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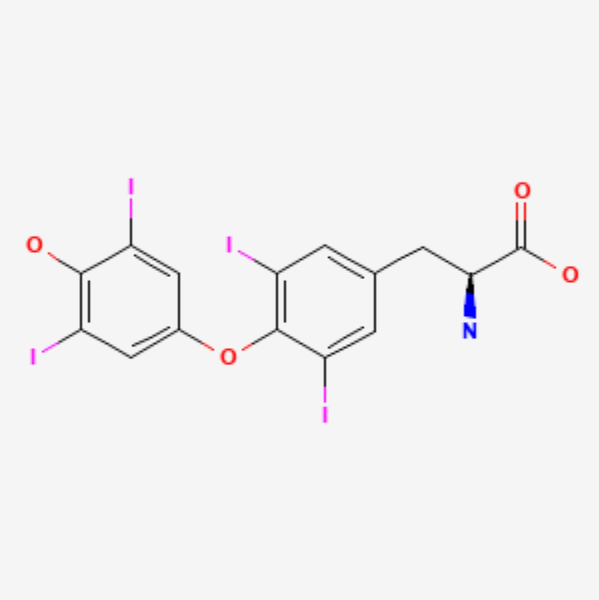
Levothyroxine

Revised: September 15, 2023.

CASRN: 51-48-9



Drug Levels and Effects

Summary of Use during Lactation

Levothyroxine (T4) is a normal component of human milk. Limited data on exogenous replacement doses of levothyroxine during breastfeeding indicate no adverse effects in infants. The American Thyroid Association recommends that subclinical and overt hypothyroidism should be treated with levothyroxine in lactating women seeking to breastfeed.[1] Adequate levothyroxine treatment during lactation may normalize milk production in hypothyroid lactating mothers with low milk supply. Levothyroxine dosage requirement may be increased in the postpartum period compared to prepregnancy requirements in patients with Hashimoto's thyroiditis.[2]

Drug Levels

Levothyroxine is a normal component of human milk. Although somewhat controversial, it appears that levothyroxine passes into milk poorly.[3-7] Average levothyroxine levels reportedly range from 0 to 77 mcg/L.[8] In one study, term and preterm breast milk samples were collected monthly for 6 months from mothers of term (n = 16) or preterm (n = 15) infants. Term milk contained higher average amounts of thyroxine 11,245.5 nmol/L (8738 mcg/L) that preterm milk. 671.6 nmol/L (522 mcg/L). In the milk of preterm mothers, average thyroxine levels were 842.2 nmol/L (654 mcg/L) in the first two months of lactation compared to 595.7 nmol/L (463 mcg/L) in the 3rd through 6th month of lactation.[9]

Maternal Levels. In a study of 56 mothers with thyroid disorders, 50 had hypothyroidism and were being treated with levothyroxine; 5 mothers had controlled hyperthyroidism with no medications and 1 had hyperthyroidism treated with a medication. Milk levels of thyroid hormones were free T4 4.5 ng/L, total T4 29.6 mcg/L, free T3 2.3 ng/L and total T3 0.35 mcg/L. The average milk to serum level ratios over the period were free T4 0.32 and total T4 0.3. Levels of free and total T3 and total T4 in milk were positively correlated with their respective plasma levels.[10]

Infant Levels. Relevant published information was not found as of the revision date.

Effects in Breastfed Infants

Effects of exogenous thyroid hormone administration to mothers on their infant have not been reported. One case of apparent mitigation of cretinism in hypothyroid infants by breastfeeding has been reported, but the amounts of thyroid hormones in milk are not optimal, and this result has been disputed.[11,12] The thyroid hormone content of human milk from the mothers of very preterm infants appears not to be sufficient to affect the infants' thyroid status.[13] The amounts of thyroid hormones in milk are apparently not sufficient to interfere with diagnosis of hypothyroidism.[14]

In a telephone follow-up study, 5 nursing mothers reported taking levothyroxine (dosage unspecified). The mothers reported no adverse reactions in their infants.[15]

One mother who had undergone a thyroidectomy was taking levothyroxine 100 mcg daily as well as calcium carbonate and calcitriol. Her breastfed infant was reportedly "thriving" at 3 months of age.[16]

A woman with propionic acidemia took levothyroxine 50 mcg daily as well as biotin, carnitine, and various amino acids while exclusively breastfeeding her infant for 2 months and nonexclusively for 10 months. At that time, the infant had normal growth and development.[17]

Effects on Lactation and Breastmilk

Adequate thyroid hormone serum levels are required for normal lactation. Replacing deficient thyroid levels should improve milk production caused by hypothyroidism. Supraphysiologic doses would not be expected to further improve lactation.

References

1. Alexander EK, Pearce EN, Brent GA, et al. 2017 Guidelines of the American Thyroid Association for the diagnosis and management of thyroid disease during pregnancy and the postpartum. Thyroid 2017;27:315-89. PubMed PMID: 28056690.
2. Galofré JC, Haber RS, Mitchell AA, et al. Increased postpartum thyroxine replacement in Hashimoto's thyroiditis. Thyroid 2010;20:901-8. PubMed PMID: 20615129.
3. Sato T, Suzuki Y. Presence of triiodothyronine, no detectable thyroxine and reverse triiodothyronine in human milk. Endocrinol Jpn 1979;26:507-13. PubMed PMID: 499092.

4. Varma SK, Collins M, Row A, et al. Thyroxine, tri-iodothyronine, and reverse tri-iodothyronine concentrations in human milk. J Pediatr 1978;93:803-6. PubMed PMID: 712487.
5. Mallol J, Obregon MJ, Morreale de Escobar GM. Analytical artifacts in radioimmunoassay of L-thyroxin in human milk. Clin Chem 1982;28:1277-82. PubMed PMID: 7074933.
6. Oberkotter LV, Tenore A. Separation and radioimmunoassay of T3 and T4 in human breast milk. Horm Res 1983;17:11-8. PubMed PMID: 6551313.
7. Koldovský O. Hormones in milk. Vitam Horm 1995;50:77-149. PubMed PMID: 7709605.
8. Mallya M, Ogilvy-Stuart AL. Thyrotropic hormones. Best Pract Res Clin Endocrinol Metab 2018;32:17-25. PubMed PMID: 29549956.
9. Vass RA, Kiss G, Bell EF, et al. Thyroxine and thyroid-stimulating hormone in own mother's milk, donor milk, and infant formula. Life (Basel) 2022;12:584. PubMed PMID: 35455075.
10. Zhang Q, Lian XL, Chai XF, et al. [Relationship between maternal milk and serum thyroid hormones in patients with thyroid related diseases]. Zhongguo Yi Xue Ke Xue Yuan Xue Bao 2013;35:427-31. PubMed PMID: 23987491.
11. Bode HH, Vanjonack WJ, Crawford JD. Mitigation of cretinism by breast-feeding. Pediatrics 1978;62:13-6. PubMed PMID: 683777.
12. Letarte J, Guyda H, Dussault JH, Glorieux J. Lack of protective effect of breast-feeding in congenital hypothyroidism: Report of 12 cases. Pediatrics 1980;65:703-5. PubMed PMID: 7367075.
13. van Wassenaer AG, Stulp MR, Valianpour F, et al. The quantity of thyroid hormone in human milk is too low to influence plasma thyroid hormone levels in the very preterm infant. Clin Endocrinol (Oxf) 2002;56:621-7. PubMed PMID: 12030913.
14. Abbassi V, Steinour A. Successful diagnosis of congenital hypothroidism in four breast-fed neonates. J Pediatr 1980;97:259-61. PubMed PMID: 7400893.
15. Ito S, Blajchman A, Stephenson M, et al. Prospective follow-up of adverse reactions in breast-fed infants exposed to maternal medication. Am J Obstet Gynecol 1993;168:1393-9. PubMed PMID: 8498418.
16. Caplan RH, Wickus GG. Reduced calcitriol requirements for treating hypoparathyroidism during lactation. A case report. J Reprod Med 1993;38:914-8. PubMed PMID: 8277494.
17. Mungan NÖ, Kör D, Büyükkurt S, et al. Propionic acidemia: A Turkish case report of a successful pregnancy, labor and lactation. J Pediatr Endocrinol Metab 2016;29:863-6. PubMed PMID: 27089410.

Substance Identification

Substance Name

Levothyroxine

CAS Registry Number

51-48-9

Drug Class

Breast Feeding

Lactation

Milk, Human

Thyroid Hormones