

Risk of Pathological Fracture and Paralysis during Rehabilitation for Patients with Bone Metastases: A Questionnaire-Based Study

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Background: Bone metastases can cause severe pain, pathological fractures, and spinal cord paralysis, which interrupt treatment for tumors and cause patients to be bedridden. In this study, we aimed to clarify therapists' problems in the rehabilitation of patients with bone metastases and their countermeasures using the results of questionnaires to therapists and recommend safer and more rational rehabilitation.

Methods: Questionnaire forms were sent to 21 therapists in our department. The questionnaire was conducted anonymously about problems during the rehabilitation procedure such as the risk of pathological fractures and paralysis.

Results: All of the therapists had strong anxiety (43%) or some anxiety (57%) about the risk of pathological fractures or paralysis during a procedure. However, no therapist responded that this had ever occurred. Many of the respondents had changed a procedure to a milder one (81%) or interrupted a procedure (48%) due to the patient's condition on the day. Therapists chose many options to reduce the risk of pathological fractures and paralysis during the procedure. Among them, "pre-rehabilitation referral to orthopedic surgeon" (86%), "consultation with a doctor about changes in patient's symptoms and findings" (86%), and "regular cooperation between multiple occupations" (67%) were frequently selected.

Conclusions: Our questionnaire survey of therapists regarding the treatment of patients with bone metastases found that there was considerable anxiety about the risk of pathological fractures and paralysis during treatment. Our findings suggest that it is necessary to strengthen cooperation with multiple occupations, especially those in the orthopedic field. (J Nippon Med Sch 2023; 90: 326–332)

Key words: bone metastasis, rehabilitation, pathological fracture, paralysis, questionnaire

Introduction

Japan has become a super-aging society with more than 27% of people aged 65 and over¹, and the number of newly diagnosed cancers exceeds 1 million annually². Cancer rehabilitation began to spread in Japan in the mid-2000s. A cancer patient rehabilitation fee was newly established in the 2010 fiscal year medical fee revision, as many patients were undergoing cancer rehabilitation.

Cancer rehabilitation is defined as "helping a person with cancer to help himself or herself to obtain maximum physical, social, psychological, and vocational func-

tioning within the limits imposed by disease and its treatment"³. It is performed between the time of diagnosis of cancer and the time of death. Cancer rehabilitation has been shown to bring physical and quality of life improvements to patients during and after cancer treatment⁴. Rehabilitation has a positive effect on cancer survival and prevention of recurrence^{5,6}.

On the other hand, cancer rehabilitation is not sufficiently recognized by cancer patients and cancer treatment doctors, and many basic and clinical questions remain to be clarified. One of the rehabilitations that in-

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<p>Q1 Which is your occupation?</p> <p>1. Physical therapist 2. Occupational therapist 3. Speech therapist</p> <p>Q2 How many years of clinical experience as a therapist do you have?</p> <p>1. 4 years or less 2. 5-9 years 3. 10 years or more</p> <p>Q3 Have you had experience treating of one or more patients with bone metastases in the last year?</p> <p>1. Yes 2. No</p>
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Fig. 1 Questionnaire 1.

cludes many unresolved questions about daily medical care is the rehabilitation of patients with bone metastases. Bone metastases can cause severe pain, pathological fractures, and spinal cord paralysis, which interrupt treatment for tumors and cause patients to be bedridden. In this study, we aimed to clarify therapists' problems in the rehabilitation of patients with bone metastases and their countermeasures using the results of questionnaires to therapists and recommend safer and more rational rehabilitation.

Materials and Methods

Institutional Review Board approval was deemed unnecessary.

At our facility, when the risk of pathological fracture or paralysis due to a procedure seems to be high at the start of rehabilitation, the rehabilitation doctor asks the primary cancer doctor to consult with an orthopedic surgeon. If unexpected pain or paralysis occurs during the rehabilitation period, rehabilitation is suspended, and a therapist or rehabilitation doctor consults the primary cancer doctor about the symptoms. In addition, a cancer board specializing in bone metastasis is held once a month to discuss patients with bone metastasis.

1. Questionnaires

Questionnaire forms (Fig. 1, 2) were sent to 21 therapists in our department: 11 physical therapists (PT), six occupational therapists (OT), and four speech therapists (ST). The questionnaire was conducted anonymously. The questionnaire consisted of two parts: questionnaire 1 and 2 (Fig. 1, 2). The first part included questions about occupation (PT, OT, or ST), period of clinical experience as a therapist (4 years or less, 5-9 years, or 10 years or more), and experience treating one or more patients with bone metastases in the last year. In the second part, they were asked three questions about problems during the reha-

bilitation procedure such as the risk of pathological fractures and paralysis. We analyzed the association between the results of the questionnaire regarding anxiety about the risk of pathological fractures and paralysis during the procedure (Question 4) and the three results in questionnaire 1 using Pearson's chi-square test.

Results

By occupation, PT was the most common occupation and accounted for almost half of responses (Fig. 3). More than half of the therapists had more than 10 years of experience (Fig. 4). Four respondents did not have experience treating one or more patients with bone metastases in the last year (Fig. 3).

All of the therapists had strong or some anxiety about the risk of pathological fractures or paralysis during a procedure (Fig. 5); however, no therapist responded that this had ever occurred (Fig. 6). Many of the respondents had changed a procedure to a milder one or interrupted a procedure due to the patient's condition on the day. Therapists chose many options to reduce the risk of pathological fractures and paralysis during the procedure (Fig. 7). Among them, "pre-rehabilitation referral to orthopedic surgeon", "consultation with a doctor about changes in patient's symptoms and findings", and "regular cooperation between multiple occupations" were frequently selected. Other than these choices, there were opinions such as "creating a platform for sharing information among multiple occupations" and "getting advice from rehabilitation doctors and other PTs before rehabilitation intervention". As difficulties other than anxiety about pathological fractures and paralysis, about half of therapists listed poor communication between multiple departments involved and inadequate pain control (Fig. 8). Opinions other than the choices included "the patient's understanding may be low" and "it is unclear to

Q4 Do you feel anxious that patients may have a pathological fracture or paralysis during the procedure? Please check the most appropriate answer.

1. Yes, I feel strong anxiety.
2. Yes, I feel some anxiety.
3. Yes, I feel slight anxiety.
4. No, I feel almost no anxiety.

Q5 Please check the number that applies to you regarding the risk of pathological fractures or paralysis during the procedure. Please check all appropriate answers.

1. Patients have had pathological fractures or paralysis due to my procedure.
2. I have experienced a minor incident where the procedure may have caused a pathological fracture or paralysis.
3. I changed the procedure to a milder one due to the patient's condition on the day.
4. I interrupted the procedure due to the patient's condition on the day.
5. I have no experience like the above.
6. Others ()

Q6 Do you think the following suggestions would reduce the anxiety that you may cause a pathological fracture or paralysis during the procedure? Please check all appropriate answers.

1. Patients with bone metastases are referred to an orthopedic surgeon before rehabilitation to obtain opinions on load restrictions.
2. Patients are instructed to immediately report any appearance or change of symptoms.
3. The therapist should immediately consult with the attending physician, rehab doctor, or orthopedist if there are any changes in the patient's symptoms or findings.
4. Patients undergo regular imaging tests.
5. Multidisciplinary occupations (rehabilitation, primary cancer department, orthopedics, palliative care department, nurses, etc.) have the opportunity to collaborate on a regular basis.
6. Others ()

Q7 Other than the anxiety of pathological fractures and paralysis mentioned above, what do you find difficult in treating patients? Please check all appropriate answer(s).

1. Inadequate pain control.
2. Difficulty in dealing with patients due to lack of coordination between multiple departments.
3. Others ()

Fig. 2 Questionnaire 2.

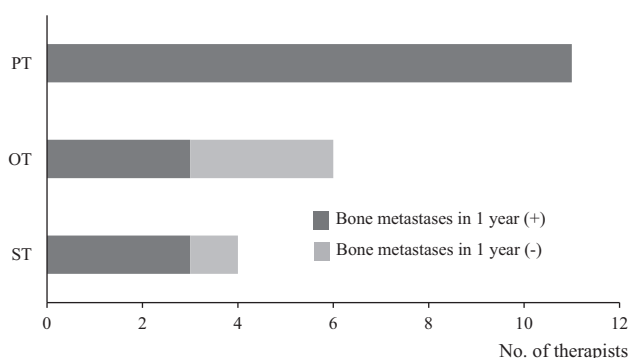


Fig. 3 Occupation and the presence or absence of experience treating of one or more patients with bone metastases in the last year.

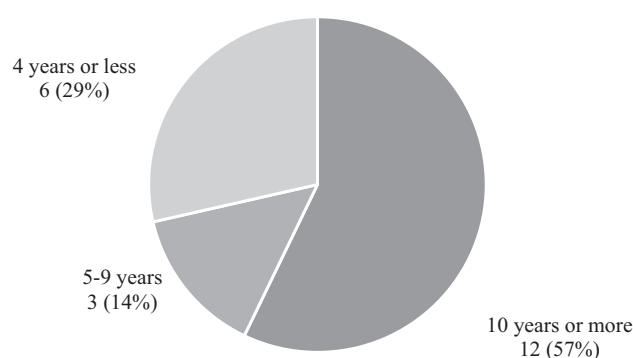


Fig. 4 Period of clinical experience as a therapist.

what extent patients have been notified of cancer and bone metastases”.

No significant association was found between the results of the questionnaire regarding anxiety about the risk of pathological fractures and paralysis during the procedure and the three results in questionnaire 1 (Table 1).

Discussion

This study’s most important finding was that many therapists were found to be anxious about the risk of pathological fractures and paralysis when treating patients with bone metastases. The anxiety tended to be slightly milder in ST, but there was no significant difference among the types of occupation. Unlike PT and OT, patients are not given a heavy weight load or exercise load in ST procedures, but it was speculated that STs may feel such anxiety during cervical spine movements during swallowing assessment or during patient transfer to the examination room. Although 4 therapists had not

treated patients with bone metastases in the last year, all therapists felt anxiety when treating patients with bone metastases. This may be based on previous experience. Our findings also suggest that anxiety was not related to the number of years of experience as a therapist and the number of such patients that the therapist was in charge of.

However, it was also found that pathological fractures and paralysis rarely occur during actual treatment, and that the therapist was able to be flexible according to the patient’s condition in this study. Many choices were selected as measures, but especially “patients with bone metastases are referred to an orthopedic surgeon before rehabilitation to obtain opinions on load restrictions” and “the therapist should immediately consult with the attending physician, rehabilitation doctor, or orthopedic surgeon if there are any changes in the patient’s symptoms or findings” were selected by as many as 86% of therapists. Other than the choices, there was an opinion that “poor communication between multiple departments involved” was a problem.

Omori and Tsuji reported that in a questionnaire conducted to 573 facilities that participated in a cancer rehabilitation workshop, the main answers to the question, “what are you careful about and devising when rehabilitating patients with bone metastases?” were as follows: “checking the condition of metastases and other metastases”, “sharing sufficient information with bone metastasis treatment doctor (orthopedic surgeon) about rest, load, and contraindications”, “avoiding painful or twisting movements”, “using braces and assistive devices”, “unifying the degree of rest and movement of patients with the ward staff”, and “giving sufficient explanations to patients and their families, and obtaining understanding

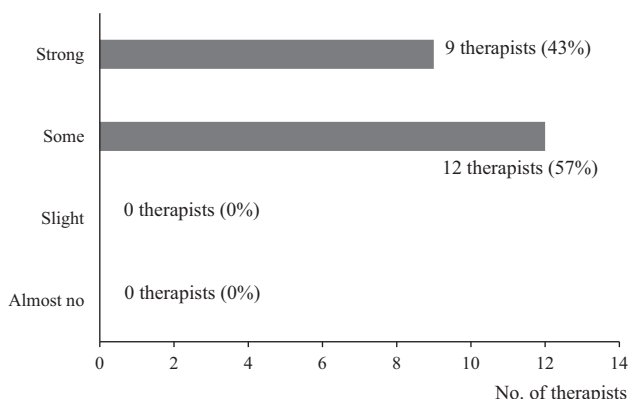


Fig. 5 Anxiety about the risk of pathological fractures or paralysis during the procedure.

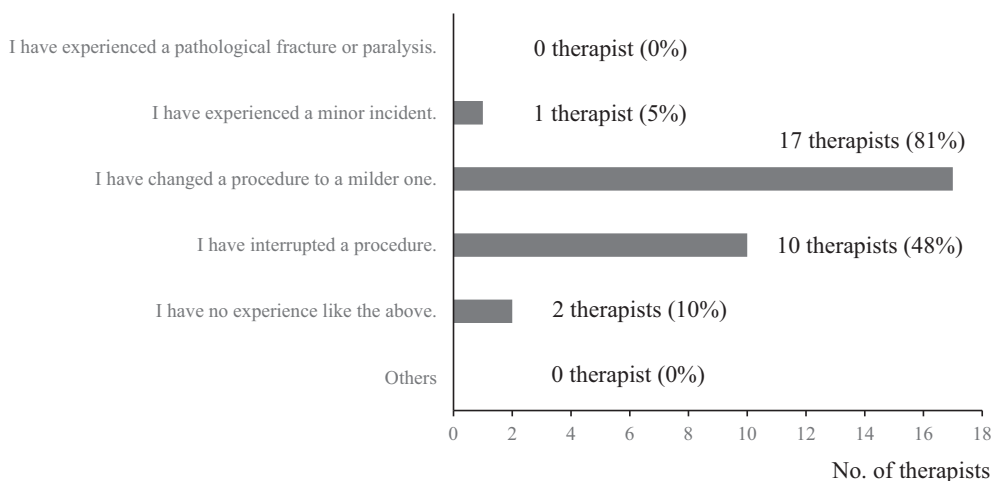


Fig. 6 Experience of pathological fractures or paralysis during the procedure.

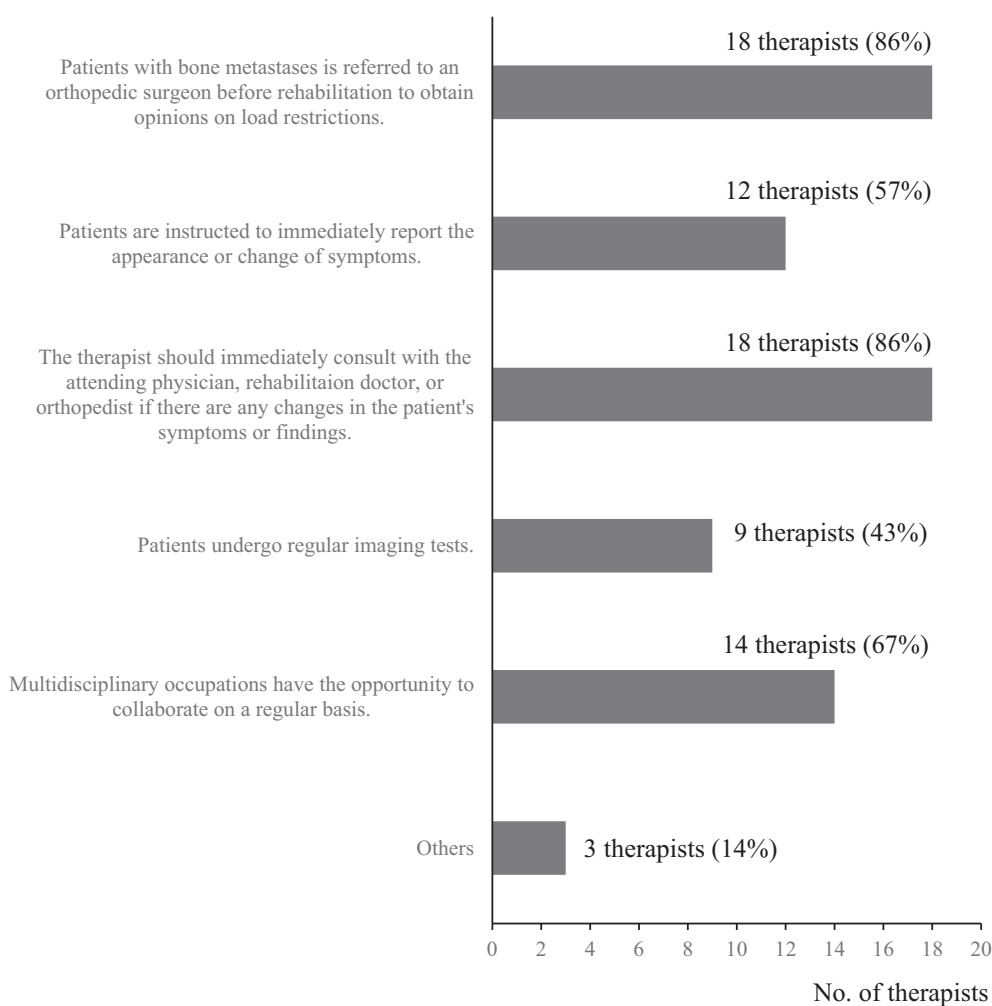


Fig. 7 Measures to reduce the risk of pathological fractures or paralysis.

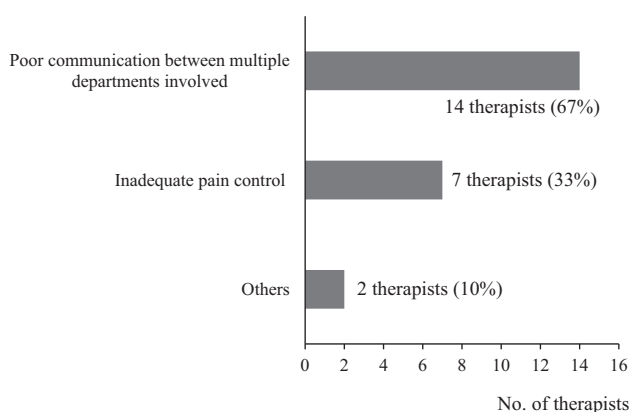


Fig. 8 Difficulties other than anxiety about pathological fractures and paralysis.

and consent⁷⁷.

It is not easy to assess the risk of pathological fracture, despite the development of many evaluation methods for pathological fracture risk⁸⁹. This is because the therapeutic effects on drug therapy and radiation therapy vary from tumor to tumor, and bone metastases steadily

worsen without effective treatment. Bunting et al. reported that 54 patients with bone metastases who underwent rehabilitation had 16 fractures in 12 patients during the rehabilitation period¹⁰. Among them, one occurred during rehabilitation, one during transfer, six while the patient was in bed, and the eight others were of unknown origin but some of them may have occurred during rehabilitation^{10,11}. It is necessary to build a system that reduces this risk.

Various methods have been reported to reduce the risk of pathological fractures and paralysis in the rehabilitation of patients with bone metastases, but what to adopt depends on the characteristics of the facility, including human factors. Akezaki et al. held weekly multidisciplinary conferences to share information and have discussions¹². Kido et al. reported that they shared information and responded to emergency cases using an in-hospital mail system using an electronic medical record network¹³. Reich reported that nurses play a key role in the management of patients with bone metastases and emphasized

Table 1 Relationships between the degree of anxiety and clinical information

Clinical information	Anxiety		<i>p</i>
	Strong	Some	
Occupation			0.11
Physical therapist	5	6	
Occupational therapist	4	2	
Speech therapist	0	4	
Clinical experience as a therapist			0.63
>9 years	5	7	
5-9 years	2	1	
<5 years	2	4	
Experience treating one or more patients with bone metastases in the last year			0.75
Yes	7	10	
No	2	2	

the importance of patient and family education such as early recognition and reporting of early signs¹⁴.

We believe positive and careful rehabilitation may help patients with bone metastases to obtain physical, social, psychological, and vocational functioning. To reduce the risk of pathological fractures and paralysis in rehabilitation of patients with bone metastases, it is important to ensure that there is: strengthening of a multidisciplinary collaboration system by creating a platform, such as an electronic medical record bulletin board; risk assessment by an orthopedic surgeon before rehabilitation intervention; explanation and education to patients and families; informed consent regarding risk of fracture and paralysis; and prompt cooperation with doctors when the patient's symptoms change. In order to implement these measures, it is necessary to have orthopedic surgeons who can devote a lot of time to the treatment of bone metastases and respond quickly to any problems.

In conclusion, our questionnaire survey of therapists regarding the treatment of patients with bone metastases found that there was considerable anxiety about the risk of pathological fractures and paralysis during treatment. Our findings suggest that it is necessary to strengthen cooperation with multiple occupations, especially those in the orthopedic field.

Conflict of Interest: The authors declare no conflicts of interest.

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