

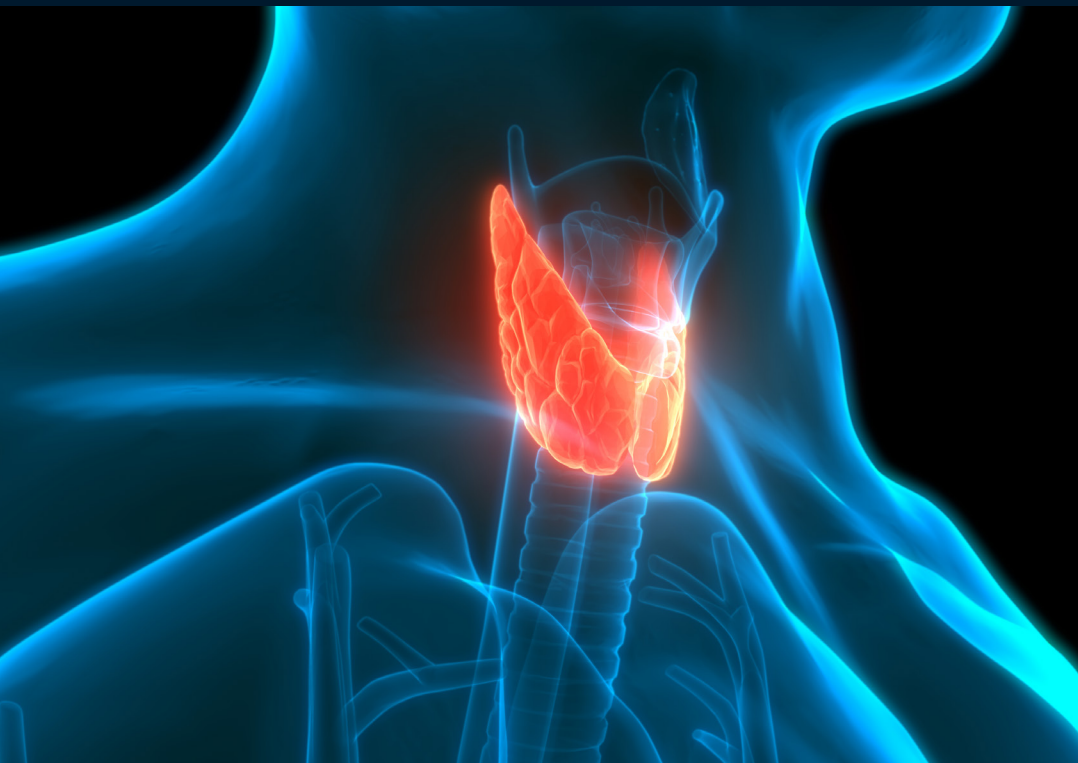
# PARATHYROID DISEASE

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## MINIMALLY INVASIVE PARATHYROIDECTOMY



Parathyroid glands are small glands of the endocrine system which are located in the neck behind the thyroid. Parathyroid glands control the calcium in our bodies-how much calcium is in our bones, and how much calcium is in our blood.

Calcium is the most important element in our bodies (we use it to control many systems), so calcium is regulated very carefully. Parathyroid glands control the calcium.

Parathyroid glands (we all have 4 of them) are normally the size of a grain of rice. Occasionally they can be as large as a pea and still be normal. Regularly, the four parathyroid are as mustard yellow glands behind the pink thyroid gland.

We must make sure you understand that the thyroid and parathyroid are NOT related. Although they are neighbours and both are part of the endocrine system, the thyroid and parathyroid glands are otherwise unrelated--they do not have the same function-just similar and confusing names!

### The Role of Calcium in the Human Body... and how the Parathyroid Glands Control All Calcium Levels in our Bodies.

First a word about CALCIUM and what it does in our bodies. We use many elements in our bodies to perform all the different functions of life. Calcium is essential to life, and is used primarily for three things:

1. To provide the electrical energy for our nervous system
2. To provide the electrical energy for our muscular system
3. To provide strength to our skeletal system.

Thus, calcium is the most closely regulated element in our bodies. In fact, calcium is the ONLY element / mineral that has its own regulatory system (the parathyroid glands).

## THE ROLE OF THE PARATHYROID GLANDS - to Regulate Calcium

The ONLY purpose of the parathyroid glands is to regulate the calcium level in our bodies within a very narrow range so that the nervous and muscular systems can function properly. This is all they do. They measure the amount of calcium in the blood every minute of every day... and if the calcium levels go down a little bit, the parathyroid glands recognize it and make parathyroid hormone (PTH) which goes to the bones and takes some calcium out (makes a withdrawal from the calcium vault) and puts it into the blood. When the calcium in the blood is high enough, then the parathyroids shut down and stop making PTH.

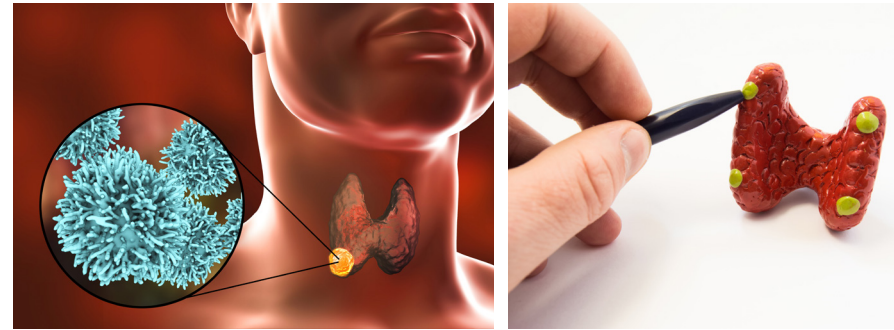
The single major disease of parathyroid glands is over-activity of one or more of the parathyroids which make too much parathyroid hormone causing a potentially serious calcium imbalance (too high calcium in the blood). This is called hyperparathyroidism and this is the disease that this entire web site is about.

## SYMPTOMS OF PARATHYROID DISEASE (Hyperparathyroidism)

- Loss of energy. Don't feel like doing much. Tired all the time. Chronic fatigue. (1# symptom)
- Just don't feel well; don't quite feel normal. Hard to explain but just feel kind of bad.
- Feel old. Don't have the interest in things that you used to.
- Can't concentrate, or can't keep your concentration like in the past.
- Depression.
- Osteoporosis and Osteopenia.
- Bones hurt; typically, it's bones in the legs and arms but can be most bones.
- Don't sleep like you used to. Wake up in middle of night. Trouble getting to sleep.
- Tired during the day and frequently feel like you want a nap (but naps don't help).
- Spouse claims you are more irritable and harder to get along with (cranky, bitchy).
- Forget simple things that you used to remember very easily (worsening memory).
- Gastric acid reflux; heartburn; GERD.
- Decrease in sex drive.
- Thinning hair (predominately in middle aged females on the front part of the scalp).
- Kidney Stones (and eventually kidney failure).
- High Blood Pressure (sometimes mild, sometimes quite severe; up and down a lot).
- Recurrent Headaches (usually patients under the age of 40).
- Heart Palpitations (arrhythmias). Typically, atrial arrhythmias.
- Atrial Fibrillation (rapid heart rate, often requiring blood thinners and pacemakers).
- High liver function tests (liver blood tests).
- Development of MGUS and abnormal blood protein levels.



Most people with hyperparathyroidism will have 6 - 5 of these symptoms. Some will have lots of them. A few people will say they don't have any... but after an operation they will often say otherwise. %95 of people with hyperparathyroidism will have 4 or more of these symptoms. In general, the longer you have hyperparathyroidism, the more symptoms you will develop.



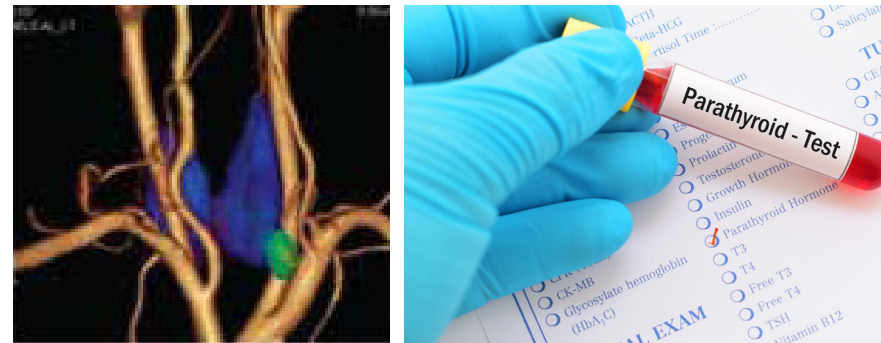
## LOCALIZATION OF PARATHYROID DISEASED GLANDS

The following list describes briefly the different tests which may help a surgeon or endocrinologist find the diseased parathyroid gland which is over secreting parathyroid hormone.

The Sestamibi Scan is now the preferred method for identifying a diseased parathyroid gland prior to an operation. Almost 80 percent correct when it shows a single gland when done by experts that do LOTS of these scans. But %50-40 will be negative regardless of who does it.

Therefore, you must understand that this is just a scan and nothing more. Far too much emphasis is put on this scan and the results of this scan. There are technique differences which make these scans at some hospitals much better than they are at other hospitals.

SPECT scanning is a mechanism by which a three dimensional picture can be obtained following injection of the Sestamibi drug.

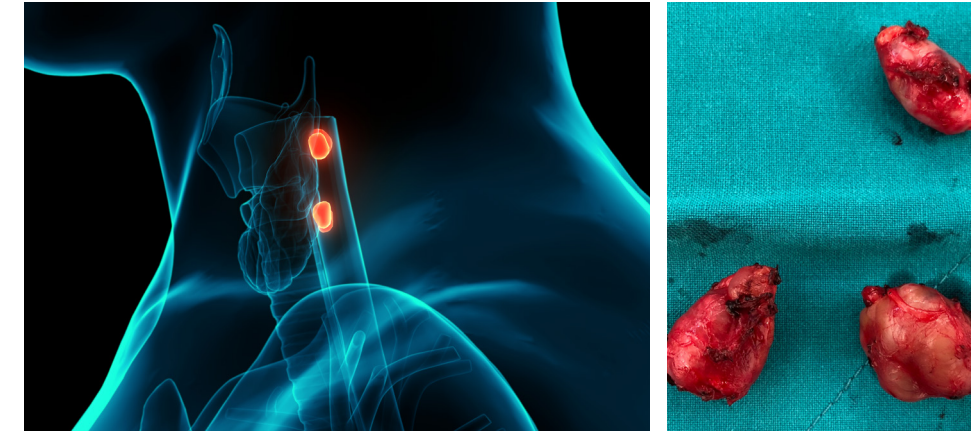


**MRI** scans are almost never useful because MRI scans don't show parathyroid tumors well. At best, an MRI will find less than %8 of parathyroid tumors, therefore, the indications for getting this scan are VERY few.

**CT** scans are used much less frequently since the introduction of the Sestamibi scans. They can occasionally be helpful, but getting a CT scan prior to a first operation for hyperparathyroidism is NEVER warranted.

**Ultrasound** is less costly than CAT scans and MRIs, they are easily performed, carries no significant risks, and can be useful in localizing a parathyroid adenoma.

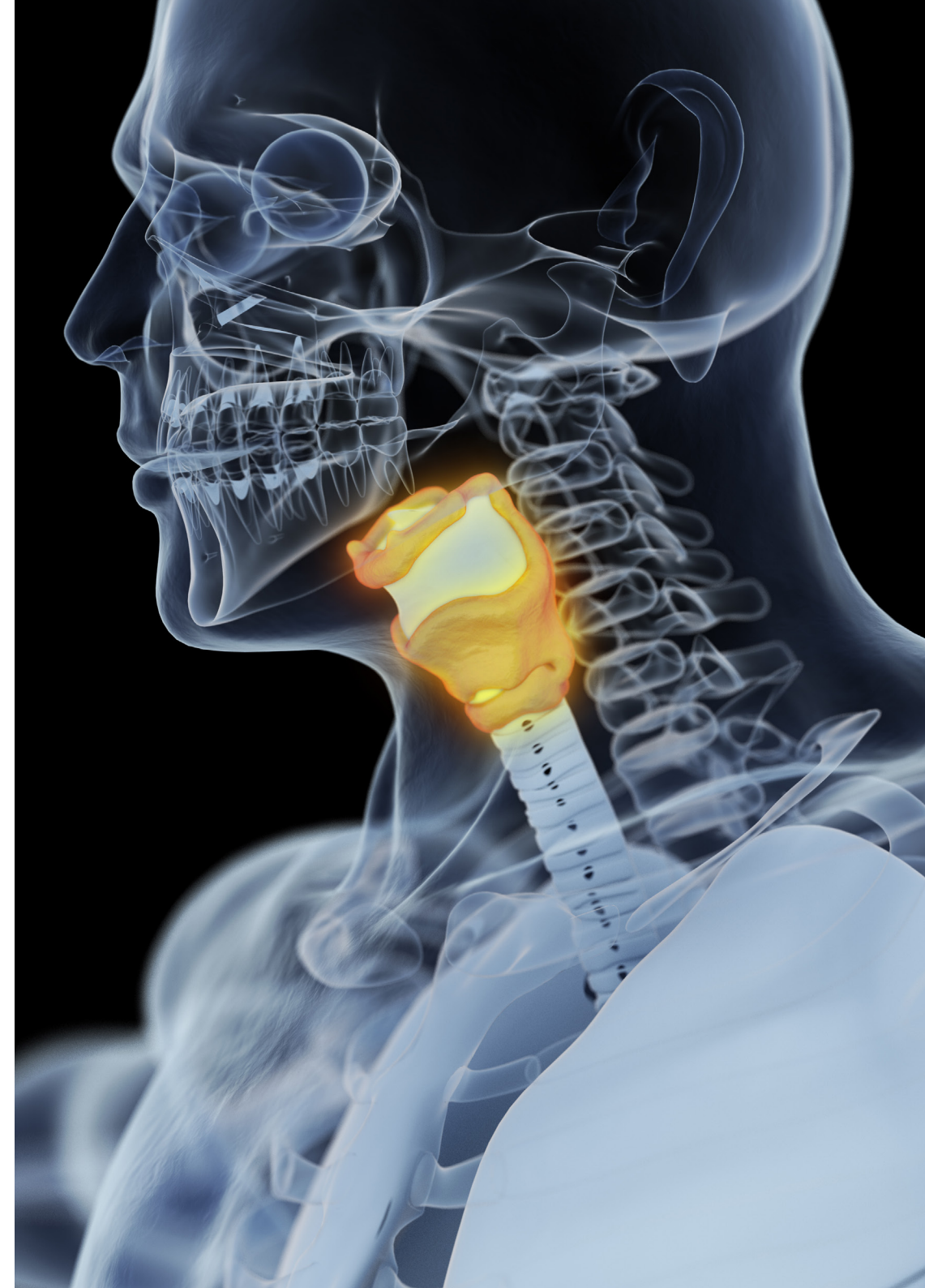
There are numerous potential advantages to minimally invasive radioguided parathyroidectomy.



First of all, the surgeon has a very good idea which one of the four parathyroid glands is hyperactive prior to beginning the operation.

**Another advantage of the MIRP parathyroid surgery technique is that it almost NEVER requires general anesthesia.** Mini-parathyroid surgery is usually performed using IV sedation (like getting a colonoscopy), or using a very light general anesthesia (called LMA). LMA anesthesia allows the patient to be out for the procedure, but awake enough that they breathe for themselves and wake up completely within a minute or two.

Nerve Monitoring might be used by some surgeons.





## Advantages of Minimally Invasive Radioguided Parathyroid Surgery

(The MIRP Procedure)

- Less anesthesia, almost no patients have to be intubated (a tube into your trachea) and put on a breathing machine typical of general anesthesia.
- 0.5 to 1.25-inch incision instead of 6 to 8-inch incision (average is 1 inch).
- Usually 20-14 minutes (average 17.8) in the operating room vs. 3 to 5 hours.
- Zero risk to nerves and other structures on the "normal" side of the neck.
- Less than 2/1 of the potential complications than the standard operation even when standard operation is performed by very experienced endocrine surgeons.
- Much smaller overall operation so less pain (only Tylenol or Motrin needed).
- Return to normal activities almost always by the next day.
- Almost always home in an hour or 2 (vs. 1 or possibly 2 days in the hospital).
- Get out of the hospital and avoid hospital acquired infections and hospital errors.
- Almost all patients go out to eat the evening of surgery.
- Significantly less expensive than the standard operation. \*
- Cure rate significantly higher than the standard operation (our cure rate is currently %99.8).
- Dramatically reduced chance of surgery not helping the problem.
- Near zero risk of hypoparathyroidism (a rare complication seen when all parathyroids are removed)
- Normal parathyroid glands are not removed (the probe and experience prevents this!).
- Can still examine the thyroid and remove thyroid nodules if necessary.

## Three reasons that a patient needs a second parathyroid operation:

1. The surgeon could not find the diseased parathyroid gland at the first operation (about %88).
2. The surgeon removed one parathyroid tumor and the patient was one of %25 or so that have more than one tumor (this group is about %12)
3. Many years after a successful operation, a patient gets hyperparathyroidism in another parathyroid gland (a different gland goes bad). This is far less than %1 chance of this happening every 30 years.

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