Clinics of Surgery

Psychological Intervention for Patient with Cancer Pain Caused by Metastatic Bone Tumor in Chongming Island, Shanghai, China: A Cohort Study from 2014 To 2018

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Citation:

Huang R, Psychological Intervention for Patient with Cancer Pain Caused by Metastatic Bone Tumor in Chongming Island, Shanghai, China: A Cohort Study from 2014 To 2018. Clinics of Surgery. 2020; 4(4): 1-5.

1. Abstract

1.1. Purpose: To explore the clinical outcomes of psychological intervention in the treatment of cancer pain caused by metastatic bone tumors.

1.2. Method: 60 patients with cancer pain caused by bone metastases in Xinhua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Chongming Branch, from January 2014 to December 2018 were enrolled in this study. All the patients were randomly divided into a control group and a test (PI) group (n = 30 in each group). In addition to the routine supportive treatment based on the patient's condition, stage, and clinical symptoms, the PI group was treated with psychological intervention measures compared with the control group.

1.3. Results: The effective days of pain control of the patients in the PI group were more than those in the control group (63.4±14.99 days & 46.8±15.1 days, t=4.27, P <0.0001). In the first three months of treatment, the anxiety scores of PI group were significantly lower than the control group (P < 0.0001). The life quality scores for the PI were higher than that in the control groups (P <0.0001). 4) During the 90-day follow-up period, the survival days of the PI group were remarkably higher than that of control group (P<0.05).

1.4. Conclusion: Psychological intervention can reduce the days for pain relief, alleviate the anxiety symptoms and improve the quality of life in patients suffered from cancer pain, which is worth promoting in clinical practice.

2. Introduction

Cancer pain is one of the most common clinical symptoms of patients with advanced malignant tumors. 80% of cancer patients have experienced various degrees of cancer pain [1]. Cancer pain not only causes a series of pathophysiological outcomes in patients, but also results in psychological symptoms, such as anxiety, depression, insomnia, and etc., which seriously affects the quality of life of patients, and even contribute to suicide among patients.

At present, the analgesic treatments for patients with cancer pain are often followed by three-step analgesic principle of cancer pain. However, there remains 10-20% of patients with poor analgesic outcomes [2]. In the present study, we explored the psychological intervention for cancer patients caused by bone metastatic tumors.

3. Materials and Methods

3.1. Inclusion and Exclusion Criteria for Patients with Cancer Pain

The research was approved by the ethics committee of Xinhua

Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Chongming Branch, All the enrolled patients have read and signed the consent forms of this research.

3.1.1. Inclusion Criteria: 1. The metastatic bone lesions of malignant tumor were diagnosed and confirmed by pathology and radiography; 2. The ages of enrolled patients ranged from 18 to 80 years old; 3. KPS (Karnofsky) fitness score ≥40; 4. The expected survival time of the patient was more than 1 month but less than 3 months; 5. The patients should have clear mind and can report the analgesic effect.

3.1.2. Exclusion Criteria: 1. The patients were combined with other types of pain which was not induced by cancer; 2. Brain metastasis or severe cognitive impairment, such as mental illness was occurred; 3. Patients were undergoing high fever.

3.1.3. Elimination Criteria: 1. The enrolled patients were eliminated if he or she had other pain-causing diseases during this study; 2. The follow-up date was less than 30 days due to the death or loss of follow-up of the patients.

3.2. Data Acquisition

All the patients were asked to filled in anxiety and quality of life scale and pain NRS scoring sheet [3] before entering the group. According to the NCCN guidelines and the three-step analgesic principle of cancer pain, patients in both groups were given palliative care such as support and analgesia. All patients were asked to record the number of pain attack on their own at least twice every day. In addition, patients in the test group were conducted with psychological assessment based on the anxiety score.

3.3. Observation Index

The observation and follow-up time were 90 days. The criteria for observation include: 1. Effective day for pain control: the maximum daily pain intensity was no more than 3 and less than 3 times of explosive pain were recorded; 2. The self-rating anxiety scale (SAS) employed with Likert 4-level scoring. The score of each entry in SAS was added as the initial score. The initial score is multiplied by 1.25 and the integer was taken as the standard score. The higher the score, the greater the anxiety of the patient. Anxiety: score≥50; No anxiety: score<50. 3. The quality of life evaluation was referred to the standard scoring as previous reported [4], including appetite, sleep, fatigue, mood, mental state, family understanding and cooperation, self-understanding of cancer, attitude to treatment and daily life.

3.4. Statistics

Statistical analysis was performed using SPSS 25 software (IBM, Armonk, NY). T Data fitted to normal distribution were described by mean ± SD. The comparison between the groups was performed by Student-t test. $P<0.05$ is considered statistically significant.

4. Results

4.1. Demographic Characteristics

60 patients undergoing with palliative and analgesic treatment were enrolled from January 2014 to December 2018 in the Department of Oncology, Shanghai Xinhua Hospital Chongming Branch. The enrolled patients were divided into a control group and a test group, each with 30 cases. The pain rating scale (numerical rating scale, NRS) was used to score the severity of pain of the patients. Among all the patients, 32 were male and 28 were female, and the range of ages was 56 to 79 years with a median age of 68 years old. Of all the enrolled patients, there were 23 cases of lung cancer, 5 cases of gastric cancer, 9 cases of intestinal cancer, 9 cases of prostate cancer, 8 cases of breast cancer, 3 cases of nasopharyngeal cancer and 3 cases of cervical cancer; 60 patients were divided into a control group and a test group randomly with 30 cases in each group. There was no significant difference between the two groups in terms of age, gender, education, economic status, NRS score and cognitive status (P>0.05).

4.2. Cancer Pain Control Days

In the present study, we compared the cancer pain control status of the two groups. The results showed that the effective day of pain control in the control group and test group were 46.8±15.15 days and 63.4±14.99 days, respectively. The t value of the comparison was 4.27 and the P value was <0.0001, indicating a significant difference (P <0.01) between the two groups.

4.3. Anxiety Score

We compared the anxiety scored between the two groups at 0, 1, 2, 3 months after the psychological intervention. The anxiety scores of the test group and the control group at 0 month were 54.27±12.38 and 53.73±12.20, respectively (P = 0.86 >0.05), indicating no significant difference between the two groups. However, for patients at 1, 2, 3 months after psychological Intervention, the anxiety scores were 47.93±9.38, 43.86±8.04 and 38.5±6.92, respectively. Comparatively, while the anxiety scores in control group were 58.9±7.72, 59.79±5.44 and 62±4.90. All the P values between the two groups was less than 0.0001, suggesting that there were significant statistical differences between the two groups. The longitudinal comparison showed that, between the anxiety scores at 2 or 3 months to 0 month with the test group, the P values were 0.0057 and 0.0021, respectively, indicating there existed significant differences within the test group (Table 1).

4.4. Quality of Life Score

We next compared the quality of life score between the two groups at 0, 1, 2, 3 months after the psychological intervention. The quality of life scores of the test group and the control group at 0 month were 22.81±4.33 and 23±2.95 (P= 0.8433 > 0.05), indicating no significant difference in two groups before the psychological Intervention. However, the quality of life scores of the test group at 1, 2, 3 months after the psychological Intervention were 32.63±2.46, 32.95±1.67, and 35.13±1.64, respectively. By contrast, the quality of life scores of the control group were: 20.87±3.54, 19±3.19

and 15.4±2.07, respectively. Compared with the control group at all-time points, all the P values were less than 0.0001, indicating there existed significant differences between the two groups. The longitudinal comparison showed that there have significant differences in quality of life scores within each group between 0 month and 1, 2 or 3 months after psychological intervention (P <0.0001) (Table 2).

4.5. Survival Time

During the 90-day follow-up, the survival days of the test group and the control group were 73.6±14.90 and 62.2±18.10 (P=0.035 <0.05), indicating a significant difference between the two groups (Figure 1).

Table 1: Anxiety scores in control and test groups a 0,1,2 and 3 months after psychological Intervention.

		0 (Month)	1(Month)	2 (Months)	3(Months)
Test	Score	54.27±12.38	47.93±9.38	43.86±8.04**	38.5±6.92**
	Case (n)	30	30	22	8
Control	Score	53.73±12.20	58.9±7.72	59.79±5.44	62±4.90
	Case (n)	30	30	14	5
t		0.1702	4.946	6.509	6.584
P		0.8655	<0.0001	<0.0001	<0.0001

** indicates P <0.0001

Table 2: Quality of life scores in control and test groups a 0,1,2 and 3 months after psychological Intervention.

		0 (Month)	1(Month)	2 (Months)	3(Months)
Test	Score	22.81±4.33	32.63±2.46**	32.95±1.67**	35.13±1.64**
	Case (n)	30	30	22	8
Control	Score	23±2.95	20.87±3.54**	19±3.19**	15.4±2.07**
	Case (n)	30	30	14	5
t		0.1986	14.94	17.22	19.14
P		0.8433	<0.0001	<0.0001	<0.0001

** indicates P <0.0001
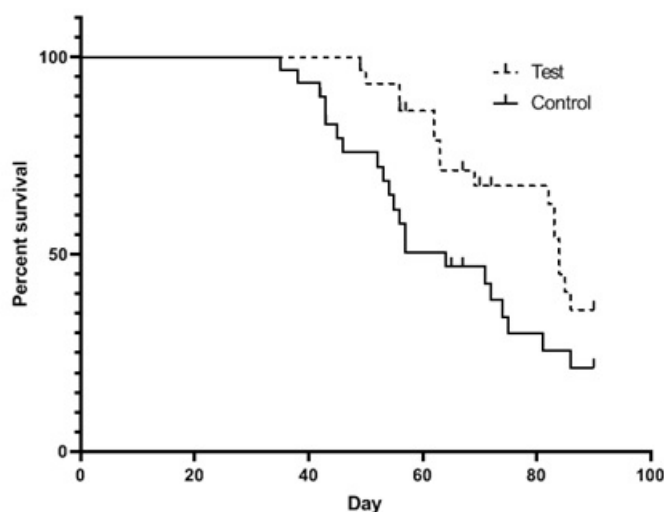
Figure 1: Comparison of survival time in test and control groups

5. Discussion

Cancer pain is one of the most common symptoms of patients with malignant tumors. About 70-80% of patients worldwide with end-stage tumors are suffering from cancer pain. The cancer pain may not only cause a series of pathophysiological disorders in patients, but also result in various of psychological symptoms like anxiety, depression and insomnia, and even committing to suicide, which seriously affecting the quality of life of the patients [5]. The pathogenesis and complexity of cancer pain are caused by the complicated interactions between cancer cells, peripheral tissues, central nervous system and immune system [6]. Meanwhile, psychosocial factor plays an important role on pain severity and relief [7]. Therefore, a majority of studies and guidelines recommend the combination of pharmacologic and non-pharmacologic approaches to cancer-related pain based on the biopsychosocial model.

This study adopted an anxiety questionnaire survey on patients with metastatic bone tumors on the basis of conventional treatment under the guide of NCCN guidelines, Chinese expert consensus statement on clinical diagnosis and treatment of malignant bone metastasis and bone related diseases (2014 edition), and the principle of three-step analgesia for cancer pain. Psychological assessment, psychological intervention and anti-anxiety medications were conducted respectively according to the survey results. The study reveals that after psychological intervention, the patient's effective day of pain control, anxiety symptom score, and depression score were significantly better than the control group. Psychological intervention may be effective in treating cancer pain in reducing the patient's anxiety and depression symptoms. It is assumed that [12] psychological intervention may stimulate changes in the immune function of patients. Changes in immune function may lead to changes in the tumor microenvironment of patients with cancer pain, resulting in clinical efficacy. In addition, some researches have indicated some psychological problems happened in patients with cancer-related pain, which are regarded as barriers to the communication between patients and medical providers on pain. For example, patients are always fear of reporting their pain because they think increased pain severity means progression or recurrence of their diseases, or not expect to reduce the dose of their chemotherapy, or they don't believe the pain can be relieved [13]. The treatment of cancer-related pain can be improved by modifying patient's cognition of pain and breaking the communication barrier by means of psychological assessment, psychological interventions and anti-anxiety drug treatment [14]. However, further basic experimental confirmation is needed to support the hypotheses above.

Other forms of psychological intervention can be added in future studies. For example, Miaskowski et al. published an RCT research paper on cancer pain patients in 2004. The paper discussed the role of patient education in relieving cancer pain. The experiment found that compared with the control group, the pain intensity score of the experimental group receiving patient education was significantly decreased from the baseline (all P<.0001) at the end of the study [15]. A meta-analysis of 20 articles supports that cognitive behavioral therapy (CBT) has a significant effect in reducing cancer pain in breast cancer patients. In the experimental group, 69% of patients had a lower degree of cancer-related pain than those in the control group [16]. In addition, hypnotherapy may also be effective. After analyzing 27 effect sizes and more than 900 participants, Montgomery et al. concluded that hypnotic suggestion is an effective analgesic. For 75% of the population, hypnosis can greatly relieve pain [17]. On the other hand, in addition to anxiety and depression, interventions can also be targeted to other psychological disorders such as post-traumatic stress disorder(PTSD). It is reported that up to one third of patients experienced PTSD symptoms after their diagnosis and 3% to 22% among them will develop into PTSD, which is likely to be one of the psychological problem associated with cancer pain [13].

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