A case report on the use of oral thiamine in a palliative care patient in the management of peripheral edema in a community setting in New South Wales, Australia

Vicki May Ling Tai

SUMMARY

Thiamine deficiency is common in malnourished states presenting with nonspecific symptoms including anorexia but may progress to irreversible neurological and cardiovascular sequelae if left unrecognised and untreated. A 42-year-old male with advanced lung cancer had visceral and neuropathic pain related to malignancy. Progressive oedema had been noted in hospital. Factors including heart failure, lymphatic obstruction, protein loss or deficiency were considered but multiple investigations including blood tests such as serum albumin, echocardiography and radiology failed to determine an underlying cause. An analgesic review prompted a switch of opioid and a change in delivery route from oral to subcutaneous. In terminally unwell patients medications given subcutaneously is not unusual. After stabilising, the patient elected discharge home. The community nurse subsequently reported difficulty accessing subcutaneous sites due to oedema.

Review of records revealed thiamine deficiency had not been considered. Shortly after oral supplementation an improvement in oedema was noted by the patient, his wife and the community and palliative care nurses. The patient reported increased diuresis without increase in fluid intake within days. Contours of his face became more defined with swelling of ankles, calves and arms with “woody” induration of his skin from chronic distension improving. The patient reported improved comfort of his skin. Diuretic doses needed reduction in the month following.

Mechanisms for thiamine deficiency include inadequate intake, increased utilization or increased loss. Cancer patients are known to be prone. There is a spectrum of disorders associated with thiamine deficiency; the underlying cause attributed to inhibition of a series of enzyme- catalysed reactions. Organ systems affected may include the nervous system, eye, gastrointestinal tract, heart and blood vessels. Body storage of thiamine is minimal and may be depleted within two weeks. A major limitation to this report is lack of evidence of thiamine deficiency. Thiamine status can be determined by erythrocyte transketolase activity or whole blood thiamine levels but technical and practical issues meant that it was not done in this patient. Guidelines suggest supplementation prior to verification of deficiency is valid as thiamine is nontoxic.
Thiamine supplementation is inexpensive and safe; deficiency states are insidious in presentation. Micronutrient deficiency states in frail patients may be mistaken for expected decline. Peripheral oedema is common towards the end of life and may lead to loss of skin integrity, infection and skin discomfort. Thiamine supplementation was commenced as an “outside chance” but had surprisingly good results. There were no other variables in this case. Several questions are now raised and hopefully more research will be done in this area.
A case report on the use of oral thiamine in a palliative care patient in the management of peripheral edema in a community setting in New South Wales, Australia

Vicki May Ling Tai

ABSTRACT

Introduction: Thiamine deficiency may present insidiously and has a spectrum of symptoms. Whilst outbreaks occur in developing countries, select communities in developed countries are also susceptible. Body stores of thiamine are low and depleted easily. Initially, deficiency may present with anorexia, malaise, generalized weakness and paresthesias with edema and palpitations. Over time it may progress to frank peripheral neuropathy and cardiac involvement [1]. Palliative care patients are frail, often malnourished with weight loss with catabolic states contributing to deficiency of micronutrients. Symptoms as described are often attributed to underlying disease or treatment received. A previous study found high rates of thiamine deficiency in terminally ill patients admitted to a palliative care unit [2]. Case Report: A 42-year-old Aboriginal Australian male community based palliative care patient with peripheral edema affecting quality of life and access of subcutaneous sites for medications received thiamine supplementation. This resulted in improvement of edema, access of subcutaneous sites for medications and most importantly patient satisfaction and comfort. Conclusion: Thiamine deficiency should be considered in the frail, malnourished. Presentation may be insidious and symptoms may be overlooked in those who are palliative. Supplementation is inexpensive. Biochemical verification is not always feasible and for practical reasons often supplementation precedes detection. More research needs to be done in this area.

Keywords: Edema, Malnourished, Micronutrient, Palliative, Thiamine deficiency

How to cite this article

Tai VML. A case report on the use of oral thiamine in a palliative care patient in the management of peripheral edema in a community setting in New South Wales, Australia. Int J Case Rep Images 2016;7(1):15–17.

doi:10.5348/ijcri-201603-CR-10590

INTRODUCTION

Thiamine (vitamin B1) is an important coenzyme in carbohydrate metabolism and a deficiency syndrome is well described in literature [1]. Once deficiency is recognized, replacement therapy is relatively inexpensive and safe. Severe deficiency may lead to death.

Insidious presentation may occur after prolonged dietary deficiency and susceptible individuals include those who are malnourished with poor protein-calorie balance. It has been noted that it is surprising that thiamine deficiency as a cause of cognitive impairment in the palliative care setting has not been more recognized [2] and reports have focused on neurological and
neuropsychiatric sequelae [2, 3]. Palliative care patients commonly have anorexia, malaise and generalized weakness. Nausea and vomiting is not uncommon, also affecting nutritional intake. Peripheral edema has been used in prognostic prediction models in palliative care settings [4]. All of the aforementioned signs and symptoms are also known to occur in thiamine deficiency.

CASE REPORT

A 42-year-old Aboriginal male with advanced metastatic non-small cell lung cancer was reviewed as a palliative care patient in the community. During an inpatient stay one month prior with pneumonia, an increase in his peripheral edema had been noted. Investigations including an echocardiogram, ventilation perfusion scan and left upper limb venous Doppler did not reveal any contributors. His serum albumin and renal function were normal (Table 1). He was commenced on diuretics and completed his antibiotic treatment. Prior to discharge, a discussion with his Oncology team included a ceiling of care discussion, the patient declining any escalation of care beyond that for symptomatic management and wished to return home for terminal care. Significant right sided chest wall pain was attributed to metastatic replacement of the lateral right fourth to seventh rib involvement.

His pain control had been complex and at the time of review included both neuropathic and strong opioids. Strong opioids were delivered via a subcutaneous syringe driver over 24 hours and he had required multiple additional “as required” doses to help control pain. Suitable subcutaneous sites were limited due to edema. Interventional pain management had been discussed but the patient refused. A review of his records post discharge revealed that thiamine deficiency had not been considered. A discussion revealed that the patient had particularly poor dietary intake.

CASE MANAGEMENT

Oral thiamine at a dose of 100 mg three times daily was commenced. The dose of the neuropathic agent was maximised but rapidly had to be reduced to baseline due to side effects of myoclonus. There had been no recent changes with regard to his diuretic management. Approximately, one week subsequent to thiamine initiation, Patient’s wife and the community palliative care nurse noted improvement in both facial and lower limb edema. A subsequent review visit by the Author also affirmed this with noted particular resolution of lower limb edema. The patient reported increases in urinary output most marked in the days subsequent to supplementation. Dry mucous membranes and skin prompted the dosages of his diuretic medication to be reduced in the month following. There was some improvement in his pain level requiring fewer “as required” opioid doses. In the weeks following the implementation, there was discussion regarding a staged switch in route from subcutaneous back to oral opioid. Unfortunately, in the weeks following review the patient was admitted with increasing shortness of breath related to a chest infection and died.

DISCUSSION

Thiamine deficiency may produce a spectrum of symptoms ranging from mild and non specific nature to life-threatening. Whilst known to affect those whose diet is poor, and observed in those who have a higher demand of thiamine, such as the pregnant, it is also seen in association with certain diseases including cancer, liver disease, infections and hyperthyroidism. In more affluent societies, deficiency is common in alcoholics and may progress to Wernicke-Korsakoff syndrome. The subject in this case presentation had cancer, a poor dietary intake and edema unexplained by routine investigations.

### Table 1: Blood tests done as inpatient one month prior to commencement of thiamine

| Test              | Result | Reference range | Units   |
|-------------------|--------|-----------------|---------|
| Sodium (Na)       | 138    | 134–145         | mmol/L  |
| Potassium (K)     | 3.6    | 3.5–5.0         | mmol/L  |
| Chloride          | 95     | 98–107          | mmol/L  |
| Bicarbonate       | 31     | 22–29           | mmol/L  |
| Urea              | 7.8    | 3.1–8.1         | mmol/L  |
| Creatinine        | 75     | 64–104          | umol/L  |
| Anion Gap         | 16     | 7–17            | mmol/L  |
| Estimated GFR     | 106    | Regarded as normal high | mL/min/1.73 m² |
| Bilirubin         | 5      | 3–20            | umol/L  |
| Protein           | 70     | 60–83           | g/L     |
| Albumin           | 38     | 35–52           | g/L     |
| Alkaline Phosphatase | 102   | 41–119          | U/L     |
| Gamma GTP         | 119    | 12–64           | U/L     |
| ALT               | 36     | <55             | U/L     |
| AST               | 29     | 12–36           | U/L     |
| Calcium           | 2.36   | 2.10–2.55       | mmol/L  |
| Corrected Calcium | 2.40   | 2.10–2.55       | mmol/L  |
| PO4               | 1.12   | 0.74–1.52       | mmol/L  |
| Mg                | 0.86   | 0.67–1.05       | mmol/L  |
| CRP               | 45     | <5              | mg/L    |
| WBC               | 14.9x10⁹ | 4–11x10⁹     | /L      |
| Hb                | 126    | 135–180         | g/L     |
| Plts              | 189x10⁹ | 150–400x10⁹   | /L      |
| TSH               | 0.595  | 0.4–3.5         | mIU/L   |
The supplementation of thiamine resulted in reported diuresis, reduction of peripheral edema, improved skin integrity and comfort and access of subcutaneous sites.

This case report was limited by several factors. It was not practicable to test for thiamine levels in this community setting. We, therefore, do not have direct evidence of either deficiency or replenishment, however, there were no other factors to explain the improvement of his edema other than the temporal relationship between supplementation and resolution of edema.

Several questions are raised. Should we more frequently assess for thiamine or micronutrient deficiency in the palliative care population? What impact will it have if we do so? How do we make those tests more readily available and what would we use as our screening criteria?

CONCLUSION

Consideration of possible thiamine deficiency and supplementation may assist in symptom management in the palliative care setting. With this patient, improvement in peripheral edema particularly in the first few weeks following commencement of thiamine allowed us to continue using subcutaneous medications and improve comfort. There is a limitation to this report. There were no rigorous biochemical and measurement data to confirm initial thiamine deficiency and results of repletion in this patient. Several questions are raised and more work needs to be done in this area.

********

Acknowledgements
Jenni Dibley, Palliative Care Liaison Nurse, Central Coast Palliative Care Service, NSW, Australia

Author Contributions
Vicki May Ling Tai – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor
The corresponding author is the guarantor of submission.

Conflict of Interest
Authors declare no conflict of interest.

Copyright
© 2016 Vicki May Ling Tai. This article is distributed under the terms of Creative Commons Attribution License which permits unrestricted use, distribution and reproduction in any medium provided the original author(s) and original publisher are properly credited. Please see the copyright policy on the journal website for more information.

REFERENCES

1. World Health Organization. Thiamine deficiency and its prevention and control in major emergencies. 1999. [Available at: http://www.who.int/nutrition/publications/emergencies/WHO_NHD_99.13/en/]
2. Barbato M, Rodriguez PJ. Thiamine deficiency in patients admitted to a palliative care unit. Palliat Med 1994 Oct;8(4):320–4.
3. Onishi H, Kawanishi C, Onose M, et al. Successful treatment of Wernicke encephalopathy in terminally ill cancer patients: report of 3 cases and review of the literature. Support Care Cancer 2004 Aug;12(8):604–8.
4. Ohde S, Hayashi A, Takahasi O, et al. A 2-week prognostic prediction model for terminal cancer patients in a palliative care unit at a Japanese general hospital. Palliat Med 2011 Mar;25(2):170–6.
Edorium Journals: An introduction

Edorium Journals Team

About Edorium Journals
Edorium Journals is a publisher of high-quality, open access, international scholarly journals covering subjects in basic sciences and clinical specialties and subspecialties.

Invitation for article submission
We sincerely invite you to submit your valuable research for publication to Edorium Journals.

But why should you publish with Edorium Journals?
In less than 10 words - we give you what no one does.

Vision of being the best
We have the vision of making our journals the best and the most authoritative journals in their respective specialties. We are working towards this goal every day of every week of every month of every year.

Exceptional services
We care for you, your work and your time. Our efficient, personalized and courteous services are a testimony to this.

Editorial Review
All manuscripts submitted to Edorium Journals undergo pre-processing review, first editorial review, peer review, second editorial review and finally third editorial review.

Peer Review
All manuscripts submitted to Edorium Journals undergo anonymous, double-blind, external peer review.

Early View version
Early View version of your manuscript will be published in the journal within 72 hours of final acceptance.

Manuscript status
From submission to publication of your article you will get regular updates (minimum six times) about status of your manuscripts directly in your email.

Our Commitment

Six weeks
You will get first decision on your manuscript within six weeks (42 days) of submission. If we fail to honor this by even one day, we will publish your manuscript free of charge.

Four weeks
After we receive page proofs, your manuscript will be published in the journal within four weeks (31 days). If we fail to honor this by even one day, we will publish your manuscript free of charge and refund you the full article publication charges you paid for your manuscript.

Most Favored Author program
Join this program and publish any number of articles free of charge for one to five years.

Favored Author program
One email is all it takes to become our favored author. You will not only get fee waivers but also get information and insights about scholarly publishing.

Institutional Membership program
Join our Institutional Memberships program and help scholars from your institute make their research accessible to all and save thousands of dollars in fees make their research accessible to all.

Our presence
We have some of the best designed publication formats. Our websites are very user friendly and enable you to do your work very easily with no hassle.

Something more...
We request you to have a look at our website to know more about us and our services.

We welcome you to interact with us, share with us, join us and of course publish with us.

CONNECT WITH US

Edorium Journals: On Web
Browse Journals

This page is not a part of the published article. This page is an introduction to Edorium Journals and the publication services.