

# Thiamine deficiency as a cause of anorexia in terminally ill cancer patients: A case of possible gastrointestinal beriberi

## Case Report

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## Abstract

**Objectives.** Anorexia in cancer patients has a variety of causes and impairs patients' quality of life. However, there have been few reports of thiamine deficiency (TD) playing a role in anorexia during palliative care. The objective of this report was to describe such a case.

**Methods.** An 82-year-old woman with advanced cervical cancer was admitted for palliative care because of progressive disease. One month after admission, she developed myoclonus on the left side, difficulty speaking, slurred speech, and drooping of the left corner of the mouth, with no consciousness disturbance. She also developed nausea and complained of decreased dietary intake for more than 2 weeks.

**Results.** The patient's thiamine level, which had been measured 2 weeks earlier, was 27 ng/ml, which was below the normal range, and 100 mg of thiamine was administered intravenously. After 2 hours, the patient's neurological findings resolved, and her dietary intake improved from 30% to 40% of meals to 90% to 100%. Subsequently, the patient did not experience similar symptoms, and her clinical course was stable. Based on the patient's clinical course, gastrointestinal beriberi was diagnosed.

**Significance of results.** This case shows that TD may cause anorexia. Many patients who receive palliative care have decreased dietary intake. Consequently, such patients may present with gastrointestinal beriberi, as in the present case. Appropriate diagnosis and treatment may contribute to increasing such patients' quality of life. It may be necessary to differentiate TD from other conditions as a cause of anorexia in patients receiving palliative care.

## Introduction

Terminal cancer patients have a variety of somatic symptoms. One common symptom is anorexia, which occurs in 75%–80% of patients with advanced cancer and nearly all terminal cancer patients (Amano et al. 2017). The causes of anorexia in cancer patients are wide-ranging, and persistent anorexia in terminal cancer patients can result in deficiencies of essential nutrients. Thiamine, in its biologically active form thiamine pyrophosphate, is an essential coenzyme for oxidative cellular metabolism. However, thiamine is not synthesized in the body, and about 20 days is sufficient time to deplete the body's reserve of thiamine. Consequently, anorexia that persists for 2–3 weeks can result in thiamine deficiency (TD) (Sechi et al. 2016).

A neuropsychiatric disorder that occurs with persistent TD is Wernicke's encephalopathy (Sechi and Serra 2007). Symptoms of typical cases of Wernicke's encephalopathy can include consciousness disturbance, cerebellar symptoms, and oculomotor dysfunction. If TD persists, Korsakoff's syndrome, an irreversible brain disorder, can also occur (Sechi et al. 2016). Treatment involves high-dose intravenous thiamine administration, and if TD is diagnosed and treated early, it improves without sequelae (Sechi and Serra 2007). However, the symptoms of Wernicke's encephalopathy vary widely. Only 16% of patients exhibit all 3 symptoms, and 19% exhibit none of them (Harper et al. 1986), so TD can often be overlooked. Therefore, making a definitive diagnosis of TD is difficult (Sechi et al. 2016). Recent reports have noted that the main symptoms of TD were abdominal (i.e., gastrointestinal beriberi). This TD-related disorder often manifests as symptoms such as anorexia, nausea, and peripheral neuropathy, and the symptoms improve quickly with thiamine administration (Attaluri et al. 2018).

In palliative care, many patients complain of these abdominal symptoms, but there have been very few reports of gastrointestinal beriberi in patients receiving palliative care.

This report describes a terminal cancer patient with persistent anorexia. TD was suspected because of the patient's reduced dietary intake and response to thiamine administered intravenously. Marked improvement in the patient's appetite and improved quality of life were seen within a short time.

### Case report

The patient was an 82-year-old woman who had been diagnosed with stage IIIB cervical cancer 5 years earlier and had undergone radiation therapy. The patient had undergone ileus surgery and colostomy 2 years earlier for dyschezia and anemia resulting from caecal and rectal invasion. The patient subsequently did not wish to undergo aggressive anti-cancer treatment, and watchful waiting was implemented. However, her condition progressed, and she had been admitted to the palliative care unit 1 month earlier.

On day 31 of hospitalization, myoclonus occurred on the left side of the patient's body in the morning, increasing her anxiety, since she thought she may have had a cerebral infarction. In addition, the patient had difficulty speaking, and her speech was slurred. Neurologically, drooping of the left corner of the mouth was seen, but no disturbance of consciousness was observed. The patient also experienced nausea and complained of decreased dietary intake for more than 2 weeks.

The patient's thiamine level, which had been measured 2 weeks earlier, was 27 ng/ml (reference range 30–70 ng/ml), which was below the normal range, and 100 mg of thiamine was administered intravenously. After 2 hours, the patient's appetite improved markedly, and she began to eat sweet food. In addition, her dietary intake increased markedly after the injection, and she reported a marked improvement of slurred speech related to some neurological problems. Subsequently, the patient did not experience similar symptoms, and her clinical course was stable. Based on the patient's clinical course, gastrointestinal beriberi was diagnosed.

The meals the patient received contained 1,100 calories and 0.8 mg of thiamine. With respect to dietary intake, before thiamine was administered, the patient consumed 30%–40% of her meals, and intake was inconsistent, with the patient consuming only 1 meal on some days. After thiamine was administered, the patient consumed 90%–100% of her meals, in addition to food brought by family members, and this situation continued for 2 weeks. However, the patient's underlying condition subsequently progressed, and her intake decreased.

### Discussion

A case in which TD was the cause of anorexia in the field of palliative care was presented. Many patients who receive palliative care have decreased dietary intake. Consequently, such patients may exhibit gastrointestinal beriberi, as in the present case. Appropriate diagnosis and treatment may contribute to increasing such patients' quality of life.

In the present case, TD due to anorexia was found. TD should be suspected when anorexia persists for 2 weeks in terminal cancer patients. This is because thiamine remains in the body for approximately 2 weeks (Sechi *et al.* 2016), and there have been reports of TD in cancer patients who exhibited anorexia for 2 weeks (Onishi *et al.* 2018, 2022). This case thus aligns with Francis' criteria (Francis *et al.* 1990) regarding the association between gastrointestinal symptoms and TD. In addition, there have been other reports of significant improvement in appetite after thiamine administration in cancer patients (Ishida *et al.* 2024).

The present patient had seizures on the left side of her body, and the cause was therefore investigated. However, if these symptoms had not appeared, the condition may have been overlooked and regarded as the natural course of a patient with terminal cancer. TD is not rare in cancer patients (Isenberg-Grzeda *et al.* 2015; Onishi *et al.* 2018; Uchida *et al.* 2023a), and there have been reports of patients who have exhibited TD during the terminal stage of cancer (Onishi *et al.* 2021). Therefore, TD may need to be differentiated from other conditions as a cause of anorexia in patients receiving palliative care.

The patient's myoclonus-like symptoms also improved after thiamine administration. Such symptoms do not appear after thiamine is administered, and there have been patients with seizures caused by TD (Seto *et al.* 2022). It is, therefore, highly likely that TD caused the seizures in the present case. Although the symptoms of facial paralysis and slurred speech also improved, it was necessary to differentiate TD from a transient ischemic attack.

The present study has a limitation. A blood sample for measurement of vitamin B1 was not collected on the day that vitamin B1 was administered. However, thiamine is an enzyme cofactor in the citric acid cycle, which begins to function immediately after thiamine is administered. In the present case, there was a 14-day lag between the identification of TD and administration of thiamine. Reports have shown a rapid decrease in thiamine levels in cancer patients within a short period (Uchida *et al.* 2023). In the present case as well, since appetite was reduced until blood sampling and thiamine administration, there is a possibility that thiamine levels had further decreased. Therefore, its effect appeared quickly. In fact, appetite has been found to improve 1 hour after thiamine administration (Ishida *et al.* 2024). Because no treatment other than thiamine administration was performed in the present case, thiamine is thought to have contributed to the improvement of the patient's appetite.

### Conclusion

There have been reports of patients who developed gastric beriberi in the terminal stage of cancer, and TD should be suspected when anorexia persists for 2 weeks in terminal cancer patients. Appropriate diagnosis and treatment may contribute to increasing such patients' quality of life.

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**Competing interests.** The authors declare none.

**Ethical approval.** This work received approval from the Institutional Review Board of Fujisawa Shounandai Hospital (ID: 05-04). After the patient's death, consent for publication of this case report was obtained from the patient's family.

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