Evaluation of the safety of intravenous thiamine administration in a large academic medical center
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**Background:** Chronic alcoholism can affect the absorption, storage, metabolism, and activation of many vitamins, including thiamine. Thiamine deficiency can result in Wernicke’s encephalopathy, which can progress to an irreversible dementia known as Wernicke-Korsakoff syndrome. Patients with a history of alcohol abuse are often given prophylactic thiamine supplementation, which is most commonly administered parenterally to ensure adequate absorption. While evidence to support any specific dosing regimen is lacking, published literature indicates that higher thiamine doses are required for the prevention and treatment of Wernicke’s. Given the perceived benefit of higher doses of intravenous (IV) thiamine, our institution has noted increase rates of patients receiving doses greater than 100 mg IV. Previous literature has described increased incidence of infusion-related reactions when administering thiamine doses >100 mg as an IV push. Due to the high utilization of IV push for 200 mg doses within our institution, we sought to evaluate the safety of this practice compared to administration by infusion.

**Methods:** A single-center, retrospective cohort study was performed from June 2017 to October 2017. Patients were included if they were at least 18 years old and received one dose of IV thiamine 200 mg or greater. Patients were divided into two groups, including those who received thiamine 200 mg IV push (n=100) and those who received thiamine 200 mg or greater as an IV infusion (n=100). Patients were included in the IV infusion group if they received at least one dose of thiamine as an infusion. The primary outcome assessed was rate of adverse reactions. Thiamine administration was characterized by thiamine dilution/rate, dose, timing of administration in relation to dextrose-containing fluids, and duration of thiamine therapy. Continuous variables were compared using the Wilcoxon Rank Sum test, and categorical variables were compared using Fischer’s exact test.

**Results:** On average, patients included were 55 years old and male. The most common reasons for admission included altered mental status (12.0%), alcohol withdrawal (9.5%), and cirrhosis (3.5%). Patients received an average of 2000 mg of thiamine and seven doses total. Fifty percent received 200 mg IV push only, while 20% of patients received both IV infusion and IV push, and 30% of patients received IV infusion only. Adverse reactions possibly due to thiamine administration occurred in four patients (2.0%). One patient had received 200 mg thiamine via IV infusion, while three received 200 mg thiamine via IV push. There was no significant difference (p=0.640) in rate of adverse reactions between IV push and IV infusion administrations. Reactions noted included shortness of breath and/or wheezing and abdominal pain. Anaphylaxis, hypersensitivity, syncope, and cardiac arrest were not observed in the patient population studied. No patients developed shock which could be attributed to thiamine administration.

**Conclusion:** In conclusion, the data provided supports administering thiamine doses of 200 mg or less as an IV push. Given lack of robust safety data, it is recommended to continue to dilute thiamine doses greater than 200 mg and infuse over 30 minutes.