

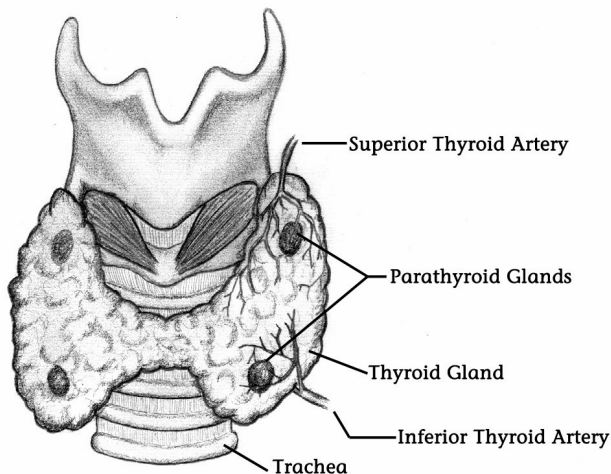
UNDERSTANDING PARATHYROID DISEASE

The Parathyroid Glands

The parathyroid glands are part of the endocrine system within the body. The endocrine system refers to special organs or glands that make hormones. Hormones work as chemical messengers in the body. One of the most well known endocrine organs is the pancreas, which makes insulin, a chemical messenger, which targets cells throughout the body to metabolize blood sugar. Other common endocrine glands include the thyroid and adrenal glands.

Location

The parathyroid glands are found in the neck. “Para” means “around” - the parathyroids are four glands that are located around the thyroid gland. These glands are very small – about one half the size of a small pea.



Calcium Balance

The parathyroid glands are responsible for maintaining normal calcium balance in the body. Calcium is important for muscles to contract and nerves to conduct impulses. Our bones contain 95% of the calcium in the body. Calcium concentration in the blood normally measures between 8.5 and 10.5 mg/dl.

The parathyroid glands are sensitive to the concentration of calcium circulating in the blood. When the calcium level decreases, the parathyroid glands send out a chemical messenger that is called parathyroid hormone or PTH. PTH signals the bones to release more calcium into the blood.

When the calcium in the blood returns to normal, the parathyroid glands decrease PTH secretion. In this manner, the parathyroid glands maintain a normal calcium balance in the body.

Hyperparathyroidism

Hyperparathyroidism is a disease in which there is a growth (tumor) of the parathyroid gland causing excessive production of PTH and high blood calcium. PTH is produced even when the calcium concentration in the blood is above normal. It might be helpful to think of the example of a malfunctioning thermostat in one's home. Instead of turning off the heat at a certain temperature, the malfunctioning thermostat continues to signal the furnace to release heat. Similarly, the malfunctioning parathyroid continues to signal the bone to release calcium, even though the calcium concentration is above normal. Over time, calcium pulled from the bone results in bone thinning (osteopenia or osteoporosis). The higher concentration of calcium in the urine may lead to the formation of kidney stones. A blood test showing an elevated calcium in the blood may be the first sign of the disease.

A variety of symptoms have been associated with hyperparathyroidism. Some patients report feeling more tired and fatigued, having bony aches and pains, mood swings, thirst, urinating more frequently especially at night, and constipation. Other patients report very few or no symptoms.

The most common cause of excessive PTH secretion is a benign or non-cancerous tumor in one of the parathyroid glands. The reason the gland enlarges is not known. In most cases, only one of the four parathyroid glands grows larger than normal and is overactive. This parathyroid enlargement is called a parathyroid "adenoma". Less commonly, more than all of the four parathyroid glands may be enlarged and overactive. This situation is called parathyroid "hyperplasia" (multiple gland disease). In rare instances, patients have had more than 4 glands and an extra gland in the chest.

Parathyroid Surgery

Presently, the only cure for hyperparathyroidism is an operation to remove the overactive gland. The calcium balance returns to normal with the function of the remaining glands – only one functioning gland is needed. Parathyroid surgery usually entails a one-night stay in the hospital, although in some patients it can be done on an outpatient basis. The Medical College of Wisconsin has a dedicated team of health care professionals specializing in endocrine surgery. Endocrine surgeons with special expertise and training, as well as membership in the American Association of Endocrine Surgery are a key part of this team. Parathyroid disease has been a particular interest of this Medical College program. Specific areas of research have included:

- ◆ studying the symptoms of patients with hyperparathyroidism and improvement after surgery
- ◆ development of improved methods to localize enlarged parathyroid glands.
- ◆ the use of PTH testing during surgery
- ◆ the use of minimal invasive surgical techniques, gamma probe localization, outpatient surgery and local anesthesia

HELPFUL GLOSSARY TERMS IN UNDERSTANDING THE DISEASE

Hyperparathyroidism:

A disease in which the parathyroid gland(s) produce excessive hormone (PTH) and cause increased level of calcium in the blood.

Parathyroid glands:

4 small glands located in the neck which function to maintain a normal level of calcium within the blood.

Hormone:

A cellular protein that travels as a chemical messenger to a specific type of cell within the body.

PTH:

Parathyroid hormone; a chemical messenger released from the parathyroid gland. PTH regulates the calcium level in the blood.

Osteoporosis & Osteopenia:

Decreased bone mass or density.

Calcium:

An essential mineral in the body responsible for muscle contraction and nerve transmission.

Parathyroidectomy:

A surgery to remove one or more enlarged, over functioning parathyroid glands.