The Profile of Oncologic Orthopedic Surgery in 2 Years of COVID-19 Pandemic: A Single-Centered Study in Orthopedic Hospital

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The COVID-19 pandemic has led to a difficult condition for healthcare providers to maintain their service without risking their safety. Generally, patients were canceling their hospital visits as they feared COVID-19 transmission. This has led to a general decline in the number of patient visits, attending doctors, and elective surgeries. However, this may not be the same for oncologic orthopedic cases which are allowed to continue elective surgeries, and the patients still perceive their condition as urgently in need of treatment. This article aimed to compare the number of oncologic orthopedic surgeries before and during the COVID-19 pandemic and describe the profile of oncologic orthopedic surgery two years of the pandemic.

Methods: This was a retrospective study comparing the total number of oncologic orthopedic patients undergoing elective surgery in a single center, Prof. Dr. R. Soeharso Orthopedic Hospital, Surakarta, Indonesia, from March 2019 to February 2022. The number of surgeries per month before the pandemic, in the first and second years of the COVID-19 pandemic, was described and compared with one-way ANOVA. The surgical procedures performed in these three years were also described.

Results: The total of oncologic orthopedic surgeries before the COVID-19 pandemic was 390 cases in comparison to 374 cases in the first year and 355 cases in the second year of the pandemic. The average number of cases per month was $32.5 \pm 6.4$ before the pandemic compared to $31.2 \pm 7.8$ in the first year and $29.5 \pm 6.4$ cases per month in the second year of the pandemic. There was no significant difference ($p = 0.59$, Confidence Interval 95%). Sophisticated reconstruction surgery such as arthroplasty and megaprosthesis still took place during the pandemic.

Conclusions: The trend in the number of oncologic orthopedic surgeries did not decline significantly during the COVID-19 pandemic.

INTRODUCTION

The COVID-19 pandemic was declared by WHO in March 2020. It started in China and led to an outbreak throughout Asia and was widespread worldwide to the western countries. The understanding of this disease was limited. It had high infectivity, and the risk factors were still unclear. However, the severity of COVID-19 varies by age and comorbidities. Those with comorbidities were likely to get the infection and often died from COVID-19. These comorbidities include geriatric, autoimmune diseases, lung diseases, diabetes mellitus, and tumor diseases [1]. Local governments and their health departments had taken several policies to control and prevent the spread of the disease like mass education, locking down, limiting outdoor activities, providing vaccination, isolation rooms in their hospitals, and making people always wear masks.

This COVID-19 pandemic had driven fear in society when it already led to a difficult condition for healthcare providers to maintain their service without risking the safety of everyone involved [2]. The safety that is put at stake is that of doctors, especially surgeons as they need relatively long and close contact with patients. Some procedures may cause aerosolization that significantly increases the risk of COVID-19 transmission, for instance, drilling and osteotomy that occur in orthopedic surgery. The patients were also put at risk...
of any infection as they entered any hospital even before the COVID-19 pandemic. These fears in society have led to a general decline in the number of patient visits, attending doctors, and surgeries, especially elective surgeries [3]. However, tumor patients with a sense of urgency to seek treatment seemed to be relatively willing to take more risks and seek an examination from a doctor. Thus, this article aimed to compare the number of oncologic orthopedic surgeries before and during the COVID-19 pandemic and describe the number and procedures of oncologic orthopedic surgeries in two years of the COVID-19 pandemic.

METHODS

This was a retrospective study comparing the effect of the COVID-19 pandemic on the number of oncologic orthopedic surgeries in a single-center hospital. The total number of oncologic orthopedic patients undergoing elective surgery in a single-center national referral hospital that should accept every referral, Prof. Dr. R. Soeharso Orthopedic Hospital, Surakarta, Indonesia from March 2019 to February 2022 (3 years) was collected from the hospital registry system. All types of oncologic orthopedic surgeries were included in this study. March 2020 was set as the starting month in which the COVID-19 pandemic had been declared and started to affect the number of hospital visits and surgeries. The number of oncologic orthopedic surgery each month (from March 2019 until two years after the pandemic, February 2022) was compared to that of the same month. One-way ANOVA was used for statistical analysis, with p < 0.05 considered significant.

RESULTS

All oncologic orthopedic surgeries performed one year before and 2 years during the pandemic were included. It included all elective and urgent surgeries performed by the oncologic orthopedic department. The three most common diagnoses for surgeries were pathological fracture due to metastatic bone disease (30%), giant cell tumor (26%), and osteochondroma (13%) followed by bone cyst, osteosarcoma, fibrous dysplasia, chondrosarcoma, rhabdomyosarcoma, and other musculoskeletal tumors.

The number of surgeries each month is presented in Figure 1. The average cases per month in each year is 32.5 cases before the pandemic, 31.2 cases in the first year of pandemic, and 29.6 cases in the second year of the pandemic (see Table 1). The total number of oncologic orthopedic surgeries per year was 390 cases before the pandemic, 374 cases in the first year of the pandemic, and 355 cases in the second year of the pandemic. There was no statistically significant difference when comparing the means of the number of surgeries each month in three years group (p = 0.59).

The profile and distribution of surgical procedures were also described and presented in Figure 2. There was a decline in some procedures like amputation, excision, and open biopsy while there was an increase in core biopsy and arthroplasty. Sophisticated reconstructions with megaprosthesis were still taking place during the pandemic.

Table 1. The mean of oncologic orthopaedic surgery per month in three years

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before pandemic</td>
<td>12</td>
<td>32.50</td>
<td>6.45</td>
<td>1.86</td>
<td>22</td>
<td>43</td>
</tr>
<tr>
<td>Year 1 Pandemic</td>
<td>12</td>
<td>31.17</td>
<td>7.81</td>
<td>2.26</td>
<td>16</td>
<td>41</td>
</tr>
<tr>
<td>Year 2 Pandemic</td>
<td>12</td>
<td>29.59</td>
<td>6.43</td>
<td>1.86</td>
<td>19</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>31.08</td>
<td>6.83</td>
<td>1.14</td>
<td>16</td>
<td>43</td>
</tr>
</tbody>
</table>

Figure 1. The number of oncologic orthopaedic surgery per month before the pandemic until two years of the pandemic
we performed the research. This national referral hospital was not able by policy to refuse or limit referral, making the number of cases in this national referral hospital relatively similar compared to before the pandemic when actually the total of patient visits might be declining but the available hospital was left in the tertiary centers. Moreover, when we see the total number of visits in the second year of the pandemic, it was declining though not statistically significant. This number was declining as the COVID-19 pandemic became more under control and peripheral hospitals had already performed more surgeries and more patients were able to be taken care of in the smaller hospitals.

Continuing to provide and perform oncologic orthopedic surgeries in the middle of the pandemic had to be done in tertiary hospitals, and this might be true also for smaller hospitals. Such conditions are in line with the recommendation to resume elective surgery for the patient since it is unclear when the pandemic will end. There are also recommendations for continuing biopsy procedures for patients whose medical history, physical, and supportive examination indicate a high risk of malignancy. All of them were done under 3 basic principles: clinical urgency, the safety of the healthcare workers, and continuity of resources [6].

However, defining elective surgery is rather difficult as there is no agreement about the definition of elective or the scope of elective surgery. Nevertheless, some have proposed to prioritize the patients into emergency, urgent, semi-urgent, nonurgent, and elective patients [7]. The orthopedic oncology itself may be characterized as an emergency when it carries a neurological deficit and needs surgery within 24 hours or many arrived in the hospital with an impending pathologic fracture that is categorized as urgent, and surgery within 48 hours is recommended [3]. The surgeries performed in our research included all surgeries performed by the

Figure 2. The number of oncologic orthopaedic surgery per month before the pandemic until two years of the pandemic

DISCUSSION

The result showed a general decline in cases per year. However, there was no significant difference, and, in some months, the number was even greater than before the pandemic. This finding is in contrast to general reports stating that, since the announcement of the COVID-19 pandemic by WHO in March 2020, the number of patient visits and elective surgeries had a massive decline in that same month, and surgeons were canceling all elective surgery [3]. This was also in contrast with the study shown in the relatively near region of Surakarta, in Dr. Moewardi General Hospital, which found that there was a significant decline in the number of surgeries, especially in oncologic surgeries by 51.5% [4]. Other study in India also stated that they had a significant decrease of cancer care visits by 46% which happen during the peak of national lockdown in March to May 2020 [5]. In our research, the number of oncologic orthopedic surgeries declined after the lockdown policy from March to April 2020, and it did not take long for more patients to visit the hospital and plan for surgeries. The trend of elective oncologic orthopedic surgery did not seem to be decreasing as in other fields of orthopedic as in trauma cases. The core biopsy had increased during the pandemic since fine-needle aspiration biopsy (FNAB) was not available during the early pandemic. Even demanding surgery such as wide excision, megaprosthesis, pelvic resection, sacrectomy, and scapulectomy were still undergone during the pandemic. The fact that this research took place in the national tertiary orthopedic hospital may serve as a main reason why the number of oncologic orthopedic surgeries did not have a significant decline. Other smaller hospitals around the region were still limiting their elective surgeries, so they had to refer vertically to the tertiary hospital like the one where
oncologic orthopedic department, both elective and urgent surgeries. Pathological fractures took place as the most common cause of the patient coming for surgeries, and the pandemic should not limit the surgical care of such patients as this case should be considered an urgent surgery. The mild diagnosis of osteochondroma might seem trivial. However, when it already causes neurological deficits like in the proximal fibula causing peroneal nerve lesions, it should be considered an emergency or at least urgent surgery. Delaying an elective cancer surgery, although the short-term outcomes were not compromised in some surgery, the longer preoperative delay may lead to significant morbidities and long-term reductions in survival [8].

This finding should raise our awareness to provide oncologic orthopedic care during a pandemic with all the risks it carries. This continuing practice may be supported by research conducted in Indonesia that found that elective surgery in orthopedic patients, whose history, signs, and symptoms of COVID-19 were negative, may not be associated with COVID-19 infection [2]. However, screening should be strict as one study recommended that surgery should not be performed in patients who had a COVID-19 infection within 7 weeks as they may still be infectious [9]. Besides that, to employ patient and health worker safety, detailed and sophisticated measures have been proposed: preoperative screening of COVID-19 to the medical staff and patients, priority selection for elective surgeries, the limited number of medical staff in the operating room, physical distancing by teleconference for the medical staff, limiting visitors, and appropriate personal protective equipment (PPE) [3,10].

The limitation of this study was that it included every surgery performed by the oncologic orthopedic department without exclusion. This might include repeated surgeries of the same patients as in recurrent tumors or failed core biopsy that was continued with open biopsy.

CONCLUSIONS

The trend in the number of oncologic orthopedic surgeries did not significantly decline during the COVID-19 pandemic. Patients with tumors in their extremities feel the urge to visit the hospital. The proposed categorization of surgical urgency also supports the surgery for many orthopedic oncologic patients as they easily fall into the emergency or urgent category.

DECLARATIONS

Ethics Approval

Ethical approval was achieved on August 9, 2021, with certification of ethical review clearance number LB.02.01./XXX.3/4747/2021.

Competing of Interest

The authors declare no competing interest in this study.

Acknowledgment

N/A.

REFERENCES