Transient neonatal iatrogenic hypothyroidism due to iodinated contrast

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Introduction

Iodine is necessary for thyroid hormone synthesis, but when exposed to large quantities, iodine may have an inhibitory effect on hormone synthesis leading to hypothyroidism, known as the Wolff-Chaikoff effect[1]. We identified three cases of suspected iatrogenic hypothyroidism in preterm newborns who had been given iodine contrast during intestinal x-ray.

Method

Thyroid function was monitored in infants with gestational age ≤ 36 weeks at birth and exposed to iodinated contrast via the GI tract before 40 gestational weeks. 32 patients with elevated TSH (thyroid stimulating hormone) and prolonged GI (gastrointestinal) passage time were identified during 2012-2017.

Results

32 patients (44%) had increased TSH levels after iodinated contrast exposure (9,2-484 mU/L, ref 1,9-8,8 mU/L). Six patients (8,3%) had both elevated TSH, and decreased f-T4 (thyroxine). Mean TSH was 53,6 mU/L. TSH was spontaneously normalized after mean 19 days in 7 infants who were not given levothyroxine treatment. In 8/11 (73%) infants who were given levothyroxine, TSH was normalized during treatment. 28/32 (88%) patients with elevated TSH, had a prolonged GI passage time.

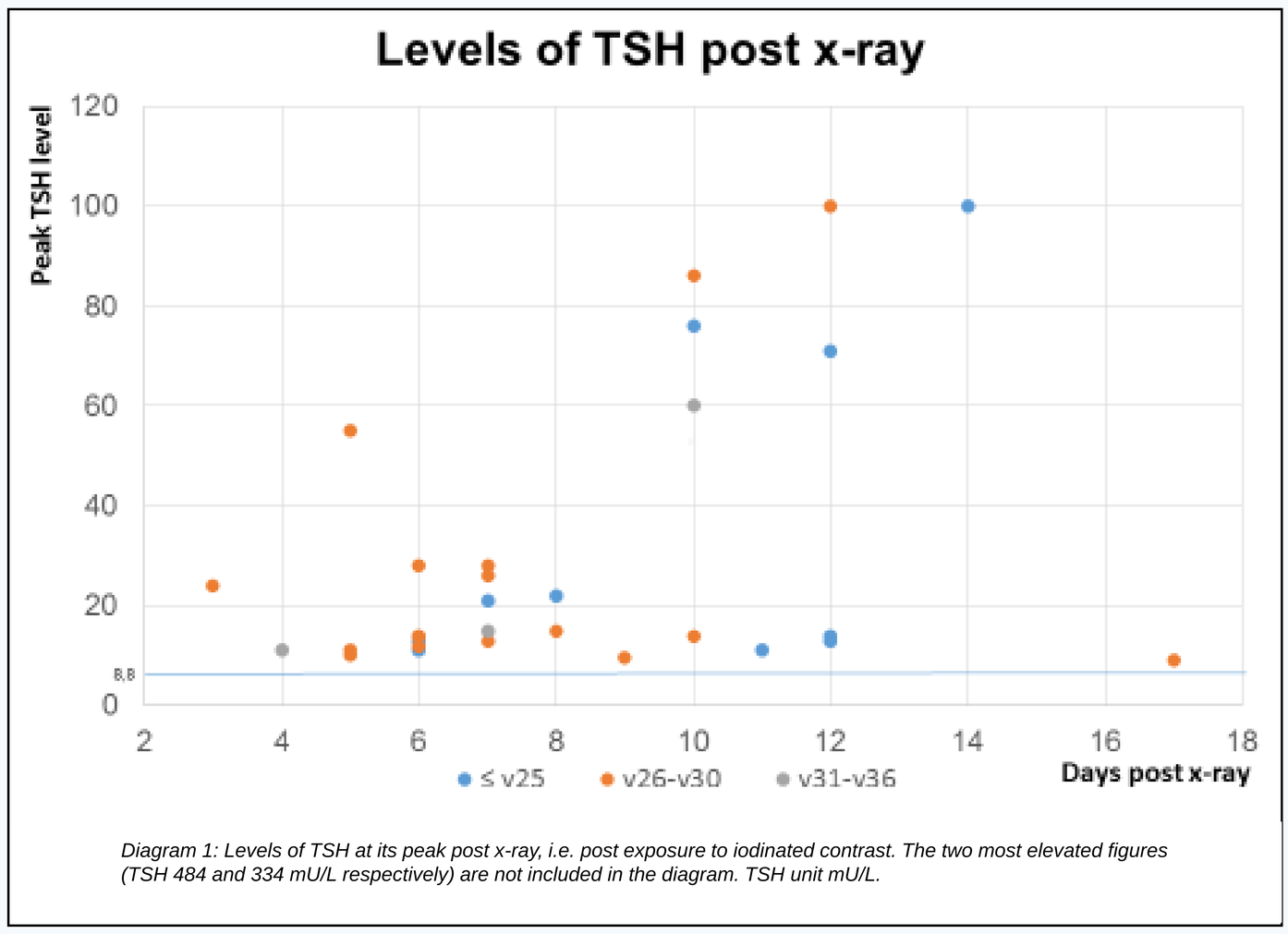

Diagram 1: Levels of TSH at its peak post x-ray, i.e. post exposure to iodinated contrast. The two most elevated figures (TSH 484 and 334 mU/L respectively) are not included in the diagram. TSH unit mU/L.

Conclusion

We found elevated TSH levels in preterm infants after exposure to iodinated contrast via the GI tract. Both prematurity and prolonged exposure time to iodine may be risk factors for iodine induced hypothyroidism.
Even though this condition seems to be transient in most cases, follow-up studies are needed, especially investigations of cognitive outcome of these children.

We suggest investigation of thyroid function in preterm infants before and after exposure to iodine containing contrast solutions.

Diagram 2: TSH rise and return to reference interval over time post iodine exposure during GI x-ray with contrast. Day 0 being day of x-ray.

Reference

1. Wolff J, Chaikoff IL. The inhibitory action of excessive iodine upon the synthesis of diiodotyrosine and of thyroxine in the thyroid gland in the normal rat. *Endocrinology* 1948 43:174-9.

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