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AN OVERVIEW OF CHEMOTHERAPY SIDE EFFECTS ON PATIENTS WITH PROSTATE CANCER, BLADDER CANCER, AND TESTICULAR CANCER AT HAJI ADAM MALIK GENERAL HOSPITAL MEDAN FROM 2020-2022

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ABSTRACT

Background: Every year, male urological cancer occupies the highest incidence rate of cancer. However, it is not the leading cause of death. Chemotherapy is one of the treatment options, but it always comes with side effects that vary from each patient. **Objective:** To identify the most and least chemotherapy side effects on prostate, bladder, and testicular cancer patients. **Methods:** The method used is descriptive quantitative with a total sampling technique. The study population was 35 patients with prostate, bladder, and testicular cancer undergone chemotherapy at Haji Adam Malik General Hospital Medan in 2020-2022. **Results:** From frequency distribution calculations, sequence of chemotherapy side effects on prostate cancer were hair loss (94.1%), fatigue (88.2%), decreased appetite (76.5%), nausea and vomiting (70,6%), constipation (58.8%), muscle pain (47.1%), diarrhea (47.1%), weight loss (41.2%), skin rash (35.5%), painful urination (35.3%), headache (23.5%), mouth ulcer (23.5%), and heartburn (17.6%). Bladder cancer namely, fatigue (100%), decreased appetite (87.5%), nausea and vomiting (87.5%), painful urination (62.5%), muscle pain (62.5%), hair loss (50%), weight loss (50%), diarrhea (50%), constipation (50%), headache (37.5%), mouth ulcer (25%), heartburn (25%), and skin rash (12.5%). Testicular cancer namely, hair loss, decreased appetite, nausea and vomiting (100%), muscle pain (80%), weight loss (70%), fatigue (70%), heartburn (60%), mouth ulcer (50%), constipation (50%), headache (40%), skin rash (40%), painful urination (40%), and diarrhea (30%). **Conclusion:** The most and least side effects in prostate cancer patients were hair loss and heartburn, bladder cancer were fatigue and skin rash, and testicular cancer were hair loss and diarrhea.
Keywords: *Bladder Cancer, Chemotherapy, Prostate Cancer, Side Effects, Testicular Cancer*

INTRODUCTION

Chemotherapy is one of the anticancer therapies. The goal of chemotherapy treatment is to attack cancer cells by inhibiting the supply of nutrients to the development of cancer cells, inhibiting blood flow to cancer cells, inhibiting the development of cancer cells, and destroying parts of cancer cells.[1] In general, side effects of chemotherapy are hair loss, decreased appetite, weight loss, headache, fatigue, mouth ulcers, diarrhea, nausea and vomiting, constipation, nosebleeds, skin rashes, painful urination, muscle pain, and heartburn. Each individual experiences different side effects. This difference can be influenced by the type of chemotherapy, chemotherapy dose, and individual factors.[2]

Male urological cancer is one of the highest incidence rate, which includes prostate cancer, bladder cancer, testicular cancer, and kidney cancer. According to GLOBOCAN, by the year 2020, prostate cancer has increased by 1,414,259 cases with a total of 375,304 deaths. Bladder cancer with 573,000 new cases and 213,000 deaths. Testicular cancer with 74,458 new cases and 9,334 deaths.[3]

The goal of a clinician is to prolong survival and maintain the quality of life for cancer patients. The side effects of chemotherapy tend to be feared and can affect a person's quality of life.[4] Therefore, authors are interested in knowing the most to the least side effects of chemotherapy in patients with prostate cancer, bladder cancer, and testicular cancer who have completed their first cycle of chemotherapy.

The main objective of this study was to determine the side effects of chemotherapy in patients with prostate cancer, bladder cancer, and testicular cancer at Haji Adam Malik Hospital in Medan. The specific objectives of this study were to determine the most and least side effects of chemotherapy in patients with prostate cancer, bladder cancer, and testicular cancer and to find out the similarities and differences in side effects in patients with prostate cancer, bladder cancer, and testicular cancer at Haji Adam Malik General Hospital Medan.

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METHODS

This study uses a quantitative descriptive research method. The sampling technique used is the total sampling technique. The number of respondents in this study was 35 people, from patients with prostate cancer, bladder cancer, and testicular cancer who had undergone their first cycle of chemotherapy at Haji Adam Malik General Hospital Medan in 2020-2022. Research respondents met the inclusion and exclusion criteria. The inclusion criteria for this study were patients with prostate cancer, bladder cancer, and testicular cancer who had undergone the first cycle of chemotherapy at Haji Adam Malik General Hospital in Medan in 2020-2022 and were willing to become research subjects, while the exclusion criteria included patients with incomplete personal data, consumption of other drugs that are known to mislead the side effects, and patients with comorbid diseases. Data were obtained from patients' medical records and phone interviews, then filled in in the form of a questionnaire that was modified from the National Cancer Institute's Patient Reported Outcomes version of the Common Terminology Criteria for Adverse Events (PRO-CTCAE®) Measurement System.

The dependent variable in this study was the type of drug and the dose of chemotherapy. Prostate cancer chemotherapy uses docetaxel at a dose of 75 mg/m^2. Bladder cancer using a combination of cisplatin at a dose of 70 mg/m^2 and gemcitabine at a dose of 1.000 mg/m^2. Testicular cancer uses a combination of the drugs bleomycin, etoposide, and cisplatin (BEP) at doses of 30.000 IU, 20 mg/m^2, and 100 mg/m^2 respectively. This research is presented by calculating the frequency distribution with statistical software applications.

RESULTS

Characteristics were obtained from 35 respondents, divided based on cancer types. Data regarding individual characteristics can be seen in the following table.

Table 1. Individual Characteristics

Cancer Types	Characteristics	Total
Prostate Cancer (n=17)	Male	17 (48,6%)
Bladder Cancer (n = 8)	Male	8 (22,8%)
Testicular Cancer (n = 10)	Male	10 (28,6%)

Based on table 1, the number of respondents was 35 respondents. With details, prostate cancer was 17 people (48.6%), bladder cancer was 8 people (22.8%), and testicular cancer was 10 people (28.6%).

The side effects of prostate cancer chemotherapy varied quite a lot among respondents. The following table is a description of the side effects of chemotherapy in prostate cancer patients obtained from 17 respondents.

Table 2. Overview of Prostate Cancer Chemotherapy Side Effects

	Frequency (n)	Percentage (%)
Hair Loss	16	94,1
Decreased Appetite	13	76,5
Weight Loss	7	41,2
Headache	4	23,5
Fatigue	15	88,2
Mouth Ulcer	4	23,5
Diarrhea	8	47,1
Nausea and Vomiting	12	70,6
Constipation	10	58,8
Nosebleed	0	0
Skin Rash	6	35,3
Painful Urination	6	35,3
Muscle Pain	8	47,1
Heartburn	3	17,6

Based on table 2, the most to the least side effects of chemotherapy in prostate cancer were hair loss in 16 people (94.1%), fatigue in 15 people (88.2%), decreased appetite in 13 people (76.5%), nausea and vomiting in 12 people (70.6%), constipation in 10 people (58.8%), muscle pain in 8 people (47.1%), diarrhea in 8 people (47.1%), weight loss in 7 people (41.2%), skin rash in 6 people (35.3%), painful urination in 6 people (35.3%), headache in 4 people (23.5%), mouth ulcer in 4 people (23.5%), heartburn in 3 people (17.6%), there were no side effects of nosebleed in the respondents.

In this study, the side effects of 8 respondents with bladder cancer who had undergone the first cycle of gemcitabine cisplatin chemotherapy was identified. The following table is a description of the side effects of chemotherapy in bladder cancer patients obtained from 8 respondents.

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Table 3. Overview of Bladder Cancer Chemotherapy Side Effects

	Frequency (n)	Percentage (%)
Hair Loss	4	50
Decreased Appetite	7	87,5
Weight Loss	4	50
Headache	3	37,5
Fatigue	8	100
Mouth Ulcer	2	25
Diarrhea	4	50
Nausea and Vomiting	7	87,5
Constipation	4	50
Nosebleed	0	0
Skin Rash	1	12,5
Painful Urination	5	62,5
Muscle Pain	5	62,5
Heartburn	2	25

Based on table 3, the most common side effects of chemotherapy in 8 respondents with bladder cancer were fatigue in 8 people (100%), decreased appetite in 7 people (87.5%), nausea and vomiting in 7 people (87.5%), painful urination in 5 people (62.5%), muscle pain in 5 people (62.5%), hair loss in 4 people (50%), weight loss in 4 people (50 %), diarrhea in 4 people (50%), constipation in 4 people (50%), headache in 3 people (37.5%), mouth ulcer in 2 people (25%), heartburn in 2 people (25 %), skin rash in 1 person (12.5%), and no nosebleed side effects occurred in the respondents.

The side effects of 10 testicular cancer respondents who had undergone the first cycle of BEP chemotherapy were studied. The following are the results of a study involving 10 respondents with testicular cancer.

Table 4. Overview of Testicular Cancer Chemotherapy Side Effects

	Frequency (n)	Percentage (%)
Hair Loss	10	100
Decreased Appetite	10	100
Weight Loss	7	70
Headache	4	40
Fatigue	7	70
Mouth Ulcer	5	50
Diarrhea	3	30
Nausea and Vomiting	10	100
Constipation	5	50
Nosebleed	0	0
Skin Rash	4	40
Painful Urination	4	40
Muscle Pain	8	80
Heartburn	6	60

Based on table 4, the most common chemotherapy side effects were obtained in 10 respondents, namely hair loss, decreased appetite, and nausea and vomiting in 10 people (100%), followed by muscle pain in 8 people (80%), weight loss in 7 people (70%), fatigue in 7 people (70%), heartburn in 6 people (60%), mouth ulcer in 5 people (50%), constipation in 5 people (50%), headache in 4 people (40%), skin rash in 4 people (40%), painful urination in 4 people (40%), diarrhea in 3 people (30%), and there were no nosebleed side effects in the respondents.

DISCUSSION

The most common side effects of chemotherapy in prostate cancer respondents are hair loss, fatigue, decreased appetite, nausea and vomiting, and constipation. The results of this study are supported by European Medicine Agency Research regarding the side effects of docetaxel chemotherapy in prostate cancer. In that study, it was explained that the most common side effects of chemotherapy were fatigue (3.9%), hair loss (3%), nausea and vomiting (2.4%), diarrhea (1.2%), decreased appetite (0.6%), and muscle pain (0.3%).[5]

Risk factors and prevalence of bladder cancer were found more in men.[6] In this study, the side effects of gemcitabine cisplatin chemotherapy that had undergone the first cycle of chemotherapy in 8 respondents with bladder cancer were fatigue, decreased appetite, nausea and vomiting, painful urination, and muscle pain. Based on previous research conducted by the BC Cancer Protocol Summary, the most common side effects of gemcitabine cisplatin chemotherapy for bladder cancer were nausea and vomiting, mouth ulcer, fatigue, hair loss, and skin rash.[7] The differences in results could be caused by psychological, ethnicity, and physiology factors.[8]

An overview of the side effects of BEP chemotherapy in testicular cancer patients with a total of 10 respondents, showed that the most side effects were hair loss, decreased appetite, and nausea and vomiting which were complained by all respondents, followed by side effects such as muscle pain, fatigue,

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and weight loss. The results of this study are supported by the Orchid National Male Cancer study, in which the side effects that patients often complain about are hair loss, decreased appetite, nausea and vomiting, mouth ulcer, and fatigue.[9]

The side effects of chemotherapy in old age can produce more serious side effects, due to physiological changes and decreased organ function such as glomerular filtration which can cause drug toxicity.[10] Other individual factors that can cause differences in side effects are sociodemographic characteristics. It was found that the black race experienced more side effects than the white race.[11] Cancer Related Fatigue (CRF) is a condition of fatigue caused by cancer or a side effect of cancer treatment. Approximately 80% to 90% of patients experience fatigue while undergoing chemotherapy.[12] Chemotherapy Induced Alopecia (CIA) is divided into three, respectively always, often, and rare. Docetaxel and etoposide are included in the always category, bleomycin and gemcitabine are included in the often category, and cisplatin is included in the rare category.[13]

Chemotherapy agents can cause apoptosis of intestinal mucosal epithelial cells and vagus nerve abnormalities, resulting in Chemotherapy Induced Diarrhea (CID) and Chemotherapy Induced Constipation (CIC).[14] Nausea and vomiting are caused by oxidative reactions of chemotherapeutic agents that activate neurotransmitter receptors in the postrema area of the brain or stimulate the vagal nerves, thereby providing input to the vomiting center in the medulla oblongata.[15] The 2017 NCCN guidelines divide chemotherapeutics emetogenic potential into 4 classifications, respectively minimal risk of emetic with a frequency of below 10%, low risk of emetic with a frequency of 10% to 30%, moderate risk of emetic with a frequency of 30 % to 90%, and high risk frequency emetic with frequency above 90%. Bleomycin is minimal risk, docetaxel, gemcitabine, and etoposide are low risk, and cisplatin is emetic high risk.[16]

Muscle pain or myalgia can be caused by several factors, namely oxidative stress, changes in calcium homeostasis, axon degeneration, and inflammatory processes.[17] The pathogenesis of decreased appetite and weight loss is caused by a complex process involving cytokines, hormones, and peptides. Decreased appetite can be accompanied by depression and nausea and vomiting which lead to weight loss.[18] Mouth ulcer, painful urination, and heartburn are caused by inflammation of the mucosa caused by chemotherapeutic agents.[19]

Skin rash is a manifestation of an allergic reaction to chemotherapy. Docetaxel is the causative agent of a maculopapular rash on the face and limbs. Gemcitabine is a chemical anti-metabolite drug that often causes itchy skin rashes. Bleomycin produces a bullous erythema rash, scleroderma lesions, and flagellate erythema. Another type of skin rash that can appear as a side effect of chemotherapy is dry skin and desquamation. Chemotherapy in high doses can cause necrosis and ulceration of the skin.[20]

One of the factors contributing the differences of side effects are ethnicity. This research can be used as a reference for the risk of side effects that will be experienced by patients after receiving chemotherapy especially for local Sumatera ethnicities. Although, the relationship between local Sumatera ethnicities and side effects of chemotherapy has not been studied further. Besides, this study has limitations, such as the lack of the number of respondents, which leads to less data variation. If this research is continued, it would be better to carry out the research in several hospitals and extend the span of years for data collection, in order to get more and more representative research results.

CONCLUSION

The side effects of chemotherapy from the most to the least in prostate cancer patients consecutively were hair loss, fatigue, decreased appetite, nausea and vomiting, constipation, muscle pain, diarrhea, weight loss, skin rash, painful urination, headache, mouth ulcer, and heartburn. The side effects of chemotherapy from the most to the least in bladder cancer respondents were fatigue, decreased appetite, nausea and vomiting, painful urination, muscle pain, hair loss, weight loss, diarrhea, constipation, headache, mouth ulcer, heartburn, and skin rash. The side effects of chemotherapy from the most to the least in testicular cancer respondents were hair loss, decreased appetite, nausea and vomiting, muscle pain, weight loss, fatigue, heartburn, mouth ulcer, constipation, headache, skin rash, painful urination, and diarrhea.

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ETHICAL APPROVAL

This study has obeyed procedures and ethics from The Health Research Ethics Committee of Sumatera Utara University. The ethical clearance certificate issued by the committee is No. 757/KEPK/USU/2022.

CONFLICT OF INTEREST

The authors declare no conflict of interest related to this study.

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