

CHAPTER I

INTRODUCTION

1.1. Background

Osteosarcoma is the most prevalent solid malignancy of the bone. From the general population, it can be observed that the incidence of osteosarcoma is only about 2-3/million persons per year. However, the amount of cases in adolescents are more numerous, numbering as high as 8-11/million per year for persons aged 15-19 years old. Males are also more likely to suffer a case of osteosarcoma with men 1.4 times more likely to be affected than females (Ritter and Bielack, 2010).

Osteosarcomas are derived from primitive mesenchymal cells, originating from the bone and soft tissue. However, the etiology of the disease itself remains unclear. Osteosarcoma that develops in the age of pubertal growth spurts and the sites of maximum growth however, indicates a correlation with rapid bone proliferation. Some cases are caused by exposure to radioactive agents, alkylating substances may also correlate with the development of the disease. Persons suffering from hereditary disorders such as alterations of tumor suppressor genes, hereditary retinoblastoma, (Fletcher et al., 2002) and the Li-Fraumeni cancer family syndrome increase the likelihood of developing osteosarcoma (Ritter and Bielack, 2010).

Recent advances in chemotherapy has significantly improved the survival rate of osteosarcoma patients. The increased rate of survival has increased along with the rate of limb salvage, improving patient quality of life after the disease overall. The standard regimen of modern osteosarcoma

chemotherapy consists of two stages. The first stage is done to induce a necrotic effect in the primary tumor, providing early treatment of micrometastatic disease. The effects of this first phase of therapy assists the surgical resection, leading to the aforementioned higher rate of limb survival. Following the surgery, an adjuvant regiment of chemotherapy is given (Wittig et al., 2002).

Despite all of these advancements, mortality remains a persistent problem due to the side effects of chemotherapy on the patient's body and general condition. The most prevalent, and less threatening side effects of chemotherapy include gastrointestinal reactions, manifesting in lower blood, nausea, and vomiting. However, some substances like Doxorubicin, a staple in most osteosarcoma chemotherapy regiments may cause potentially lethal adverse reactions due to its cardiotoxicity. (Zhang et al., 2018)

Methothrexate, another important drug in osteosarcoma chemotherapy, is nephrotoxic. The renal dysfunction caused by this drug may in turn elevate its serum plasma levels, amplifying other manifestations of its toxicity, namely myelosuppression, mucositis, hepatitis, and dermatitis. Vomiting and diarrhea during or soon after administration is a common sign of methothrexate induced renal dysfunction, though a majority remain asymptomatic. (Widemann and Adamson, 2006) Adverse side effects may require temporarily stopping the drug causing the unwanted effect, delaying treatment, and by extension the survivability of the patient (Hanna et al., 2020).

An important factor in determining the risk of toxicity of the chemotherapy treatment is the general condition of the patient. Weight loss, a

principal symptom in most malignancies is detrimental to the patient's response to chemotherapy. Premature termination or suspension of chemotherapy is associated with low BMI (≤ 17 BMI), in addition to non-hematologic toxicity (Grabowski et al., 2018). Albumins, transport proteins that bind to various ligands in the body, is also an important marker indicating the prognosis of a cancer patient. The suppression of albumin synthesis during the process of malnutrition and inflammation makes it a simple, yet effective prognostic indicator (Gupta and Lis, 2010). A patient's hemoglobin level is another notable clinical prognostic marker for cancer patients. About 40 percent of all cancer patients present with or develop anemia and chemotherapy increases the number to a staggering 90 percent, almost a universal occurrence. Low hemoglobin leads to cancer induced fatigue, in addition to decreasing the patient's quality of life; an adverse prognostic factor. (Dicato et al., 2010)

The still anomalous nature of the disease, in addition to its rarity makes researching the effect standard chemotherapy treatment has on the general condition of a patient help increase the pool of data researchers have when analyzing methods to better improve current therapeutical modalities. In addition, studying the effect the patient's physical condition has on the efficacy of the treatment may be used a stepping stone for further research into mitigating the side effects of chemotherapy, preventing delayed treatment, and thus increase survivability.

1.2. Research Question

What is the profile of osteosarcoma patients that receive chemotherapy in the Orthopaedics Department of Dr. Soetomo General Hospital from the year 2014-2020?

1.3. Objective

1.3.1. General Objective

To report the profile of the osteosarcoma patient that received chemotherapy in the Orthopaedics and Traumatology Division of Dr. Soetomo General Hospital during the period of 2014-2020

1.3.2. Specific Objective

1. To describe age of the patient when first diagnosed with osteosarcoma.
2. To differentiate gender between male and female after diagnosed with osteosarcoma
3. To describe the site of osteosarcoma occurrence
4. To describe the stage of tumor according to medical record
5. To discover the amount of chemotherapy cycles the patient endure
6. To describe the type of surgery the patient received
7. To describe the albumin level of the patient before and after receiving chemotherapy
8. To describe the hemoglobin level of the patient before and after receiving chemotherapy
9. To describe the leukocyte level of the patient before and after

receiving chemotherapy

10. To describe the thrombocyte level of the patient before and after receiving chemotherapy

11. To describe the LDH level of the patient before and after receiving chemotherapy

12. To describe the ALP level of the patient before and after receiving chemotherapy

1.4. Benefit

1.4.1. Theoretical Benefit

Providing a description of the general condition of osteosarcoma patients in Dr. Soetomo General Hospital which in turn may be used in the future as the basis for further research and for the development of public health and awareness

1.4.2. Practical Benefit

The results of this study may be used to evaluate the general condition of osteosarcoma patients undergoing chemotherapy in Dr. Soetomo General Hospital