Palliative and Supportive Care

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Wernicke encephalopathy in a caregiver: A serious physical issue resulting from stress in a family member caring for an advanced cancer patient

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Case Report

Cite this article: Ishida M, Uchida N, Yoshioka A, Sato I, Hamaguchi T, Horita Y, Mihara Y, Onishi H (2022). Wernicke encephalopathy in a caregiver: A serious physical issue resulting from stress in a family member caring for an advanced cancer patient. *Palliative and Supportive Care* **20**, 600–602. https://doi.org/10.1017/S1478951521001784

Received: 15 August 2021
Revised: 25 September 2021
Accepted: 17 October 2021

Key words:
Caregiver; Delirium; Diabetes mellitus; Thiamine deficiency; Wernicke encephalopathy

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Abstract

Objective. It is well known that the burden on the families of cancer patient extends across many aspects, but there have been no reports of family members developing delirium due to the burden of caring for a cancer patient.

Methods. We reported a caregiver who developed Wernicke encephalopathy (WE) while caring for a family member with advanced cancer.

Results. The subject was a 71-year-old woman who had been caring for her husband, diagnosed with gastric cancer and liver metastases, for 5 months. She visited the "caregivers' clinic" after referral by an oncologist who was worried about a deterioration in her mental condition that had appeared several weeks previously. The woman had a history of diabetes mellitus. Some giddiness was observed and, based on her inability to answer questions, her level of consciousness was checked and some disorientation was observed. She was diagnosed with delirium. A blood sample was collected to investigate the cause of the delirium, but the test data showed no hypoglycemia. Her appetite had declined since her husband was diagnosed with cancer. Thiamine deficiency was suspected as thiamine stores in the body are depleted within about 18 days and her loss of appetite had continued for 5 months. On intravenous injection of 100 mg of thiamine, her consciousness level was returned to normal in 1 h. A diagnosis of WE was supported by the patient's abnormally low serum thiamine level.

Significance of the results. The family members of cancer patients may develop a loss of appetite due to the burden of caring, resulting in WE. When providing care for signs of distress in family members, it is necessary to pay attention not only to the psychological aspects but also to their level of consciousness and physical aspects, particularly the possibility of serious illness resulting from reduced nutritional status.

Introduction

The presence of a family member with cancer is a major life event, with the family members of cancer patients known to experience psychological, physical, and social as well as spiritual burdens. It has, therefore, been highlighted that the families of cancer patients are "second-order patients" and require treatment and care (Lederberg, 1998).

Thiamine is, through its biologically active derivative thiamine pyrophosphate, a cofactor essential for glucose metabolism but one that cannot be produced *in vivo*, with the physiological store depending on intake from external sources. The store of thiamine within the body is depleted within about 18 days, and deficiency is likely to occur if a loss of appetite continues for a few weeks (Sechi et al., 2016). Wernicke encephalopathy (WE) is a neuropsychiatric disorder known to be caused by thiamine deficiency. This disease is said to present with a classical triad of symptoms: impaired consciousness, ataxic gait, and nystagmus, and if detected early and treated appropriately with thiamine replacement therapy, it can be resolved without sequelae. However, the triad of symptoms are nonspecific and cases are often overlooked due to the low proportion of cases showing all three (Sechi and Serra, 2007). If the condition continues to be overlooked, Korsakoff syndrome can develop, resulting in irreversible brain damage.

Fatigue and depression are common physical and psychological symptoms among the family members of cancer patients (Braun et al., 2007; Hudson et al., 2011; Johansen et al., 2018). However, although these symptoms are both symptoms of thiamine deficiency and thiamine

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deficiency-inducing symptoms, there is only one report to date on thiamine deficiency in family members caring for cancer patients (Onishi et al., 2019).

Herein, we report a case in which delirium was observed in a family member caring for a cancer patient, and as a result of detailed examination, WE was diagnosed. Appropriate treatment led to patient recovery without any sequelae.

Case report

The caregiver was a 71-year-old female whose husband had been treated with chemotherapy for gastric cancer and liver metastasis for 5 months, but whose condition had progressed. She and her husband had been told that chemotherapy would be discontinued two days prior to her visit to the "caregivers' clinic" to which she was referred by the oncologist who was concerned with her psychological status due to the insomnia and depression she had been experiencing for several weeks. She had a history of diabetes mellitus and had been receiving vildagliptin 50 mg/metformin hydrochloride 500 mg combination tablets. No decline in memory or history of alcohol and drug dependence was observed.

Some giddiness was observed on entering the room at the time of the interview and she was unable to answer simple questions from the medical staff. She was suspected of a decreased level of consciousness, and when her consciousness level was checked, she could not state the date or perform calculations (serial seven). Neurologically, some disorientation was observed, but there was no sign of nystagmus. She was 146.7 cm in height, her body temperature was 36.7° C, she was 44.0 kg in weight (body mass index = 20.45), her blood pressure was 140/63 mmHg, and her pulse rate was 74 beats/min. Her family reported that she had been experiencing a loss of appetite and she had lost 10 kg since her husband was diagnosed with cancer.

Based on the above clinical findings, her psychiatric features fulfilled the Diagnostic and Statistical Manual of Mental Disorders, 5th edition, criteria (American Psychiatric Association, 2013) for delirium.

A blood sample was collected to investigate the cause of the delirium, but the test data showed no hypoglycemia. Further, no other abnormalities were found with regard to liver function, renal function, thyroid function, etc. that could explain her medical condition (Table 1).

Thiamine deficiency was suspected as the stores of thiamine in the body are depleted within about 18 days (Sechi et al., 2016), and the patient had experienced a loss of appetite lasting 5 months and had lost 10 kg in weight. After intravenous injection of 100 mg of thiamine, her level of consciousness returned to normal in 1 h. Her serum thiamine level, as measured using high-performance liquid chromatography, was found to be abnormally low at 13 ng/mL (reference range: 24–66 ng/mL), whereas her serum vitamin B12 and folic acid levels were within the normal ranges. Based on these findings, she was diagnosed with WE.

In an interview after recovery from delirium, the patient complained that her general malaise had eased, but her depressed mood, decreased motivation, decreased appetite, sleep disorders, difficulty in concentrating, feelings of self-condemnation, and suicidal ideation continued for more than two weeks. She was diagnosed with depression and was given 15 mg of mirtazapine and 3 mg of aripiprazole. One week later, the above symptoms had improved. A consideration of these facts suggests that, in this case, the depression developed during the course of nursing care and as a result of a continued loss of appetite, with WE developing due to an insufficient intake of thiamine.

Table 1. Laboratory findings

Variable	Values	reference range
White blood cell count	5.24	$3.25–8.57 \times 10^3$
Red blood cell count	3.79	$3.58–4.90 \times 10^6$
Hemoglobin	11.7	11.10–15.50 g/dL
Hematocrit	33.4	35.10–44.40%
Albumin	4.1	3.30–4.90 g/dL
Aspartate aminotransferase (AST)	19	8.00–38.00 U/L
Alanine aminotransferase (ALT)	8	4.00–44.00 U/L
Lactate dehydrogenase (LDH)	193	124–222 U/L
Alkaline phosphatase (ALP)	71	38–113 U/L
Creatinine (Cr)	0.58	0.34–0.79 mg/dL
Sodium (Na)	146	138.00–147.00 mEq/L
Chloride (Cl)	110	98.00–110.00 mEq/L
Potassium (K)	3.8	3.30–4.80 mEq/L
Calcium (Ca)	9.1	8.50–10.50 mg/dL
Glucose	105	73–109 mg/dL
Hemoglobin A1c	6.6	4.9–6.0%
Free T3	2.34	1.88–3.18 pg/mL
TSH	1.332	0.35–4.94 μIU/mL
Free T4	0.98	0.70–1.48 pg/dL
Vitamin B1	13	24–66ng/mL
Vitamin B12	242	180–914 g/mL
Folic acid	5.2	≧4 pg/mL

Oral administration of 100 mg of fursultiamine has since been continued as a treatment for thiamine deficiency. She has continued to care for her husband, but no deterioration in consciousness or depressive symptoms has been observed.

Discussion

A family member of an advanced cancer patient presented with delirium that arose during the course of care, and detailed interviews and examinations revealed WE. However, proper diagnosis and treatment allowed recovery without any CNS-related sequelae.

To our knowledge there have been no reports of cases of delirium in cancer patient caregivers. This report suggests that family members may also develop delirium as well as WE.

The present case showed a history of diabetes mellitus and the patient presented with impaired consciousness, so a differential diagnosis would be hypoglycemia. However, vildagliptin/metformin combination tablets rarely lead to hypoglycemia (Matthews et al., 2019). Treatment with glucose can lead to the further depletion of thiamine and symptoms may be exacerbated (Bhardwaj et al., 2008). Therefore, thiamine should be given before glucose in cases in which a thiamine deficiency is suspected.

The patient's general malaise improved after intravenous thiamine injection. Fatigue is one of the symptoms of thiamine deficiency (Sechi and Serra, 2007), but the symptoms are nonspecific

https://doi.org/10.1017/S1478951521001784 Published online by Cambridge University Press

and can occur in relation to other illnesses. Although general malaise is common in the family of cancer patients and in patients with depression, it is also a symptom of WE, as in this case, so careful discrimination may be required.

In conclusion, staff involved in cancer care should pay attention to the level of consciousness of family members and perform screening when necessary. Family members who care for cancer patients should also be considered as having the potential to develop WE due to loss of appetite and nutritional problems associated with fatigue due to the care burden. Proper diagnosis and immediate therapeutic intervention are valuable in preventing WE-induced brain damage.

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