Impact of a Specialized Outpatient Clinic on Bone Metastasis and Its Burden on Spine Surgeons

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Abstract. Background/Aim: It is important to perform early intervention on bone metastases using multidisciplinary approaches, however it is difficult to hold frequent meetings between patients and clinicians. We aimed to evaluate the usefulness of a specialized outpatient clinic on bone metastasis, instead of the multidisciplinary approach currently in practice. Patients and Methods: We included 31 patients with vertebral metastases of various carcinomas, undergoing surgical treatment by spine surgeons. We divided the patients into two groups before and after their visit to the specialized outpatient clinic (pre and post groups), and compared their clinical characteristics. Results: The post group demonstrated a longer period from consulting the spine surgeon to the surgery than the pre group (p=0.0129). A multivariate logistic regression analysis revealed that the period from spine surgeon consultation to surgery was significantly associated with a specialized outpatient clinic visit (p=0.0460). Conclusion: Specialized outpatient clinics on bone metastasis could possibly reduce the burden on spinal surgeons.

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surgery or had brain-derived neurological deficit that affected their gait function were excluded. We eventually included 31 patients with vertebral metastasis, undergoing surgical treatment (16 men and 15 women, mean age: 67.3 years, and range=42-83 years). We inspected the patient records to collect information on their regarding age, sex, the location of the primary tumor, the site of spinal lesion, a history of primary tumor treatment, paralysis or bladder and rectal disorder, a history of denosumab treatment, the period from spine surgeon consultation to surgery, surgical method, surgery time, operation room leaving time, intraoperative bleeding volume, and preoperative embolization. The severity of the neurological deficit was assessed before the surgery using the Frankel classification (12). The specialized outpatient clinic on bone metastasis was initiated at our hospital in May 2019. We divided the patients into two groups, namely 2 years until April 2019 (Pre group) and 2 years after May 2019 (Post group). Moreover, we compared the clinical characteristics and information on surgery between the groups. In addition, we excluded patients who had not been treated for original carcinoma at our hospital or those not diagnosed with the primary tumor. We compared only patients who were being treated for primary tumors at our hospital. Furthermore, we examined factors that affected the period from consulting the spine surgeon to the surgery, in addition to those that delayed leaving the operating room.

Specialized outpatient clinic on metastatic bone tumors. From May 2019, we inaugurated a specialized outpatient clinic on bone metastasis at our hospital. One doctor with specialist qualifications in orthopedic surgery and bone and soft tissue tumor conducted session at the clinic for approximately 2 h, once a week. It primarily targeted patients being treated for carcinoma at our hospital. One patient with confirmed bone metastasis was actively introduced from other departments to the clinic. Those with a risk of fracture and spinal cord injury were regularly examined. If the doctor identified the need of consultation from the spinal surgeon for surgical adaptation, we requested for an examination to the spine surgeon. There were an average of 22.1 patients per month (range=3-41 patients) from May 2019 to April 2021.

Statistical analyses. All continuous variables are expressed as mean±standard deviations (SD). We conducted Student’s t-tests, Welch t-tests, and Chi Squared ($\chi^2$) tests to compare the characteristics between the groups. A multivariate logistic regression analysis was performed to examine the factors that affected the period from spine surgeon consultation to the surgery, and those that delayed leaving the operating room. The waiting period till the surgery was defined short if the latter was performed within 4 days after the first visit of the spinal surgeon. In addition, the leaving time was defined slow if the patients left the operating room after the first visit of the spinal surgeon. In addition, the leaving time, intraoperative bleeding volume, and preoperative embolization was assessed.

Discussion

Our findings reveal that the specialized outpatient clinic on bone metastasis prolonged the period from the first consultation of a spine surgeon to the surgery for patients with spinal metastasis who required surgery. Furthermore, this outpatient clinic significantly prolonged the waiting period until surgery. Moreover, it was possible to reduce the burden on spine surgeons by performing the surgeries with a margin.

Numerous articles have called for a multidisciplinary approach to bone metastasis (3-11). However, most of them did not shed light on the statistical validity. Thavarajah et al. reported on a shorter time to initiate radiation therapy. However, they did not demonstrate clinical efficacy (6). Nakata et al. evaluated 45 patients with bone metastasis to the spine with paralysis, and only revealed the clinical efficacy of the multidisciplinary approach (11). They reported that the cancer board shortened the time to diagnosis and treatment, besides reducing the incidence of paralysis. A multidisciplinary approach that amalgamates interdisciplinary staff, such as the cancer boards is considered important in modern cancer treatments, owing to the increasing prognosis. This necessitates applying the concept in maximum institutions providing cancer treatment.
However, meetings may be limited to once or twice a month, thus warranting a system that frequently monitors patients to rapidly notice and respond to those who are likely to develop paralysis. At our facility, we previously tried to continue the cancer board. However, we were unable to obtain the frequent cooperation from various professionals. Therefore, only one orthopedic surgeon began the specialized outpatient clinic on bone metastasis at our hospital. Outpatient treatment for approximately 2 h a week enabled extensively guiding patients with spinal metastases.
who required surgical treatment. The involvement of more orthopedic surgeons and spine surgeons at this outpatient clinic would significantly reduce the burden on each doctor. Adopting a multidisciplinary approach, such as a cancer board would be ideal. However, considering its difficulty, it would be effective to initially develop specialized outpatient clinics on bone metastasis that can be easily initiated at any facility.

Spine surgeons deal with numerous spinal disorders. Nonetheless, paralysis often requires an emergency surgery. The causes not only include bone metastasis of cancer but also infection and trauma. Therefore, surgery is extremely challenging. However, the specialized outpatient clinic on bone metastasis can supposedly reduce the burden on the spinal surgeons only for spinal metastasis. Considering the increasing prognosis of patients with cancer, a specialized outpatient clinic on bone metastasis, if not a multidisciplinary approach, will be required in future to reduce the burden on spine surgeons.

This was the first study to examine the usefulness of a specialized outpatient clinic on bone metastasis, and examine its impact on the burden on spine surgeons. However, our study had several limitations. The small sample size was the major limitation. It can be attributed to the inclusion of only patients who underwent surgery for spinal metastasis. The specialized outpatient clinic on bone metastasis extended the waiting period until surgery. Nonetheless, we could not determine if the change was because of early detection or slow response of the spine surgeon. To demonstrate the postoperative results, we would like to compare the degree of improvement in paralysis. Nevertheless, we could not make a sufficient evaluation considering few cases of paralysis. However, there was no difference in clinical data, such as the surgery time and intraoperative bleeding volume. Moreover, the proportion of patients who left the operating room late or those who did not embolize before the surgery tended to be small after visiting the specialized outpatient clinic. Therefore, early detection will likely allow patients to respond with a margin. In addition, it is necessary to consider various factors, such as differences depending on the type of carcinoma, which could not be performed owing to the small sample size. We need to continue specialized outpatient clinic on bone metastasis for the next few years, and we intend to perform detailed studies with larger number of patients with bone metastasis requiring surgical treatment.

In conclusion, the present study demonstrated that the specialized outpatient clinic on bone metastasis had the possibility of reducing the burden on spinal surgeons by providing a margin for patients with spinal metastasis who required surgery. Because the number of patients with bone metastases is expected to increase, it is important to create a new system that will lead to early intervention for patients with bone metastases. Considering the difficulty to adopt a multidisciplinary approach, we should consider developing specialized outpatient clinics that can be sustained easily by an orthopedic surgeon alone.

Conflicts of Interest

The Authors report no conflicts of interest.

Authors' Contributions

All Authors were involved in the planning and reviewing of this research. Tsuchie H, Hongo M, Kasukawa Y, Nagasawa H, Kudo D, and Kimura R, collected the clinical data. Tsuchie H analyzed the raw data. Tsuchie H wrote this dissertation. Miyakoshi N reviewed the manuscript.
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