

# Side Effects of Drugs in Patients with Nasopharyngeal Carcinoma Receiving Neoadjuvant Chemotherapy

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Research Article

## Side Effects of Drugs in Patients with Nasopharyngeal Carcinoma Receiving Neoadjuvant Chemotherapy

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### ABSTRACT

**Background:** Nasopharyngeal carcinoma (NPC) therapy includes radiation, chemotherapy, or a combination of both. The purpose of this study was to determine the incidence of drug side effects in NPC patients receiving neoadjuvant chemotherapy.

**Methods:** This was a retrospective descriptive study using secondary data in the form of medical records at Dr. Soetomo Hospital, Surabaya, from January 1 to December 31, 2018.

**Results:** Comparison of the number of patients with the incidence of side effects of chemotherapy drugs was 1:3.8. Anemia was the most side effect of chemotherapy drugs with 85 cases (24.85%), followed by hypocalcemia with 78 cases (22.81%), and hyponatremia with 60 cases (17.54%). Leukopenia was the rarest type of side effect of chemotherapy drugs, with only one in 342 cases (0.29%). Based on the degree, it was found that the most side effects of chemotherapy drugs were first degree with 253 cases (73.98%), followed by second degree with 78 cases (22.81%), third degree with 9 cases (2.63%), and degree IV with 2 cases (0.58%). There were no side effects of grade V drugs in the samples.

**Conclusion:** The incidence of side effects of neoadjuvant chemotherapy drugs was 77.24% with the most side effects of anemia.

**Keywords:** nasopharyngeal carcinoma, drug side effects, chemotherapy

### INTRODUCTION

Nasopharyngeal carcinoma (NPC) is a form of head and neck malignancy often found. Nasopharyngeal carcinoma originates from the mucosal epithelium or nasopharyngeal lymphoepithelial tissue and has rapid tumor growth mostly located in the Rosenmuller fossa [1, 2]. NPC is a disease with poor prognosis because of the position of tumor close to the base of the skull and vital structures [3]. Nasopharyngeal carcinoma ranks third as the most common type of malignancy in men in Indonesia [4]. The prevalence of NPC in Indonesia is 6.2 per 100,000 or around 12 000 new cases per year [1].

The main treatments for NPC include radiation and chemotherapy [5]. Chemotherapy is the use of cytostatic drugs to inhibit or even kill cancer cells. Chemotherapy, as a combination therapy, can be given before (neoadjuvant), after (adjuvant) or in conjunction with radiotherapy (concurrent). The study also revealed that there was a significant decrease in detectable viral load in the plasma of NPC patients after therapy [6]. Chemotherapy often causes various side effects. Drug side effects of chemotherapy can occur in any organ system. According to WHO, drug side effects are any adverse or unexpected responses

to drugs, occurring at doses used in humans for prophylactic, diagnosis or therapeutic purposes [7]. According to the Common Terminology Criteria for Adverse Events (CTCAE) version 5.0, the severity of drug side effects chemotherapy is categorized into degree I to degree V. Degree I is mild, and degree V is death [8]. This study aimed to determine the incidence of drug side effects in NPC patients who received neoadjuvant chemotherapy at the Inpatient Ward of Dr. Soetomo Hospital, Surabaya, from January 1 to December 31, 2018.

### METHODS

A retrospective descriptive study used secondary data in the form of medical records. The population was the medical record of NPC sufferers who received neoadjuvant chemotherapy at the Inpatient Ward, Department of Otorhinolaryngology-Head and Neck Surgery, Dr. Soetomo Hospital, Surabaya, Indonesia, from January 1 to December 31, 2018. The sample was a medical record that met the inclusion and exclusion criteria. Inclusion criteria included patients with NPC who underwent the first to the third neoadjuvant chemotherapy cycle and had complete laboratory results after undergoing chemotherapy and a complete medical record.

Exclusion criteria were NPC sufferers who had received radiotherapy before and/or during three cycles of chemotherapy. The data recorded included basic data in the form of age, sex, comorbid factors, histopathological types based on World Health Organization (WHO) criteria, staging based on the classification of the 8th American Joint Committee on Cancer (AJCC) and chemotherapy regimens. Laboratory data recorded were laboratory results of patients two weeks after undergoing chemotherapy in the form of hemoglobin, leukocytes, neutrophils, platelets, serum creatinine, albumin, serum glutamic pyruvic transaminase (SGPT), serum electrolytes (sodium, potassium, chloride), and calcium. Other data recorded were the time of appearance, type and degree of side effects of chemotherapy drugs categorized according to the severity criteria of CTCAE.

## RESULTS

From January 1 to December 31, 2018, 167 patients were found to undergo three-cycle neoadjuvant chemotherapy. Table 1 shows the characteristics of the subjects in this study. A total of 129 patients (77.24%) of them experienced side effects of chemotherapy drugs, consisting of 97 men (75.19%) and 32 women (24.81%). The ratio of men to women is 3: 1. The mean age of the patients was 46.6 years. The youngest age of an NPC patient was 15 years, while the oldest was 75 years old. The largest age group was the age ranging from 41 to 50 years, 42 patients (32.56%). Most comorbid diseases were hypertension with 11 patients (8.53%), followed by hepatitis B and type 2 diabetes mellitus in 10 patients (7.75%). NPC patients with WHO type 3 histopathology experienced the most side effects of chemotherapy drugs, with 124 patients (96.12%). NPC patients with stage IVA were the group that experienced the most side effects of chemotherapy drugs, which was 79 patients (61.24%).

**Table 1: Characteristics of the subjects**

Characteristics	Total	Percentage (%)
Age (years)		
10 – 19	3	2.33
20 – 29	9	6.98
30 – 39	20	15.50
40 – 49	42	32.56
50 – 59	39	30.23
60 – 69	12	9.30
70 – 79	4	3.10
Comorbid factors		
Hypertension	11	8.53
Hepatitis B	10	7.75
Diabetes mellitus	10	7.75
Hypercholesterolemia	5	3.88
Hepatitis C	1	0.78
No comorbid disease	92	71.32
Type		
WHO type 1	2	1.55
WHO type 2	3	2.33
WHO type 3	124	96.12
Stage		
I	0	0.00
II	12	9.30
III	31	24.03
IVA	79	61.24
IVB	7	5.43
Total	129	100.00

Table 2 shows the characteristics of chemotherapy in the subject. NPC patients who received cisplatin and paclitaxel regimens were

the group experiencing the most side effects of chemotherapy drugs, with 79 patients (61.24%). Side effects of chemotherapy drugs begin to

appear in the first cycle of chemotherapy. A total effects in the first cycle of chemotherapy. of 117 patients (90.70%) experienced drug side

**Table 2: Characteristics of chemotherapy in the subjects**

Variables	Total	Percentage (%)
Regimen type		
Cisplatin - Paclitaxel	79	61.24
Carboplatin - Paclitaxel-	39	30.23
Cisplatin - 5FU	10	7.75
Carboplatin - 5FU	1	0.78
Chemotherapy cycle		
I	117	90.70
II	5	3.88
III	7	5.42
Total	129	100.00

Table 3 displays data on the distribution of types and severity of side effects of chemotherapy drugs. Comparison of the number of patients with the incidence of side effects of chemotherapy drugs was 1:3.8. Based on the type, it was found that anemia was the most side effect of chemotherapy drugs with 85 cases (24.85%), followed by hypocalcemia with 78 cases (22.81%), and hyponatremia with 60 cases (17.54%). Leukopenia was the rarest type of chemotherapy side effect, with only one out of 342 cases (0.29%).

Based on the degree, it was found that the most side effects of chemotherapy drugs were first degree with 253 cases (73.98%), followed by second degree with 78 cases (22.81%), third degree with 9 cases (2.63%), and degree IV with 2 cases (0.58%). There were no side effects of grade V drugs in the sample (Table 3). The most severe side effect of chemotherapy drugs was grade IV, experienced by two female patients in the age group of 31-45 years.

**Table 3: Distribution of types and severity of side effects of chemotherapy drugs**

Type of drug side effect	Degree of drug side effect										Total (N)	Total (%)
	I		II		III		IV		V			
	N	%	N	%	N	%	N	%	N	%		
Anemia	73	21.35	12	3.51	0	0.00	0	0.00	0	0.00	85	24.85
Hypocalcemia	52	15.20	25	7.31	1	0.29	0	0.00	0	0.00	78	22.81
Hyponatremia	41	11.99	15	4.39	4	1.17	0	0.00	0	0.00	60	17.54
Hypokalemia	30	8.77	4	1.17	0	0.00	1	0.29	0	0.00	35	10.23
Hypoalbuminemia	31	9.06	3	0.88	0	0.00	0	0.00	0	0.00	34	9.94
Hyperkalemia	5	1.46	11	3.22	1	0.29	0	0.00	0	0.00	17	4.97
Decreased SK	6	1.75	2	0.58	0	0.00	0	0.00	0	0.00	8	2.34
Hypercalcemia	7	2.05	0	0.00	0	0.00	0	0.00	0	0.00	7	2.05
Neutropenia	0	0.00	4	1.17	1	0.29	1	0.29	0	0.00	6	1.75
Thrombocytopenia	3	0.88	1	0.29	1	0.29	0	0.00	0	0.00	5	1.46
Hypernatremia	4	1.17	0	0.00	0	0.00	0	0.00	0	0.00	4	1.17
SGPT increase	1	0.29	1	0.29	0	0.00	0	0.00	0	0.00	2	0.58
Leukopenia	0	0.00	0	0.00	1	0.29	0	0.00	0	0.00	1	0.29
Total	253	73.98	78	22.81	9	2.63	2	0.58	0	0	342	100.00

**DISCUSSION**

Side effects of chemotherapy are quite common. Until now, there have never been any studies that evaluate the incidence of drug side effects in NPC patients undergoing chemotherapy at Dr.

Soetomo Hospital, Surabaya. The incidence of chemotherapy drug side effects in this study was quite high. A total of 129 of 167 NPC patients undergoing three-cycle neoadjuvant chemotherapy experienced drug side effects. The

results of this study are the same as previous studies reporting the incidence of side effects of chemotherapy drugs by 71.5% [9]. The high incidence is caused by the very toxic nature of chemotherapy drugs and having a narrow therapeutic window, causing more side effects than other classes of drugs. [7].

In this study, male patients experienced more side effects of chemotherapy drugs than women, with a ratio of 3: 1. The results of this study are consistent with other studies reporting that male patients experienced more side effects of chemotherapy drugs than women [10, 11]. The NPC incidence rate in males is also higher at 1.7 per 100,000 cases, while in females it is 0.7 per 100,000 cases. [12]. However, other studies reported that female patients more often experience the side effects of chemotherapy drugs due to changes in the pharmacokinetics of chemotherapy drugs caused by the influence of hormones at puberty, menstruation or pregnancy [9, 13].

The major age groups in this study were found in the age range of 40-49 years and 50-59 years. Several other studies reported the incidence of high-risk NPC populations in the age group 40-49 years and 50-59 years [1, 14, 15]. This is also consistent with the previous study with the 41-60 year age group experiencing the most side effects of chemotherapy drugs (37.5%) [16]. The high incidence of side effects of chemotherapy drugs in the group of elderly patients can be caused by a decrease in the body's metabolic capacity and kidney excretion function as well as pharmacokinetic and pharmacodynamics changes in drugs circulating in the body, causing accumulation of chemotherapy drugs in the body, and ultimately triggering the emergence of drug side effects [9, 17].

The most comorbid disease in this study was hypertension. This is consistent with the previous report stating that hypertension is the most common comorbid disease for patients with malignant cases (37%) [18]. Hypertension is a complication often found in patients receiving cisplatin-based chemotherapy regimens [19]. Hypertension can be suffered before or after undergoing a chemotherapy cycle. The administration of chemotherapy can cause side effects of hypertension drugs, and most are caused by the group of alkylating agents (36-39%), angiogenesis inhibitors (17-80%), and immunosuppressants given after stem cell transplantation (30-80%) [18]. This class of drugs causes reduced bioavailability of nitric oxide and increased production of endothelin in blood vessels and kidneys, causing endothelial dysfunction, increased vascular tone, decreased

microvessels density, thrombotic microangiopathy and ultimately causes changes in glomerular structure, proteinuria, and hypertension [18, 19]. The side effects of chemotherapy drugs are most experienced by NPC patients with the cisplatin-paclitaxel regimen. This is similar to other studies [17, 20]. The cisplatin-paclitaxel regimen is recommended as one of the inductions of chemotherapy regimens for NPC. One of the side effects of platinum is nephrotoxic. Cisplatin causes lesions in the proximal tubules of the kidneys that interfere with sodium and water reabsorption. In the acute phase, there are changes in renal morphology in the form of cellular necrosis, epithelial layer depletion, hydropic degeneration, and vasa recta congestion. In the chronic phase, there is cellular atrophy, atypical nuclei, and interstitial inflammation. Some of the damage will cause Na<sup>+</sup>/K<sup>+</sup>-ATPase inhibition and lead to electrolyte imbalance. Cisplatin and carboplatin are also toxic to hemoglobin, leukocytes and platelets. Anemia is found in 9-40% of patients, while thrombocytopenia is found in 2 - 50% of patients. Leukopenia occurs in 0-50% of patients and causes a leukocyte count of less than  $1.5 \times 10^9/L$  in 5% of patients [21]. Side effects of taxanes occur because of myelosuppression. Paclitaxel often causes side effects in the form of neutropenia, hypersensitivity reactions, and peripheral neuropathy [22]. The high side effects of chemotherapy drugs in NPC patients receiving the cisplatin-paclitaxel regimen may also be caused by the large number of samples in this group.

The results of this study indicated that the incidence of drug side effects in the first cycle of chemotherapy was 90.70%. These results are consistent with a recent study reporting that 80% of patients experienced side effects of chemotherapy drugs in less than two weeks after the first chemotherapy [16]. The regimen obtained by the patient can cause the high appearance of the side effects of chemotherapy drugs in the first cycle. Cisplatin-paclitaxel was used by 61.2% of patients in this study. Nephrotoxic effects of cisplatin in the form of lesions in the proximal renal tubules can appear within 30 minutes of administration of the drug, and disruption of tubular reabsorption appears within two to three days afterwards [21]. The myelosuppression effect of cisplatin in the form of anemia arises since the administration of the first cycle of chemotherapy, and the value of hemoglobin decreases with the administration of the next cycle of chemotherapy [23]. Cisplatin also causes leukopenia which appears within 6 to 26 days after the first administration [21].



Paclitaxel can cause the number of leukocytes to decrease on the fifth to seventh day after administration, reach the lowest number before the 14th day, and begin to recover on the 21st day [22].

Anemia was the most common side effect of chemotherapy drugs in this study. In this study, the highest degree of anemia was grade I with 73 patients (21.35%). These results are in accordance with previous studies [7, 24]. Anemia is often found in cancer patients; its prevalence reaches 30-90% [25]. In cases of malignancy, anemia is caused by many factors. Cancer cells can infiltrate the bone marrow and directly suppress hematopoiesis. Cancer cells can also produce several cytokines resulting in the sequestration of Fe, and lead to decreased production and lifespan of red blood cells. Myelosuppression chemotherapy drugs cause post-chemotherapy anemia. Chemotherapy drugs directly interfere with the synthesis of red blood cells in the bone marrow. Also, platinum group chemotherapy drugs are nephrotoxic and cause anemia through decreased erythropoietin production in the kidneys [25].

The incidence of side effects of first-degree chemotherapy drugs in this study was 73.98%. This is consistent with recent studies reporting that most of the side effects of chemotherapy drugs that appeared were grade I (57.8%) [24]. The toxicity of some chemotherapy regimens is cumulative. The more patients get chemotherapy, the more severe the side effects. European Cancer Anemia Survey reported that the incidence of anemia increased from 19.5% in the first chemotherapy cycle to 46.7% in the fifth chemotherapy. The severity of anemia is also increasing, becoming degree II or III along with the increasing number of chemotherapy cycles [25]. The side effects of the taxanes group, especially the docetaxel, are also accumulative. The incidence and severity of side effects of drugs in the form of fluid retention are increasing at cumulative doses of more than 400mg/m<sup>2</sup> [22]. In this study, most patients experienced drug side effects during the first cycle of chemotherapy. In the initial cycle, the effects of the accumulation of chemotherapy drugs have not been obtained. Thus, most of the side effects of drugs that appear are mild.

#### CONCLUSION

The incidence of side effects of neoadjuvant chemotherapy drugs in Dr. Soetomo Hospital Surabaya was 77.24%. Most side effects of the drug were found in men aged 40-49 years, with comorbid of hypertension, WHO type 3 histopathology and stage IVA. Side effects of

chemotherapy drugs appeared in the first cycle. The regimen most often causing side effects of chemotherapy was cisplatin-paclitaxel. Anemia was a type of drug side effects mostly occurred, and the first degree was the degree of drug side effects with the highest number. The results of this study are expected to be material for monitoring and evaluating treatment in NPC patients undergoing chemotherapy at Dr. Soetomo Hospital, Surabaya.

#### REFERENCES

1. Adham M, Kurniawan AN, Muhtadi AI et al., Nasopharyngeal carcinoma in Indonesia: epidemiology, incidence, signs, and symptoms at presentation., Chinese journal of cancer, 2012; 31(4):185-196.
2. Romdhoni AC, Herawati S, Mustikaningtyas E, Correlation Between Intracellular Heat Shock Protein 70 Expression And Cervical Lymph Nodes Enlargement In Nasopharyngeal Carcinoma, Folia Medica Indonesiana, 2016; 52(1):24-34.
3. Farhat, Asnir RA, Yudhistira A et al., Evaluation of matrix metalloproteinase-9 expressions in nasopharyngeal carcinoma patients, IOP Conference Series: Earth and Environmental Science, Institute of Physics Publishing, 2018. doi:10.1088/1755-1315/125/1/012130.
4. Sudiono J, Hassan I, Epstein-Barr virus (EBV) DNA as biomaker of nasopharyngeal carcinoma diagnosis, Dental Journal (Majalah Kedokteran Gigi), 2013; 46(3):140-147.
5. Savitri E, Maharis I, Kadir A et al., The expression of mir-21 and mir-29c in blood plasma of nasopharyngeal carcinoma patient post-chemoradiotherapy, Indian Journal of Public Health Research and Development, 2019; 10(10):1523-1529.
6. Savitri E, Haryana MS, Expression of interleukin-8, interleukin-10 and Epstein-Barr viral-load as prognostic indicator in nasopharyngeal carcinoma, Global journal of health science, 2015; 7(3):364-372.
7. Behera SK, Kishtapati CR, Gunaseelan V et al., Chemotherapy Induced Adverse Drug Reactions in Cancer Patients in a Tertiary Care Hospital in South India, Journal of Young Pharmacists, 2017; 9(1):118-121.
8. National Cancer Institute, Common Terminology Criteria for Adverse Events (CTCAE) version 5.0, Cancer Therapy Evaluation Program (CTEP), 2017:183.
9. Belachew SA, Erku DA, Mekuria AB, Gebresilassie BM, Pattern of chemotherapy-related adverse effects among adult cancer patients treated at Gondar university referral

- hospital, Ethiopia: A cross-sectional study, *Drug, Healthcare and Patient Safety*, 2016; 8:83–90.
10. Wahlang JB, Laishram PD, Brahma DK et al., Adverse drug reactions due to cancer chemotherapy in a tertiary care teaching hospital, *Therapeutic Advances in Drug Safety*, 2017; 8(2):61–66.
  11. S. Mallik SP, Ojha P, Mishra P, Pattern of adverse drug reactions due to cancer chemotherapy in tertiary care teaching hospital in Bangladesh, *Dhaka University Journal of Pharmaceutical Sciences*, 2007; 8(1):11–16.
  12. Salehiniya H, Mohammadian M, Mohammadian-Hafshejani A, Mahdaviifar N, Nasopharyngeal Cancer In The World: Epidemiology, Incidence, Mortality And Risk Factors, *Biomedical Research and Therapy*, 2018; 5(7):2504–2517.
  13. Mugada V, Samidala NR, Chemotherapy Induced Adverse Drug Reactions In Cancer Patients, *International Journal of Pharma Research*, 2017; 8(2):71–76.
  14. Farhat F, Daulay ER, Chrestella J et al., Correlation of P38 mitogen-activated protein kinase expression to clinical stage in nasopharyngeal carcinoma, *Open Access Macedonian Journal of Medical Sciences*, 2018; 6(11):1982–1985.
  15. Chrestella J, Farhat F, Daulay ER et al., Cyclooxygenase-2 expression and its correlation with primary tumor size and lymph node involvement in nasopharyngeal carcinoma, *Open Access Macedonian Journal of Medical Sciences*, 2018; 6(11):2001–2005.
  16. Mushi TL, Mbise RL, Prevalence and Pattern of Early Adverse Reactions in Cancer Patients Receiving Chemotherapy at Ocean Road Cancer Institute, 2019:15037–15040.
  17. Sharma PK, Misra A, Gupta A, Singh S, of Adverse Drug Reactions To Oncology Center of Clinical Excellence, 2018; (April 2019):2017–2019.
  18. Mouhayar E, Abdulla S, Hypertension in Cancer Patients, Texas: 2011. doi:10.1016/j.cmonc.2012.09.013.
  19. Cameron AC, Touyz RM, Lang NN, Vascular Complications of Cancer Chemotherapy, *Canadian Journal of Cardiology*, 2016; 32(7):852–862.
  20. Aggarwal M, Chawla S, Singh K, Rana P, Evaluation of Anticancer Drug Utilization and Monitoring of Adverse Drug Reaction in the Indoor Patients Receiving Cancer Chemotherapy in a Tertiary Care Hospital in New Delhi, *Journal of Basic and Clinical Pharmacy*, 2018; 9(2):118–124.
  21. McKeage MJ, Comparative Adverse Effect Profiles of Platinum Drugs, *Drug Safety*, 1995; 13(4):228–244.
  22. Rowinsky E, The Taxanes, *Holland-Frei Cancer Medicine*, 2003:1–16.
  23. Kurnianda J, Wiyadi N, Wulaningsih W, Risk factors of anemia in head and neck cancer patients undergoing chemotherapy with high-dose cisplatin, *Medical Journal of Indonesia*, 2008; 17(4):248–254.
  24. Xu H, Xu L, Page JH et al., Incidence of anemia in patients diagnosed with solid tumors receiving chemotherapy, 2010-2013, *Clinical Epidemiology*, 2016; 8:61–71.
  25. Rodgers IIGM, S BP, M B et al., Cancer - and chemotherapy- induced anemia: Clinical practice guidelines in oncology., *Journal of the National Comprehensive Cancer Network*, 2012; 10(5):628–653.

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