/360-indonesia-fact-sheets.pdf>