

# Surgical Profile of Osteosarcoma Patients in a Tertiary Referral Hospital in Surabaya, Indonesia

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**Abstract:-** Osteosarcoma is a rare malignant bone disease with unclear etiology. It is primarily a disease of childhood with rapid bone growth in periods of rapid bone proliferation [such as in puberty]. Before the 1970s, prognosis for this malignancy is very grim with the only available form of treatment are limb ablation [amputation]. The advent of modern chemotherapy, in addition to the development of modern limb salvage surgery [LSS] techniques, mortality has decreased and quality of life of survivors have increased. Indonesia is a developing country with unequal distribution of adequate health facilities. Studies have shown that unlike western countries, most osteosarcoma patients in Indonesia are still treated with limb ablation procedures. A retrospective descriptive study is done on Dr. Soetomo General Hospital to discover the surgical profile of patients undergoing chemotherapy during the period of 2014-2020. Results have shown that the majority [26] underwent amputation, 17 underwent no surgical treatment, and the rest [9] LSS. The results of this research shows that the clinical reality of developing nations like Indonesia is still far from the ideal clinical situation in developed western nations where these studies originate.

**Keywords:-** Surgery ; Osteosarcoma ; Developing Nation ;Hospital.

## I. INTRODUCTION

Osteosarcoma is a rare malignant bone disease, among the general population incidence never exceeds 2-3 cases/million persons per year. In developing children however, the number may be as high as 8-11/million persons per year. [1] Although etiology of the disease remains unclear, it is thought of primarily as a disease of childhood with its underlying mechanism being mutations in the bone during periods of rapid bone proliferation, namely during puberty. A second peak of incidence is observed among elderly patients as a result of secondary causes, most prominently Paget's disease but also exposure to other types of chemotherapy, alkylating substances, and radioactive materials. [2]

Before the advent of modern chemotherapy, osteosarcoma is primarily treated only with limb-ablation procedures consisting of amputations and disarticulations. However, the discovery and proliferation of various

chemotherapeutic drugs in the 1970s proved highly effective in mitigating mortality. Limb Salvage Surgery (LSS) procedures became the treatment of choice for osteosarcoma patients [at least in western clinical settings]. [3] The general steps in a limb salvage treatment requires the patient to receive chemotherapy before surgery [neoadjuvant] and also after surgery [adjuvant]. LSS has proven itself to result in an equal, and sometimes even greater disease-free survival rate when compared to amputation, while also resulting in higher satisfaction and lower long-term costs. [4]

Indonesia is a developing country of over 250 million inhabitants and one of the fastest growing economies in the world. Despite reasonable levels of economic growth and a recent bid to establish some form of subsidized healthcare, [5] health infrastructure remains unequal throughout the archipelago. [6] The city of Surabaya is the capital of Eastern Java, the most populous island in the world. It also houses Dr. Soetomo General Hospital, the highest tier of referral hospital in eastern Indonesia. A similar study on a tertiary referral hospital in Jakarta showed that the majority of osteosarcoma patients in Indonesia underwent limb ablation procedures instead of the more contemporarily preferred limb salvage. [7]

The existing literature shows a noticeable gap between the clinical ideal found in developed, western nations and the inadequate facilities and quality of care found in the developing world. The purpose of this research is to compare the research findings of researchers in a western, developed country to the clinical reality of a developing south east asian nation.

## II. MATERIALS AND METHODS

The type and design of this research paper is a retrospective descriptive study depicting the surgical profiles of osteosarcoma patients given chemotherapy at the orthopedics and traumatology division in Dr. Soetomo General Hospital during the period of 2014-2020. The sample of this research are patients with osteosarcoma in Dr. Soetomo General Hospital during the period of 2014-2020 in the orthopedics department who underwent chemotherapy. The sample size is the sum of total sample. The surgical profile of the osteosarcoma patients involved in this research is divided into no surgery, limb ablations, and limb saving surgery (LSS)

### III. RESULTS AND DISCUSSION

Table 1 Surgical Treatment of Patients

Surgical Treatment	Number of Patients
Limb Ablation	26
No Surgery	17
LSS	9

The surgical profile of osteosarcoma patients receiving chemotherapy in Dr. Soetomo General Hospital in this research is in accordance with similar, previous research. Half of all patients (50%) are still receiving limb ablation/amputation surgeries, some (32%) having no surgery at all, and the remaining few (18%) underwent limb salvage surgery. This is in accordance with previous research in dr. Soetomo General Hospital where amputations are still the most common treatment of osteosarcoma, with or without chemotherapy.[8] Complications which the patient develop, usually as a result of an alternative treatment [usually massages and chiropractic [9] in addition to little awareness about the disease itself led to many patients presenting themselves with complications that would contra-indicate the use of a limb saving surgery.[8] Similar research throughout Indonesia also showed that tertiary hospitals with similar demographics exhibited similar results. The surgical profile of patients in Dr. Cipto Mangunkusomo for example was more evenly balanced, but the majority of patients (33.1%) still underwent amputation compared to 28% that underwent LSS.[7] On the opposite end of the spectrum, research conducted in The Adam Malik Hospital located in South Sumatera, a staggering 89% of patients received limb ablation procedures.[10] This problem is not entirely isolated within Indonesia itself as research by Lisenda et al in a tertiary referral hospital in South Africa showed that other developing countries face the same obstacles that Indonesia does in facing the challenges of this disease.[11]

This is of course in stark contrast to the clinical ideal found in the west. The majority of western clinical studies in the last decade shows that the majority of patients underwent an LSS procedure successfully. [1, 2, 12, 13] Limb salvage surgery when performed correctly results in higher patient satisfaction, lower costs, and lower risk of metastases or recurrence when compared to limb ablation procedures. There are several key factors in why a similar presentation may not be seen in a developing nation like Indonesia. The most prominent factor are patients presenting with complications that would contra-indicate the use of LSS. [14] These complications are often a result of patients seeking alternative treatments to treat their malignancy. Reasons for seeking alternative treatments vary but may mainly be attributed to the expensive cost of conventional treatment and a lack of awareness/education regarding the disease. [15] Patients seeking alternative treatment often have a general distrust and/or dissatisfaction of conventional medicine, preferring alternative or traditional medicine due to the normative sociocultural values and perceived simplicity.[16]

### IV. CONCLUSION

Amputation remains the most prevalent method of surgical treatment for osteosarcoma patients undergoing chemotherapy in Dr. Soetomo General Hospital. When compared to existing literature in western clinical settings, the reality remains far removed from the ideal. The results of this study shows that there are still great strides to be made for the treatment of osteosarcoma in developing countries like Indonesia in order to increase the quality of care of patients.

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### REFERENCES

- [1]. Ottaviani G, Jaffe N. The epidemiology of osteosarcoma. *Pediatric and adolescent osteosarcoma*. 2009;3-13Briggs GG, Freeman RK, Yaffe SJ. *Drugs in pregnancy and lactation: a reference guide to fetal and neonatal risk*. 9<sup>th</sup> ed. Baltimore: Williams & Wilkins; 2011.
- [2]. Ritter J, Bielack S. Osteosarcoma. *Annals of oncology*. 2010;21:vii320-vii5.
- [3]. Isakoff MS, Bielack SS, Meltzer P, Gorlick R. Osteosarcoma: Current Treatment and a Collaborative Pathway to Success. *J Clin Oncol*. 2015;33(27):3029-35.
- [4]. Jauregui JJ, Nadarajah V, Munn J, Pivec R, Kapadia BH, Lerman DM, et al. Limb Salvage Versus Amputation in Conventional Appendicular Osteosarcoma: a Systematic Review. *Indian J Surg Oncol*. 2018;9(2):232-40.
- [5]. Wenang S, Schaeffers J, Afdal A, Gufron A, Geyer S, Dewanto I, et al. Availability and Accessibility of Primary Care for the Remote, Rural, and Poor Population of Indonesia. *Front Public Health*. 2021;9:721886.
- [6]. Mulyanto J, Kringos DS, Kunst AE. Socioeconomic inequalities in healthcare utilisation in Indonesia: a comprehensive survey-based overview. *BMJ Open*. 2019;9(7):e026164.
- [7]. Kamal AF, Widyawarman H, Husodo K, Hutagalung EU, Rajabto W. Clinical outcome and survival of osteosarcoma patients in Cipto Mangunkusumo Hospital: limb salvage surgery versus amputation. *Acta Med Indones*. 2016;48(3):175-83.
- [8]. Ferdiansyah Mahyudin N, Edward M, Basuki MH, Bari YA, Suwandani Y. Osteosarcoma has not become attention to society profile of osteosarcoma patients at dr. Soetomo General Hospital Surabaya "A retrospective study". *Journal Orthopaedi and Traumatology Surabaya*. 2018;7(1):20-30.

- [9]. Miwa S, Kamei M, Yoshida S, Yamada S, Aiba H, Tsuchiya H, et al. Local dissemination of osteosarcoma observed after massage therapy: a case report. *BMC cancer*. 2019;19(1):1-6.
- [10]. Kalim D. *Epidemiologi Osteosarkoma di RSUP Haji Adam Malik Tahun 2012-2017*. 2019.
- [11]. Lisenda L, Linda ZA, Snyman FPJ, Kyte RD, Lukhele M. Osteosarcoma patient outcomes at a South African tertiary hospital. *S Afr Med J*. 2017;107(9):754-7.
- [12]. Eaton BR, Schwarz R, Vatner R, Yeh B, Claude L, Indelicato DJ, et al. Osteosarcoma. *Pediatric blood & cancer*. 2021;68:e28352.
- [13]. Lindsey BA, Markel JE, Kleinerman ES. Osteosarcoma overview. *Rheumatology and therapy*. 2017;4(1):25-43.
- [14]. Han G, Bi W-Z, Xu M, Jia J-P, Wang Y. Amputation versus limb-salvage surgery in patients with osteosarcoma: a meta-analysis. *World journal of surgery*. 2016;40(8).
- [15]. Wang J, Wu P, Chen P, Yen C, Hung G. *Manipulation Therapy Prior to Diagnosis Induced Primary Osteosarcoma Metastasis—*. 2014.
- [16]. Žganjer M, Bašković M. Osteosarcoma and alternative medicine in children. *Pediatrics Polska-Polish Journal of Paediatrics*. 2022;97(2):165-6.
- [17]. Deliana M, Suza DE, Tarigan R. Advanced Stage Cancer Patients Experience in Seeking Treatment in Medan, Indonesia. *Open Access Maced J Med Sci*. 2019;7(13):2194-203.