



THYROID CANCER

Risk of hypoparathyroidism after total thyroidectomy

BACKGROUND

Parathyroid hormone (PTH) is produced by the parathyroid glands and is responsible for directly regulating calcium levels in the blood. If PTH levels are high, calcium levels are high and the disorder is called hyperparathyroidism, which is fairly common. If PTH levels are low, calcium levels are low and the disorder is called hypoparathyroidism, which is relatively rare. Hypoparathyroidism is a chronic illness that greatly impairs patient's quality of life and ongoing treatment can be challenging.

The most common cause of hypoparathyroidism is damage to the glands during thyroid surgery. There are usually 4 parathyroid glands in the neck and they located next to the thyroid, with 2 glands on each side. These glands frequently get bruised during surgery and mild hypoparathyroidism is rather common after surgery but usually resolves after a few days to weeks. While rare, permanent hypoparathyroidism continues to be a real, clinical problem after thyroid surgery. If it appears that the parathyroid gland(s) will not be able to recover, surgeons may autotransplant one or more parathyroid glands into the muscles of the neck during surgery. However, there remains considerable controversy and uncertainty among surgeons as to the best approach to reduce the risk of hypoparathyroidism when performing thyroidectomy.

In the hands of an experienced surgeon that does a lot of thyroid surgeries (high volume thyroid surgeon), the risk of permanent hypoparathyroidism should be <5%. The incidence in children is higher than in adults, possibly related to the decreased incidence of thyroid surgery and therefore decreased experience among many pediatric thyroid surgeons. However, even in experienced surgical hands in adult patients, the risk of temporary hypoparathyroidism is high. Only a few studies have tried to report the risks of hypoparathyroidism. The first paper reports on post-surgical hypoparathyroidism in children, while the second paper focuses on adults.

THE FULL ARTICLE TITLE

Nordenström E et al 2018 Permanent hypoparathyroidism after total thyroidectomy in children: results from

a national registry. *World J Surg*. Epub 2018 Feb 22. PMID: 29470698.

Gschwandtner E et al Hermann M 2018 How many parathyroid glands can be identified during thyroidectomy? Evidence-based data for medical experts. *Eur Surg* 50:14–21. Epub 2017 Dec 13. PMID: 29445392.

SUMMARY OF THE STUDY

In the first paper, three Swedish national databases were combined and reviewed for patients < 18 years of age that had a total thyroidectomy over a 10 year period. The end point studied was the incidence of permanent hypoparathyroidism at 6 months after total thyroidectomy. Of 275 patients ages 10–17, the majority of total thyroidectomy operations were for Graves' disease (78%) while 12% were for thyroid cancer and 10% were for other benign disease. Of these patients, 7.3% (20 patients) had permanent hypoparathyroidism, with the only significant predictor being operative time > 3 hours. There was no significant association between hypoparathyroidism and patient age, type of thyroid disease, performance of autotransplantation of parathyroid glands during surgery, lymph node surgery, weight of thyroid gland specimens, length of hospital stay, or hospital thyroidectomy volume.

In the second study, 350 adult patients > 18 years of age had a near-total, subtotal, or total thyroidectomy over an 8 year period by a single surgeon, mainly for benign disease (only 14% were for Graves' disease). Almost 1/3 of patients developed temporary hypoparathyroidism, but only 4% had permanent hypoparathyroidism, all but one of which was not severe. An average of 2.28 parathyroid glands were identified by the surgeon at the time of thyroid surgery. No parathyroid glands were found in 20 patients, 1 in 16 patients, 2 in 126 patients, 3 in 114 patients, and 4 in 41 patients. Central node dissection for cancer and parathyroid autotransplantation increased the risk of temporary and permanent hypoparathyroidism.





THYROID CANCER, continued

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

These papers show that mild temporary hypoparathyroidism after surgery is common in both children and adults. While permanent hypoparathyroidism is rare, it appears to be more common in children and teens than initially reported and is more common after longer, more extensive surgery. Even though it is recommended that

the parathyroid glands be identified during surgery, not all parathyroid glands can be identified if the search for them is confined to those that are in the usual locations. Hypoparathyroidism is a chronic illness that greatly impairs quality of life and research should be done to prevent as well as improve treatment of the disease.

— Melanie Goldfarb, MD

ATA THYROID BROCHURE LINKS

Thyroid Surgery: <https://www.thyroid.org/thyroid-surgery/>

ABBREVIATIONS & DEFINITIONS

Thyroidectomy: surgery to remove the entire thyroid gland. When the entire thyroid is removed it is termed a *total thyroidectomy*. When less is removed, such as in removal of a lobe, it is termed a *partial thyroidectomy*.

Hypoparathyroidism — low calcium levels due to decreased secretion of parathyroid hormone (PTH) from the parathyroid glands next to the thyroid. This can occur as a result of damage to the glands during thyroid surgery and usually resolves. This may also occur as a result of autoimmune destruction of the glands, in which case it is usually permanent.

Hypocalcemia: low calcium levels in the blood, a complication from thyroid surgery that is usually short-term and relatively easily treated with calcium pills. If left untreated, low calcium may be associated with muscle twitching or cramping and, if severe, can cause seizures and/or heart problems.

Parathyroid glands: usually four small glands located around the thyroid that secrete parathyroid hormone (PTH) which regulates the body's calcium levels.

Central neck compartment: the central portion of the neck between the hyoid bone above, and the sternum and collar bones below and laterally limited by the carotid arteries.

Central neck dissection: careful removal of lymph nodes in the central compartment of the neck during surgery for thyroid cancer.

Parathyroid autotransplantation: removal of a parathyroid gland that appears damaged during thyroid surgery and transplanting it into the muscles in the neck to avoid hypoparathyroidism.

