Hypnotic Intervention for Unexplained Dizziness in Patients with Advanced Cancer: A Preliminary Retrospective Observation Study

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Abstract

Context: Patients with advanced cancer rarely complain of unexplained dizziness after excluding identifiable causes. Some patients become anxious because they attribute the dizziness to the progression of their cancer. We hypothesize that unexplained dizziness is associated with neck muscle hypertonicity, a noncancer-related secondary effect. However, most cases are associated with neck muscle hypertonicity, a noncancer-related secondary effect. Aims: We evaluated the usefulness of hypnotic intervention that made patients aware of the relation between dizziness and neck muscle hypertonicity through the experience of muscle relaxation and recognition of muscle tension. Settings and Design: Advanced cancer patients requiring palliative care with unexplained dizziness who received the intervention to induce neck muscle relaxation were retrospectively compared with patients who did not. Subjects and Methods: The severity of dizziness that was evaluated using a numeric rating scale and the intervention efficacy rate were compared between the hypnotic and nonhypnotic groups as the primary endpoints, 7 days after the start of the intervention. Secondary endpoints included the effect size based on dizziness handicap inventory (DHI) scores before and after the intervention, and changes in patients’ awareness of the cause of dizziness. Results: The hypnotic intervention had a significantly greater efficacy rate (0.67, 95% confidence interval: 0.46–0.88) than the nonhypnotic intervention (0.26, 95% confidence interval: 0.08–0.44). DHI scores, especially on the emotional subscale, showed significant improvement after the intervention, and 71% of the patients were aware that neck muscle hypertonicity was the cause of dizziness. Conclusions: The rapid improvement in dizziness in the hypnotic group was considered to result from a change in patients’ awareness of self-manageable neck muscle hypertonicity as the cause of dizziness.

Keywords: Advanced cancer, awareness, dizziness, hypnosis, secondary neck muscle hypertonicity

INTRODUCTION

Patients with advanced cancer rarely complain of unexplained somatic symptoms for which no direct cause can be determined. Few studies have evaluated the cause and treatment of nonorganic somatic symptoms in patients with cancer. Somatoform disorder and anxiety disorder are used as psychiatric diagnoses for unexplained somatic symptoms, and they are difficult to ameliorate. No psychiatric and psychological intervention for unexplained somatic symptoms has yet been established in patients with advanced cancer.

One of the unexplained somatic symptoms that such patients suffer from is dizziness, which is often related to psychological stress. Stress is closely associated with endolymphatic water metabolism, which complicates the relation between dizziness and its systemic effects. Complicated dizziness should be treated with a combination of psychological and physical interventions, yet most patients demonstrating psychosomatic symptoms are reluctant to receive psychological treatment. A previous report showed that 83% of patients with advanced cancer were positive about accepting a physical interventions. Secondary neck muscle hypertonicity has been observed in patients with dizziness, and its relation with shoulder stiffness and the feeling of cervical heaviness has been addressed.

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Neck muscle hypertonicity increases to stabilize the static posture resulting from vestibular compensation.[7] There is no report on association between dizziness and neck muscle hypertonicity in patients with cancer. We hypothesize the existence of secondary neck muscle hypertonicity as a cause of unexplained dizziness in patients with cancer. The hyperactivation of the muscle spindle deep in the neck has been considered as a possible mechanism for neck muscle hypertonicity-induced dizziness.[8] There is also a possible relation between the muscle spindle and the myofascial trigger point, which is a typical pathologic finding in myofascial pain syndrome.[9] The myofascial pain syndrome is recognized in the neck to 11.9% 1 year after curative treatment of head and neck cancer.[10] The myofascial trigger points are reported to be in 31% of advanced cancer patients, and one-third was in the neck.[11] It has been reported that emotional factors such as anger and psychological distress, and psychosocial factors such as insomnia, may constitute important myofascial trigger points risk factors.[12,13]

Some patients with advanced cancer tend to consider the development of somatic symptoms as a sign of cancer progression, resulting in increased anxiety. A study that focused on patient-related barriers to opioid use reduced patients’ anxiety by addressing their misconception that pain is an indication of the progression of disease.[14] Behavioral intervention is a useful approach for changing patients’ awareness.[15] In terms of the psychosocial approach to pain management in patients with cancer, techniques aiming at behavioral change and the acquisition of coping skills are recommended.[16] These techniques include hypnotherapy, biofeedback therapy, and relaxation. To the best of our knowledge, no published studies have evaluated behavioral interventions for patients complaining of unexplained dizziness.

In this study, we used behavioral intervention to effectively change patients’ attributions of the cause of dizziness. In the intervention, patients were encouraged to experience muscular relaxation with hypnosis and to recognize the existence of neck muscle hypertonicity. We then attempted to make patients aware of the relation between dizziness and neck muscle hypertonicity, which is independent from cancer [Figure 1].

**Subjects and Methods**

This study was performed as a preliminary retrospective observational analysis. The aim was to evaluate the usefulness of hypnosis to develop awareness in patients with advanced cancer with dizziness.

The medical records of patients who received palliative care and complained of unexplained dizziness for at least 7 days were collected. We compared two patient populations: those who were encouraged to experience muscular relaxation with hypnosis and to recognize the existence of neck muscle hypertonicity (hypnotic group) and those who were encouraged to recognize the existence of neck muscle hypertonicity with linguistic explanation (nonhypnotic group). The medical records extracted for the study included demographic factors, Eastern Cooperative Oncology Group Performance Status, and the time course and severity of dizziness in both groups. Information on patients’ awareness of the cause of dizziness, the primary tumor, concomitant treatment, days to live after initiation of the intervention, and subsequent outcome was also extracted from the records of the hypnotic group. The study subjects were hospitalized at Akaiwa Medical Association Hospital or its related medical facilities from April 2009 to March 2016. “Unexplained dizziness” was determined when the patient did not have a previous history of dizziness, and the health-care provider did not find an organic cause within 7 days after the onset of dizziness.

On the 1st day of the intervention, patients in both groups were told that “neck muscle hypertonicity is one cause” of dizziness and were taught a progressive muscle relaxation technique. Patients in the awareness intervention group received hypnosis to induce neck muscle relaxation. One of the authors, HH, performed hypnosis in the hypnotic or hypnoidal state, depending on the level of muscle relaxation and the advent of catalepsy. The hypnosis in this study was performed as a single session without the clinical application technique. During the intervention period, patients in both groups received general clinical care and psychotherapy.

The primary endpoints in this study were the difference in severity of dizziness and the intervention efficacy rate between the two groups 7 days after the start of the intervention. The severity of dizziness was evaluated using a 0–10 numeric rating scale (NRS-11). The efficacy rate was evaluated in the same manner as the severity of pain,[17] based on the percentage of patients who demonstrated a reduction of ≥33% in the severity of dizziness. The first secondary endpoint was the change in baseline dizziness handicap inventory (DHI) scores 7 days after the start of the intervention. The DHI is a self-report questionnaire that assesses the effect of dizziness on daily life activities. It consists of 25 items grouped into three subscales: physical (DHI-P, 7 items), emotional (DHI-E, 9 items), and functional (DHI-F, 9 items). Each item is scored from 0 to 4, with a maximum total score of 100. Higher scores indicate more severe dizziness.[18] Another secondary endpoint was the change in patients’ awareness of the cause of dizziness in both groups. Before and after the 7-day intervention, one of the authors, HH, asked patients “What do you think causes your dizziness?”

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**Figure 1:** Schematic diagram of the intervention

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The change in the severity of dizziness was statistically analyzed using one-way repeated measures ANOVA for each group. The between-group difference in the change in severity of dizziness was compared using two-way repeated measures ANOVA. DHI scores before and after the intervention were compared using the paired t-test, followed by calculation of the effect size (γ). A large effect size was defined as >0.50, a medium effect size between >0.30 and ≤0.50, and a small effect size between >0.10 and ≤0.30.

Statistical analyses were performed using SigmaStat Version 3.5 statistical software (SPSS Inc., Chicago, IL, USA). P < 0.05 were considered statistically significant. An NRS score of 10 was applied to patients who dropped out of the study.

**RESULTS**

The hypnotic group included 21 patients, of whom 43% were male. Patients in the hypnotic group had a median age of 64.6 years (range: 40–81 years range) and a mean performance status of 2.6 (standard deviation [SD] = 0.7). The patients lived an average of 67.9 days (SD = 48.4) after eliminating two patients who survived until the end of the study period [Table 1]. The nonhypnotic group included 23 patients, of whom 35% were male. Patients in the nonhypnotic group had a median age of 65.3 years (range: 38–82 years) and mean performance status of 2.3 (SD = 0.9). Within 7 days after the start of the intervention, one patient from each group dropped out.

**Changes in severity of dizziness and comparison of the efficacy rate between the two groups**

NRS scores in hypnotic group were 7.2 (SD = 2.3) at baseline and 3.4 (SD = 3.1) and 3.3 (SD = 3.0) after 3 and 7 days, respectively. NRS scores in the nonhypnotic group were 6.7 (SD = 1.8) at baseline and 6.2 (SD = 2.6) and 7.1 (SD = 2.3) after 3 and 7 days, respectively. The efficacy rates after 7 days were 0.67 (95% confidence interval: 0.46–0.88) in the hypnotic group and 0.26 (95% confidence interval: 0.08–0.44) in the nonhypnotic group. In the hypnotic group, the change in the NRS score from baseline was significant at 3 days (P = 0.003) and 7 days (P < 0.001) after the start of the hypnosis. However, the change in NRS scores between 3 and 7 days was not significant (P = 1.000). NRS scores in the nonhypnotic group did not significantly change after 3 days (P = 0.356) or 7 days compared with the baseline (P = 0.875). A between-group comparison showed a significant difference in the change in NRS scores after the start of the intervention (P < 0.001) [Figure 2].

**Dizziness handicap inventory scores and effect sizes before and after the start of hypnosis**

The overall DHI score was significantly improved by the intervention with a medium effect size [Table 2]. There were significant improvements in the DHI-P and DHI-E subscale scores, with a medium and large effect size, respectively. No significant change was observed in the DHI-F subscale.

**Change in patients’ awareness of the cause of dizziness**

Before the hypnotic intervention, 42% of patients had a vague sense that their dizziness might be related to the progression of cancer, 24% attributed it to the side effects of chemotherapy, 24% to an unknown cause, and 10% to meningeal dissemination due to the progression of cancer. However, after the intervention, 71% of patients believed that the potential cause of dizziness included neck muscle

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**Table 1: Patients’ background, intervention efficacy, and subsequent outcome after the intervention in the hypnotic group**

| Patient No. | Age (year old) | Sex | Primary tumor site | Performance status | Concomitant therapy | Days to live after the intervention initiation | Intervention efficacy | Subsequence |
|-------------|----------------|-----|-------------------|--------------------|--------------------|----------------------------------------------|----------------------|-------------|
| 1           | 55             | F   | Large intestine   | 2                  | None               | 36 days                                      | Yes                  | None        |
| 2           | 55             | F   | Breast            | 3                  | None               | 42 days                                      | Yes                  | None        |
| 3           | 63             | F   | Large intestine   | 3                  | None               | 54 days                                      | Yes                  | None        |
| 4           | 64             | M   | Esophagus         | 3                  | None               | 27 days                                      | Yes                  | None        |
| 5           | 65             | M   | Esophagus         | 3                  | None               | Survived >3 months                           | Yes                  | None        |
| 6           | 67             | F   | Lung              | 3                  | Chemotherapy       | 44 days                                      | Yes                  | None        |
| 7           | 68             | F   | Liver             | 2                  | None               | 73 days                                      | Yes                  | None        |
| 8           | 68             | M   | Pancreas          | 3                  | None               | 34 days                                      | Yes                  | None        |
| 9           | 70             | F   | Large intestine   | 2                  | Chemotherapy       | 72 days                                      | Yes                  | None        |
| 10          | 74             | F   | Pancreas          | 3                  | None               | 31 days                                      | Yes                  | None        |
| 11          | 63             | F   | Breast            | 3                  | Chemotherapy       | 21 days                                      | Yes                  | None        |
| 12          | 68             | M   | Stomach           | 2                  | None               | 64 days                                      | Yes                  | None        |
| 13          | 40             | F   | Lung              | 2                  | None               | 64 days                                      | Yes                  | Meningeal dissemination |
| 14          | 45             | M   | Stomach           | 1                  | Chemotherapy       | Survived >3 months                           | Yes                  | Meningeal dissemination |
| 15          | 60             | M   | Stomach           | 4                  | None               | 11 days                                      | No                   | Hemorrhage  |
| 16          | 61             | F   | Breast            | 2                  | None               | 25 days                                      | No                   | Prolonged dizziness   |
| 17          | 76             | M   | Prostate          | 3                  | Radiotherapy       | 214 days                                     | No                   | Prolonged dizziness   |
| 18          | 81             | M   | Colon             | 2                  | None               | 93 days                                      | No                   | Prolonged dizziness   |
| 19          | 76             | M   | Stomach           | 2                  | None               | 77 days                                      | No                   | Prolonged dizziness   |
| 20          | 64             | F   | Breast            | 3                  | Chemotherapy       | 65 days                                      | No                   | Prolonged dizziness   |
| 21          | 73             | M   | Prostate          | 3                  | Chemotherapy       | 117 days                                     | No                   | Prolonged dizziness   |
Changes in numerical rating scale scores over time in hypothetic and nonhypothetic groups. *: P value refers to the between-group comparison. A previous report showed that the expectation of reduced pain affects the prognosis of pain in cancer patients.11 The results of this study show that patients who expected their pain to decrease had significantly lower pain intensity NRS after a week. The symptoms of pain and dizziness in advanced cancer are complex, and many factors potentially influence the outcome of the intervention. In this study, we considered that the expectation from self-management of symptoms was one of the most important factors influencing the prognosis of dizziness.

Another important finding was that the hypnotic intervention brought about rapid changes in patients’ awareness of the cause of their symptoms. Behavioral intervention is more effective for changing patients’ awareness than psychological therapy with verbal explanation.12 However, changing patients’ awareness of the cause of symptoms within a short period is not easy in the terminal stage of cancer. Progressive muscle relaxation is the most commonly used behavioral intervention in patients with cancer. However, there have been few randomized controlled studies on progressive muscle relaxation in patients with cancer,13 and no reports on whether it can change patients’ awareness.

In this study, we used a physiological feedback mechanism in which patients experienced muscular relaxation induced by hypnosis. Hypnosis, which is a behavioral intervention, can effectively stabilize the autonomic nerve system by inducing deep muscular relaxation and an altered state of consciousness. Hypnosis has the advantage of easily enabling patients to experience physiological changes. For patients with poor self-awareness of muscle tension, the experience of physiological change is surprising and promotes self-awareness of their physiological status. The patients in our study were considered to have changed their awareness through recognition of muscle tension, which led them to understand the relation between dizziness and neck muscle hypertonicity. To the best of our knowledge, no studies have evaluated the effect of hypnosis on chronic dizziness. Although studies have evaluated the outcomes of autogenic training,
including self-hypnosis for chronic dizziness and hypnosis for tension headaches, its usefulness or mechanism has not yet been established.\[25,26\]

This study has several limitations. First, the symptoms of dizziness in advanced cancer are complex and many factors could affect the outcome of the intervention. We expected that the self-management of symptoms was one of the most important factors influencing the prognosis of dizziness. Second, this study was retrospective study. This study was not blinded because the first author was the primary palliative care physician for the study participants, and also collected and analyzed the data. Finally, an objective evaluation using an electroencephalogram was not performed. Therefore, the consistency or reliability of the depth of hypnosis was not established. Based on these limitations, this study is considered to be preliminary.

**Conclusions**

The rapid improvement in dizziness in the hypnotic group was considered to result from a change in patient’s awareness of self-manageable neck muscle hypertonicity as the cause of dizziness.

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Nil.

**Conflicts of interest**

There are no conflicts of interest.

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