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Thiamine deficiency observed in a cancer patient's caregiver

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Case Report

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Abstract

Objective. Thiamine deficiency (TD) is recognized in various kinds of disease with associated loss of appetite including cancer; however, TD has not been recognized in the family caregivers of cancer patients to date.

Method. From a series of cancer patient caregivers, we reported an aged family caregiver who developed TD while caring for the cancer patient.

Result. The caregiver was a 90-year-old male. He had been accompanying his wife, who was diagnosed with colon cancer 4 years previously, on hospital visits as the primary caregiver, but because of psychological issues, he was recommended to visit the psycho-oncology department's "caregiver's clinic" for a consultation. Detailed examination revealed that his appetite had been only about 50% of usual from about one year before, and he had lost 12 kg in weight in one year. The diagnosis of TD was supported by his abnormally low serum thiamine level.

Significance of the results. This report demonstrates that there is a possibility that care providers could develop TD from the burdens associated with caregiving. TD should be considered whenever there is a loss of appetite lasting for more than 2 weeks, and medical staff should pay careful attention to the physical condition of care providers to prevent complications resulting from TD.

Introduction

Family caregivers of cancer patients suffer from various types of stress involving the psychological, physical, social, and spiritual aspects of their lives; therefore, they are often referred to as "second-order patients" (Lederberg, 1998). In terms of the physical aspects, increased morbidity of insomnia, heart disease, and increased medical costs have been noted (Carter, 2002; Patrick et al., 1992; Shaw et al., 1997).

Thiamine, in its biologically active form thiamine pyrophosphate, is an essential coenzyme for oxidative metabolism (Sechi et al., 2016). Because the human body cannot synthesize thiamine internally, thiamine must be ingested from food. The limit of thiamine storage in the human body is only 18 days (MacLean et al., 1983).

Wernicke encephalopathy (WE) is a neuropsychiatric disorder caused by severe acute/subacute thiamine deficiency (TD) (Sechi & Serra, 2007). The classical symptoms of WE are mental status changes, ataxia, and ophthalmoplegia. This disorder is reversible if properly diagnosed and treated with parenteral thiamine administration. If left untreated, however, it causes severe and irreversible brain damage (Korsakoff syndrome) leading to death. The estimated mortality rate is about 20% (Victor et al., 1971).

Thiamine deficiency (TD) is recognized in various kinds of disease with associated loss of appetite, including cancer (Isenberg-Grzeda et al., 2012, 2016; Onishi et al., 2017, 2018b); however, TD has not been recognized in family caregivers of cancer patients to date. In this communication, we describe a cancer patient's family caregiver who developed TD while caring for the cancer patient. Correct diagnosis and subsequent thiamine administration prevented delirium and irreversible brain damage resulting from WE and Korsakoff syndrome.

Case report

The caregiver was a 90-year-old male. His wife had been diagnosed with colon cancer four years previously. She had undergone surgery, but recurrence was observed two years

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previously. Since then, she has been visiting our institute for treatment with anticancer drugs. The husband had been accompanying his wife on the hospital visits as the primary caregiver, but because of psychological issues, it was recommended he visit the psycho-oncology department's "caregiver's clinic" for a consultation. Psychiatric examination identified distress associated with caring for and concerns about the future medical condition of his wife.

On physical examination, the patient was lucid, and no unsteadiness or ocular motility disorders were observed. He was 157.6 cm in height, 49.3 kg in weight (body mass index = 19.9), with blood pressure of 131/67 mmHg and pulse rate of 65 beats/min. General blood findings revealed no abnormalities in peripheral blood, electrolytes, or kidney, liver, or thyroid function. Further, he had no medical history of mental illness, drug or alcohol abuse, diabetes, or intestinal disorders. He had been undergoing regular checks with his family physician, and no particular health issues had been noted.

His psychiatric profile fulfilled the Diagnostic and Statistical Manual of Mental Disorders, 5th edition, criteria for adjustment disorder with mixed anxiety and depressed mood (American Psychiatric Association, 2013).

A more detailed examination also revealed that his appetite had been only about 50% of usual from about one year before, and he had lost 12 kg in weight in that year. When asked about factors leading to his decreased appetite, the caregiver responded that he had lost his appetite because of the burdens associated with nursing his wife.

We suspected TD because his loss of appetite had lasted about one year and ingested thiamine is only stored in the body for approximately 18 days (MacLean et al., 1983). His serum thiamine level, as measured using high-performance liquid chromatography, was abnormally low at 21 ng/mL (reference range: 24–66 ng/mL), whereas his serum vitamin B12 and folic acid levels were within the normal ranges (756 pg/mL, reference range: 180–914 pg/ml; and 6.3 pg/mL, reference range, ≧4 pg/mL, respectively). Based on these findings, he was diagnosed with TD. He was administered 100 mg of thiamine intravenously, and did not subsequently develop any symptoms/signs of TD.

Discussion

We found TD in a cancer patient's family caregiver. Clinical suspicion, correct diagnosis, and subsequent thiamine administration prevented him from developing WE. This report adds important information on new physical problems associated with caregiving.

Factors associated with TD include insufficient intake (Onishi et al., 2004), malabsorption (Yae et al., 2005), storage disorders (Onishi et al., 2005), and excessive consumption (van Zaanen & van der Lelie, 1992). Further, physiological changes from aging have been shown to affect thiamine absorption and metabolism (Nichols & Basu, 1994). In the case presented here, we considered that at least two factors were involved in the TD. The first appeared be a lack of thiamine intake because of decreased appetite; the second was the changes in the absorption and metabolism of thiamine from physiological changes common in those age 90 years or older. Diagnosis of TD in this caregiver was difficult because he did not present any of the clinical signs of WE, including mental status changes, ataxia, and eye symptoms.

The clue to the diagnosis was his appetite loss and loss of 12 kg in weight in about one year while taking care of his ill wife. TD can occur under any conditions in which nutrition is unbalanced lasting 2–3 weeks (Sechi et al., 2016) as thiamine is only stored in the body for approximately 18 days (MacLean et al., 1983). In our previous paper (Onishi et al., 2017, 2018a, 2018b, 2018c), we repeatedly emphasized that a loss of appetite lasting for two weeks is reason to suspect WE. Appetite loss lasting two weeks or longer should lead to a suspicion of TD, even in caregivers.

In conclusion, this report demonstrates that there is a possibility that care providers could develop TD from the burdens associated with caregiving. Thiamine deficiency should be considered whenever there is a loss of appetite lasting for more than two weeks, and medical staff should pay careful attention to the physical condition of care providers to prevent complications due to TD.

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