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LETTER TO THE EDITOR

Retrospective analysis of thiamine deficiency in allogeneic stem cell transplant patients

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Dear Editor,

Thiamine deficiency is an under-recognized complication of allogeneic stem cell transplantation (allo-SCT). Thiamine plays a key role in cerebral energy utilization. Severe deficiency causes neuronal injury, sometimes leading to Wernicke's Encephalopathy (WE) [1–4]. One prospective study of 180 patients whose brains were autopsied after SCT showed that 5.55% of these patients had neuropathologic findings of WE [5]. The potential for significant neurologic complications warrants early detection of thiamine deficiency in this population. In this study, we present the long-term follow-up of allo-SCT patients from the Mount Sinai Hospital who were found to have low thiamine levels.

We reviewed charts of all patients at the Mount Sinai Hospital who underwent allo-SCT between January 2014 and December 2016 ($n = 135$). Thiamine levels were checked when deemed appropriate by the treating teams. Deficiency was defined as thiamine diphosphate (TDP) level of < 70 nmol/L. Chart reviews identified patients' primary diagnoses, transplant characteristics, symptoms of neurotoxicity, and radiography.

Thirty-three patients had either whole blood or plasma thiamine levels checked. Of those, 10 had true thiamine deficiency. All 10 patients were female. Six had acute myeloid leukemia as the indication for their transplant. Six received grafts from 10/10 matched related ($n = 3$) or unrelated ($n = 3$) donors. Deficiency was discovered at a median of 91.5 days from transplant. Five demonstrated evidence of neurotoxicity: one had ocular disturbances attributed to WE, with signs of multifocal leukoencephalopathy found on MRI of the brain, while the neurologic symptoms of the four others were explained otherwise (Fig. 1). Five patients were taking systemic corticosteroids for active lower gastrointestinal (GI) tract GVHD and five patients were taking tacrolimus. One patient was receiving total parenteral nutrition (TPN).

The cytotoxic conditioning regimens required prior to hematopoietic stem cell transplant commonly lead to prolonged neutropenia, mucositis, nausea, vomiting, and diarrhea. In addition, acute and chronic GVHD occurs in an estimated 45% [6] and 70% [7] of these patients, respectively, reducing oral intake and diminishing nutrient absorption. Comorbid renal dysfunction further reduces thiamine absorption by decreasing expression of vitamin transporters in the intestine, heart, liver, and brain [8]. Compounding this is the finding that energy requirements in the post-transplant period increase by 30–50% [9]. Patients who experience subsequent malnutrition and malabsorption often require prolonged TPN to support

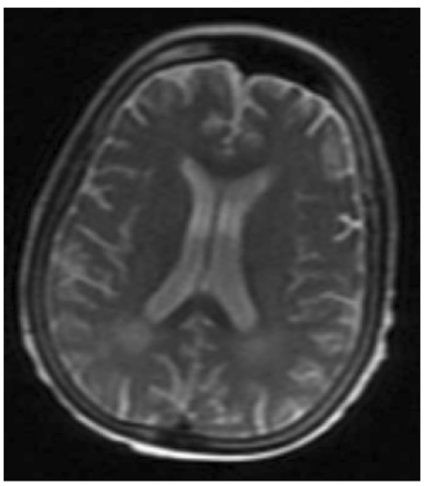

Fig 1 MRI brain of allo-SCT patient depicting T2 FLAIR hyperintense signal abnormalities involving periventricular white matter, concerning for leukoencephalopathy of underlying toxic metabolic causes

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them through the transplant period. These factors together make allo-SCT patients particularly susceptible to thiamine deficiency.

This review emphasizes the need to consider thiamine deficiency in allo-SCT patients, even in absence of acute neurological symptoms. It urges transplant clinicians to screen for thiamine deficiency in those with the risk factors described above. Despite small sample size, the propensity for low thiamine in female patients is intriguing and warrants follow-up with larger studies.

Compliance with ethical standards

Conflicts of interest The authors declare that they have no conflict of interest.

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