

# Iodine Deficiency in the PN dependent pediatric patient: A case study.



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## Purpose

Iodine deficiency affects approximately 2 billion people worldwide.<sup>1</sup> Here in the United States it is believed to have been eradicated due to the addition of iodine to table salt in the 1920s. However, patients dependent on parenteral nutrition (PN) as their sole source of nutrition are a unique population at higher risk for micronutrient deficiencies including iodine. Iodine is not routinely supplemented in PN. It is mostly supplied by the small amounts of iodine contamination present in lipid formulations. Long term PN patients, especially pediatric patients, are often limited in the amount of lipid they receive in order to prevent PNALD, and the decrease in use of iodine containing skin cleansers used during dressing changes has also reduced the amount of iodine that PN dependent patients receive. A national home infusion company looked at the case of a pediatric patient who was found to have low iodine levels and examined methods of repletion when oral diet is not an option.

## Methods

Testing for iodine is done using a spot urine sample and can be repeated every three months if results are abnormal or if the provider initiates an intervention. A 7 year old pediatric patient had routine labs completed and low iodine levels were noted. This patient was on PN for short bowel syndrome and was receiving a four-oil lipid emulsion. The patient was unable to take anything by mouth and unable to sufficiently use the enteral route for nutrition.

## Results

All options to supplement iodine were reviewed. Lipid dose could not be increased due to concerns from PNALD. Dressing changes that were available did not include iodine and the patient previously had skin reactions to those dressings that had contained iodine. An iodized salt solution administered enterally was prescribed, but the patient was only able to successfully administer it three times per week. Since the patient was unable to tolerate enough of the salt solution a topical betadine solution was prescribed to help absorb iodine. After three months of the combined interventions, the iodine urine spot test was redrawn and was normal.

## Conclusion

Iodine is not routinely supplemented in PN and it is not included in the Food and Drug Administration approved adult or pediatric IV trace element combination products. PN dependent patients are at a higher risk for iodine deficiency. Possible complication with iodine deficiencies include hypothyroidism which if untreated, could lead to abnormal cognition, growth, and metabolism. Iodine contamination can be present in lipid formulations, but long term PN pediatric or adult patients may not receive enough lipid to meet the iodine needs. Due to decreased utilization of iodine containing skin cleansers, limited methods to provide iodine include an iodized salt solution given enterally or a topical betadine solution which contains 10mg of iodine per 1mL. Providers should prescribe routine iodine testing along with regularly scheduled trace element draws for all patients who are PN dependent.

### Options to Supplement Iodine in a PN dependent patient

- Increase patient's lipid dose
- Use iodine containing skin cleansers
- Use iodine salt solution administered enterally
- Apply topical betadine

#### Sources:

1. World Health Organization. Sustaining the elimination of iodine deficiency disorders (IDD). <http://www.who.int/nmh/iodine/en/>. Accessed June 19, 2014.