

# **SURGICAL TREATMENT OF PRIMARY HYPERPARATHYROIDISM**

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For Paget's Disease of Bone and Related Disorders*

## **General Information about Surgery and Primary Hyperparathyroidism**

Primary hyperparathyroidism is a condition that affects the parathyroid glands that control the amount of calcium in the blood. In primary hyperparathyroidism, one or more of the glands becomes enlarged and produces too much parathyroid hormone. This results in abnormally high levels of blood calcium.

Currently, surgery is the only cure for primary hyperparathyroidism. When a surgeon experienced in parathyroid surgery performs the surgery, there is a 95% success rate in restoring parathyroid function to normal.

After the removal of the abnormal gland or glands, the levels of calcium in the blood return to normal. The kidney stones that affect some people with hyperparathyroidism usually do not recur. Bone density improves, typically over a period of one to four years. Some symptoms such as feelings of weakness and fatigue are not always alleviated after surgery. Some patients report a marked difference while others notice little improvement.

## **Conventional Surgery**

In conventional surgery for primary hyperparathyroidism, the enlarged gland or glands are removed under general anesthesia. There is a small incision of approximately 2 inches. The incision usually leaves a thin, faint, horizontal scar of about 2 inches on the lower neck. Though all four glands are observed, only the enlarged one/s are removed. In addition to removing the abnormal gland/s, the surgeon may perform a biopsy of one of the glands that appears to be normal. Surgical complications are rare when an experienced surgeon does the operation. However, some complications that may occur include:

1. Hypocalcemia (low blood calcium). This condition may require permanent treatment with vitamin D and calcium.
2. Damage to the nerves controlling the vocal cords. This causes hoarseness.

## **Other Surgical Approaches**

If pre-operative tests have been done to locate the abnormal parathyroid gland, another surgical approach may be used to remove the gland/s. This procedure is

done under general or local anesthesia, and the incision is smaller, approximately 1¼ inches. A parathyroid hormone measurement should be taken during this procedure, after the enlarged parathyroid gland is removed. If the hormone level drops 50% or more in 10 minutes into the normal range, the operation is usually successful, and no further exploration of the parathyroid glands is needed.

In about 15% of the cases, the hormone level does not drop in 10 minutes, and the test must be repeated. If, after the second test, the levels remain high, then a further evaluation of the remaining glands is required.

### **Use of the sestamibi scan**

Tc99m-sestamibi is a radiochemical that can locate the abnormal parathyroid gland in about 80% of patients with one abnormal gland. It is not accurate for patients who have multiple abnormal parathyroid glands. A sestamibi scan, using computerized tomography (SPECT), is the most sensitive test available for locating the abnormal gland/s. Ultrasound with high resolution can also be useful when done by a highly experienced person.

### **Less Invasive Surgical Procedures**

Less invasive surgical procedures are referred to as “minimally invasive parathyroidectomy.” The sestamibi scan and/or ultrasound is used to locate the abnormal gland and the surgery is done under local or general anesthesia. The surgery should incorporate the intraoperative hormone level test.

Another minimally invasive procedure uses the sestamibi scan a few hours before the surgery. During the surgery, a detector is passed over the area to identify the gland/s that are abnormal. Once the gland/s has been removed, the detector confirms that there is no longer an abnormal gland at work. This test, however, is not more accurate than using a pre-operative sestamibi scan.

Parathyroid surgery using an endoscope, a fiber-optic instrument that allows visualization of the gland/glands and enables the use of small high precision instrumentation, can be performed with an incision of ½ to 1 inch. This type of surgery should only be done by a surgeon experienced in both parathyroid and endoscopic surgery. Compared to other surgical approaches, this procedure is not used widely.

One of the advantages of these less invasive procedures is the relatively rapid recovery times. Patients are usually discharged from the hospital several hours to one day after the surgery. Most patients having conventional parathyroid operations can be discharged a day after the operation. In many cases, pain medication is not required. However, patients with pre-existing bone involvement may require longer hospitalizations because of postoperative low blood calcium due to increased need for calcium to heal the bone.

### **Autotransplantation and Cryopreservation**

When more than one abnormal gland is involved and multiple glands are removed, there is a possibility that the patient will be left without any parathyroid tissue, and may suffer from hypoparathyroidism (too little parathyroid hormone). In these situations, autotransplantation of parathyroid tissue may be performed to provide sufficient parathyroid hormone production.

In an autotransplantation, a piece of the glandular tissue is placed in the muscle in the patient's forearm. If that transplanted gland begins to overproduce parathyroid hormone and the calcium levels rise again, then, over time, autotransplanted parathyroid tissue can be reduced in a procedure that is much simpler than another neck operation. If the surgeon is not sure whether the patient will be left without any parathyroid tissue in the neck, some of the parathyroid gland tissue that has been removed can be preserved in liquid nitrogen (cryopreservation) and used for autotransplantation at a later time, if necessary.

### **Scans and Glands**

Imaging tests that are used to locate the abnormal gland/s play an important role in pre-surgical procedures. Ultrasound, computerized tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), and the sestamibi scan are all used to locate the overactive parathyroid gland before parathyroid surgery. CT scanning, MRI and PET scanning are expensive and are primarily used for patients who have persistent or recurrent parathyroid disease and for those patients for whom sestamibi or ultrasound do not locate the overactive parathyroid gland.

## **Summary**

- The success rate for parathyroid surgery is very high.
- Imaging technologies, including sestamibi scanning and ultrasound play an important role in identifying and locating the abnormal gland/s. CT and MRI should only be used in patients with recurrent or persistent disease.
- At present, surgery is the only cure for primary hyperparathyroidism but may not be necessary for every patient.

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