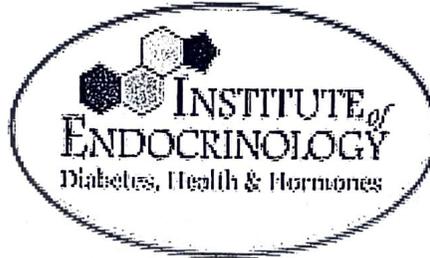


THYROID NODULES AND THYROID BIOPSY:

The Institute of Endocrinology Diabetes Health and Hormones (IEDHH) is a leading institution in our area with extensive experience in the management of thyroid disease. We, at the IEDHH, have in-house cutting edge tools to accurately evaluate, diagnose and treat all aspects of thyroid disorders. This article will discuss the management of thyroid nodules. For more information please feel free to ask our highly trained providers or visit us on the web.



So , you were diagnosed with thyroid nodules and you have questions . We hear you and here are some answers

Q. What does thyroid nodule means?

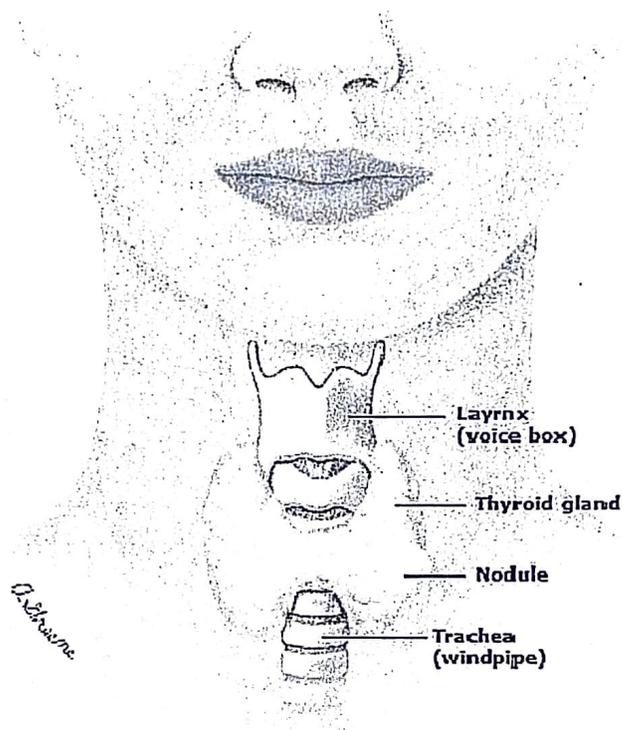
A. Thyroid nodule means simply a lump or a mass within the thyroid gland, so the mass or the lump arises from the thyroid gland and it is a part of the thyroid gland.

Q. Why are nodules in the thyroid important? What is the significance of having thyroid nodules?

A. The most important 2 things we need to know whenever someone has thyroid nodule or nodules are :

1. We need to know if this is a harmless lump (or we call it benign nodule) or if this is a harmful lump (such as cancer or malignant nodules).
2. The second thing we need to know is if the nodule (or the nodules) have affected the function of the thyroid gland or not. In other words, did they result in abnormal thyroid hormone levels in the blood or not.

The providers at the Institute of Endocrinology, Diabetes, Health, and Hormones are very experienced in answering the above two questions. They will be able to precisely identify for you, if the nodules are harmful or harmless, and they will also be able to determine for you if the thyroid functions were affected or not.



O. What is the thyroid gland and what does it do?

A. The thyroid gland is a butterfly shaped gland, normally located in the lower front of the neck. The thyroid job is to secrete hormones called thyroid hormones. These are secreted from the thyroid gland into the blood stream and then goes to every organ in the body and does important functions such as enabling the body to use energy, stay warm and keep the brain, heart and muscles and other organs working properly.

O. How common are thyroid nodules? Is this something rare or common?

A. Thyroid nodules are very common; actually up to half of the population may have thyroid nodules. So, if we pick 10 people from the street randomly, and do ultrasound of the thyroid for all of them, possibly 5 of them may have thyroid nodules.

The older we get the more likely we would have nodules in the thyroid.

Because thyroid nodules are common, in many occasions thyroid nodules are discovered incidentally during imaging of the head and neck for a completely different reason such as carotid ultrasound and MRI of the neck looking for spinal disorders for example.

O. How often these nodules turn out to be cancer? or in other words, how much is the risk of cancer in these nodules?

A. 95% of the thyroid nodules are actually benign, noncancerous and harmless. So only 4 to 6% of these nodules are cancers.

If you have a thyroid nodule, statistically speaking it is more likely to be benign than cancer. However, we have to rule out the 4 to 6% possibility of cancer in thyroid nodules when they are present.

O. What causes thyroid nodules? Why did I get it?

A. Well, sometimes, there is no specific cause that could be identified.

But, in other cases we can identify one or more causes that can result in higher risk of developing thyroid nodules.

The providers at the Institute of Endocrinology Diabetes, Health and Hormones are very experienced and they will always, in every single case, try to find out if there is a correctable cause for the nodules.

This approach will allow us to prevent further nodules from developing and also may allow us to shrink or even sometimes cure those nodules.

Some of the causes that we know about include; excessive iodine intake, deficiency of iodine intake, Hashimoto disease, other thyroid autoimmune diseases, thyroid cancer, and hyperactive benign thyroid nodules.

Exposure to radiation in the past and family history also can increase the risk of developing thyroid nodules.

Certain medications can cause a goiter and thyroid nodules such as iodine, lithium, and iodine rich medications such as amiodarone

O. Any food that can cause thyroid nodules or any food that can help thyroid nodules?

A. Generally, the effect of food especially in the U.S. on thyroid nodules is not big. Some of the foods that can cause goiter and nodules is Cassava especially eating large amounts of it and also millet in large quantities.

Q. Does having thyroid nodules run in the family?

A. Yes, in general, patients who have family history of thyroid nodules tend to have more risk of developing thyroid nodules for different reasons.

Q. How do you know if a nodule is benign or cancer ?

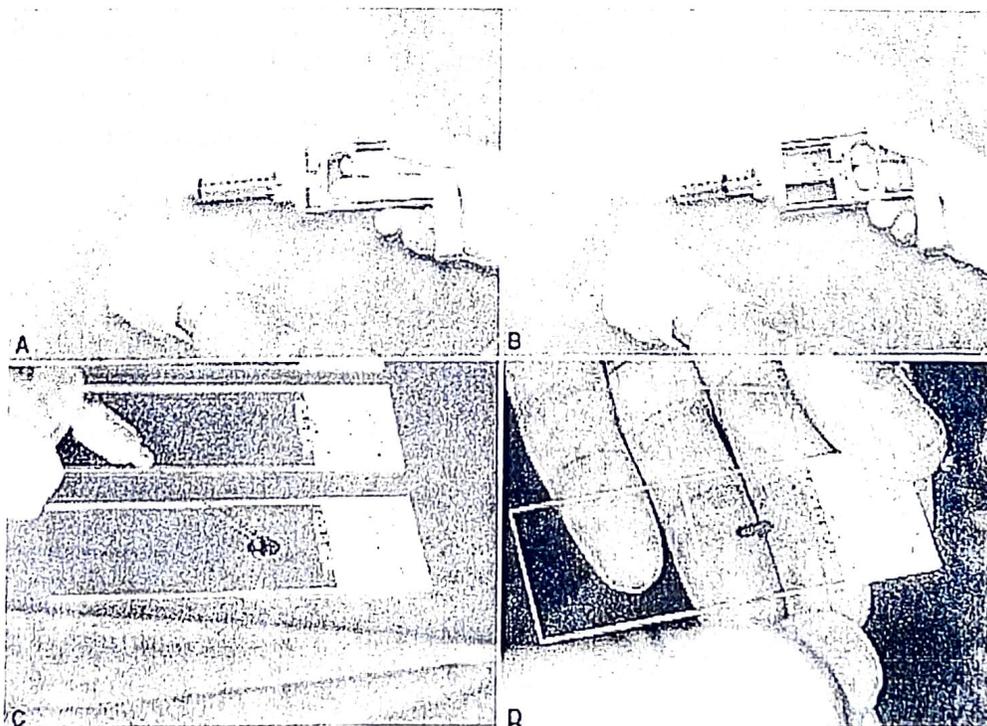
There are 2 common ways to know. One is to biopsy the nodule (taking a sample cells from the nodule) and the other is to follow the nodules by ultrasound and monitor growth and progression.

For larger nodules (generally those which measure more than 1 cm in size) or if any high risk for cancer is present (such as family history of cancer or exposure to radiation in the past) biopsy will be the preferred method to use. However, if the nodules are small (usually less than 1 cm) and benign looking and no risk factors, observation by serial ultrasound will be the method to recommend usually.

With our extensive experience treating thousands and thousands of thyroid nodules in the past, we will be able to precisely identify for you the best strategy to follow.

Q. When you do the biopsy, do you take a piece out from the thyroid? How does it look like what you take out?

A. No, we do not take a piece out. Basically, we put a very tiny needle in the thyroid under ultrasound guidance and we only take out cells, so the material we take out from the thyroid almost looks like blood. Please see pictures



Q. You mentioned that radiation exposure increases the risk for thyroid nodules and thyroid cancer . I had many X Rays and CAT scans for medical reasons . Can this be the cause of me developing nodules in the thyroid ?

A. No , radiation exposure here means radiation treatment such as for patients who were treated with radiation for Lymphoma for example . It also applies to exposure to radiation such as during the Chernobyl accident in Europe in the 1980s etc. X rays and CAT scans for medical use do not pose increased risk for thyroid nodules.

Q. I have been experiencing a lot of symptoms including weight gain, fatigue, and hair loss, etc.? Can the nodules be causing those symptoms?

A. Generally the nodules themselves do not cause fatigue and weight gain or hair loss. However, having thyroid nodules may be a sign or indication of an underlying thyroid function disorder that can result in the above symptoms. If you have the above symptoms we will always search for an underlying thyroid function disorder and work on optimizing the thyroid functions so you can be as symptom free as possible.

As above, symptoms can indicate abnormal function of the thyroid gland. Not all of the nodules will cause abnormal function of the thyroid gland but some will.

Having thyroid nodule by itself is a structural problem. Sometimes, it can cause functional problem to the thyroid and sometimes not.

To explain the difference between structural and functional disorder for example, a person can have a small lump on the hand (which is a structural problem), but it may not affect the function of the hand. That person may still be able to use the hand fine. So this would be called structural problem, but not functional.

Another person may have a small lump on the nose, but still able to smell, therefore, it did not affect the function of the organ. The same thing applies to the nodules in the thyroid gland. Thyroid nodules could just be structural problem but the function is not affected and sometimes they could also affect the function of the gland itself.

Structural effects from the thyroid nodules can include compression symptoms particularly if the nodules are large in size (more than 2 cm in size or so).

For example, if the lump is big enough, it can cause pressure in the neck, it can cause pressure on the esophagus or on other organs in the neck and the patient can feel difficulty swallowing or sometimes difficulty passing the food and pressure sensation etc.

Usually nodules that are small in size (less than 1 cm) are unlikely to cause pressure symptoms.

However, people vary a lot in their threshold for symptoms. Some patients may have very large nodules that measure even 5 cm and have no symptoms whatsoever and some patients may have nodules that measure less than 1 cm in size but they are very symptomatic and have difficulty with swallowing and significant feeling of pressure in the neck.

Rest assured that if you have any symptoms suggestive of thyroid function abnormalities, the providers at the Institute of Endocrinology, Diabetes, Health and Hormones will do extensive evaluation for the thyroid functions. This extensive evaluation will not leave a case without being identified. There is no chance that functional disorder of the thyroid will be missed with our approach.

The Institute of Endocrinology Diabetes Health and Hormones will always check with you about how bad your symptoms are, and they will act on that appropriately.

Sometimes, the thyroid can be underactive or overactive or having problems such as Hashimoto's disease or experiencing iodine deficiency or excess. The providers at the Institute of Endocrinology Diabetes Health and Hormones will advise you of how to correct these abnormalities in order to help your symptoms if applicable.

O. I have compression symptoms from my nodules, even though they are benign and not malignant, what is the solution?

A. So, some patients have pressure symptoms from the nodules. Those patients may experience some difficulty with swallowing or have tenderness or pressure in the neck. Sometimes once a patient is diagnosed with thyroid disorder, his or her attention increases to the neck area and that decreases the threshold to feeling symptoms.

Having a nodule in the thyroid is very similar to having a nodule or a lump on any other organ.

If the nodule is benign and is not very large (greater than 4 or 5 cm) it will usually be up to the patient if the nodule should be removed by surgery or be observed.

If the nodule is cancer, obviously the thyroid gland will have to be removed by surgery.

If the nodule is benign but very large (measuring more than 4 or 5 cm in size) , it will usually have to be removed by surgery based on the size that most likely will cause pressure on the surrounding organs.

If the nodule is benign and small, it will be up to the patient depending on how bad their symptoms are and the balance between the benefit of relieving the pressure symptoms vs the risks involved with surgery (such as scarring, infection, bleeding etc.)

In general, if the patient has significant compression symptoms such as significant difficulty swallowing and pressure sensation and the symptoms are bad enough to affect the quality of life for the patient, surgical excision is usually recommended to remove the nodule.

If the symptoms are just mild and off and on the patient may select to just observe the nodule or nodules.

Patients vary a lot in their tolerance to symptoms. There are patients who have large nodules measuring 4 cm or more and feel nothing, and there are patients who have just tiny nodules measuring 1 cm or less and have severe symptoms.

Since no one feels the symptoms except the patient, we at the IEDHH, always will listen to the patient and consider their preference when it comes to decisions about their health conditions.

O. I feel hoarse and have to clear the throat all the time, can this be from the nodule?

A. The thyroid gland is usually very far from the vocal cords (which control the voice). Most cases of hoarseness of the voice or the urge to clear the throat arise from allergies, post nasal drip, esophageal reflux and irritants such as tobacco. For the thyroid to cause hoarseness, it has to be really huge to enlarge several folds and wrap around the vocal cords which is very rare to happen.

O. OK, I was told I need a biopsy for my nodule. How do I prepare for it?

A. There are no major precautions that you have to take before the biopsy except for a few;

1. Try to not put any makeup on the neck because we will clean the skin anyway.
2. Try to wear clothes that covers the front of the neck if possible. This is because we will be working on the neck area. So, a low cut or V-shaped neckline shirts or T-shirts would be a good option.
3. Try not to wear necklace in that day, because it will be removed anyway when we do the biopsy.
4. If you are taking any blood thinners, such as Xarelto or Coumadin. Please inform the provider during the day you are told that you need a biopsy. The provider may ask you to hold the blood thinner in the day when you have the procedure.

The procedure is usually not a very bloody procedure and the blood loss may be minimal, (usually a few drops) However in some cases the provider may prefer to hold the blood thinner in the day of the procedure for some cases for safety reasons. Please ask the provider if you are on a blood thinner whether you need to hold it or not.

5. If you are a patient who tends to have severe anxiety with procedures, and very afraid of the procedure, it would be a good idea to ask the provider for an anxiety medicine such as a small dose of Valium or Ativan an hour before your procedure.

6. You usually do not have to have somebody drive you back and forth. However, if you receive anxiety medicine before the procedure such as Ativan or Valium, then you should bring somebody to drive you from and out of the office.

O. What happens the day of the biopsy ?

A. You will arrive to the office and register at the front desk as usual. In general, the visit should be short and the biopsy itself does not take long (the procedure usually takes less than 15 minutes).

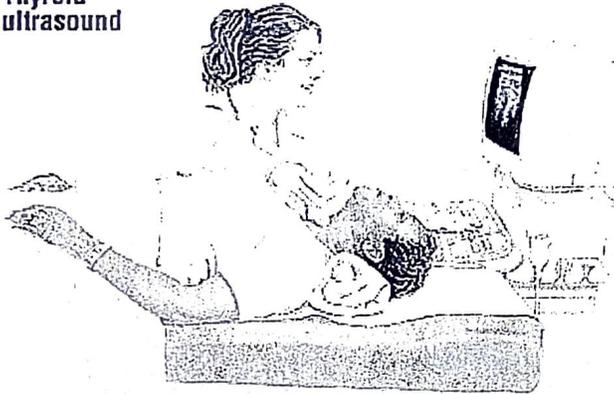
The front desk may collect copays or deductibles and will inform the ultrasound technician or medical assistant about your arrival.

The Ultrasound technician or the medical assistant will greet you and will take you to the biopsy room.

You may be given a brochure or a video explaining the procedure in details or she may explain the procedure to you herself. Please make sure you ask any question during that time about the procedure.

You will sign the procedure consent and the assistant will place you on the procedure table in the appropriate position. Usually, we ask that you lay down on your back with your head lying behind the pillow. Therefore your shoulders and part of your neck will be on the pillow. This way your neck will be stretched and exposed to the maximum for easy access to the thyroid nodule.

Thyroid ultrasound



The skin will be cleaned with alcohol pads. We do not use iodine because many people have iodine allergy.

Then the doctor will use a very tiny needle much smaller than the needle that is used for blood draw. This needle will be used to inject lidocaine under the skin and this will make your skin numb. The numbing usually takes 2 to 3 tiny injections. Most patients do not have severe discomfort with the numbing needles, however, there might be some burning and stinging because the lidocaine. The first needle will numb the skin and the second needle will numb the muscle and the soft tissue.

Overall during the whole process of the biopsy, there is only very minimal discomfort usually, not severe pain. If you have severe pain anytime during the procedure, just please raise your hand and the staff will stop the procedure immediately. Minor discomfort is expected however. Pressure and movement sensation, and some burning is expected as well.

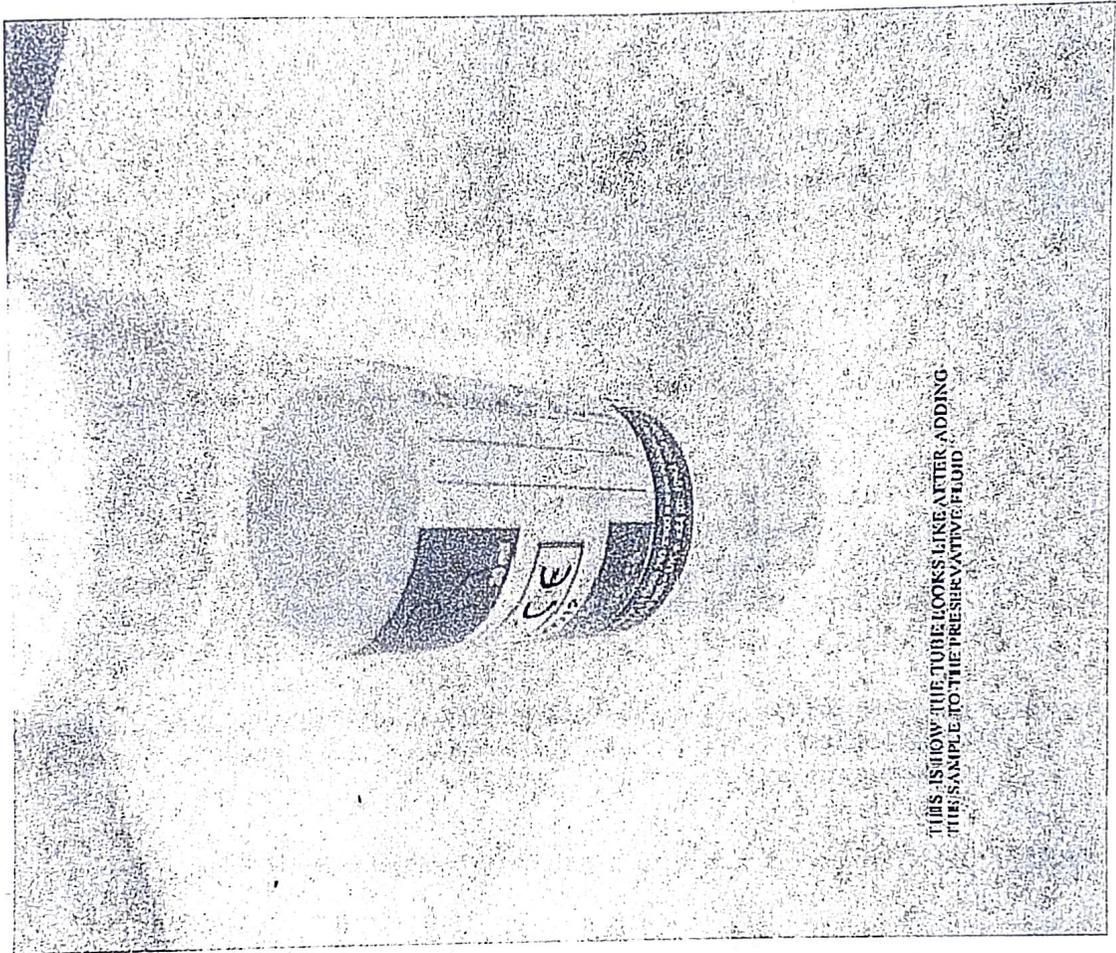
The doctor then will use ultrasound machine to guide placing a needle right into the thyroid nodule and then will move the needle back and forth a few times to obtain sample cells out.

Once the doctor feels that we got enough sample for analysis, the procedure will be completed. The assistant will put a band aid on the neck and will set you up slowly.

You should sit up for a minute and then you will be good to go back to normal.

Some patients experience little sense of dizziness after the procedure either from the neck extension or from the lidocaine or even sometimes just from being anxious. Therefore we ask that you please do not sit up until the assistant sits you up slowly.

The doctor puts the sample obtained in a tube that has a preservative and then the tube will be sent to a pathologist (a doctor who reads slides and determines the results)



O. How long will the numbing medicine last? Is it normal to feel numb in the ears or the jaw during or after the procedure?

A. The numbing medicine usually lasts about one hour. It is normal during the procedure to feel numb in the neck and in areas such as the jaw or the ears. This is because the nerve supply goes up from the thyroid area to the ears and the jaw. So, it is completely OK if you feel numb in those areas.

O. when can I remove the band aid after having the biopsy done ?

A. 10 to 15 minutes

Q. Anything I have to avoid after the biopsy ?

Not really. You can pretty much go back to your life as normal. You can drive (unless you took a medication to decrease anxiety before the procedure), eat and drink and go back to work as usual.

You may get a courtesy call from our staff in the next few days after your biopsy to check on you and make sure that everything is OK. Please let us know if you feel anything unusual.

Q. Do I have the result of the biopsy right away?

A. No, the sample will be collected in a tube filled already with liquid (preservative). Then it will be sent to pathology and the cytopathologist will look at the slides under the microscope and then generate a report back to the doctor. The pathologist does not work under our office, so they determine how long they will take to get the results back to us. Their process may take a few days but it may take up to a few weeks. Usually, in most cases we receive the results within 2 weeks, therefore, every patient will be given an appointment to come back 2 weeks later after the biopsy to discuss the results.

Q. Can the biopsy result take more than two weeks?

A. yes, Sometimes the pathologist may like to do further testing on the sample (molecular testing) which is more detailed on the specimen and this can take more than two weeks.

Q. If my biopsy results are taking more than 2 weeks, does this mean that it is a cancer? Should I be worried?

A. No, no need to get worried for no reason. Most of the samples that undergo molecular testing are benign. So do not get worried until your biopsy results are back. Worst case scenario, if the nodule is cancerous, most thyroid cancers are curable. In our institution, the cure rate for thyroid cancer cases exceeds 99%.

Q. Can I be called for the result of my biopsy?

A. No, please do not call for the results. You will be given a follow up appointment to go over the results and discuss further action in details.

In order to avoid any miscommunication or misunderstanding of the results, we ask that every patient who has a biopsy done to come back for follow up to discuss the results in person. This will allow the provider to make sure that the patient completely understood the results and the necessary action accordingly.

Q. Is there anything I should be looking for after the procedure?

A. Nothing major, there might be a very small bruise or swelling similar to what you get when you have a blood draw. You can go back to normal life. You can drive. You can eat. You can go back to work. There are no precautions that you have to worry about.

At the Institute of Endocrinology Diabetes Health and Hormones, we have never encountered a severe complication during this procedure and we are proud to state that we perform not less than 50 biopsies every month on average.

Q. I had labs done and I need to know and discuss the results and I also have some symptoms I would like to discuss with the doctor?

A. In general, the biopsy day is reserved for procedures only. Unless you are experiencing an emergency, please expect that lab results, symptoms etc. will not be discussed in the day of the biopsy. You will be given a follow up appointment two weeks later to discuss the results and at the same day you will be able to discuss any lab results and of course any symptoms you might be experiencing with the provider in details.

After all, the provider will need the biopsy result along with your labs and knowing your symptoms in order to formulate a thorough plan that takes in consideration all available data. If the doctor takes decision before knowing the biopsy result, that plan may have to be completely changed once the biopsy results come back and reviewed. Therefore it is a better strategy to wait until we get all results (biopsy, labs and history) before making a final medical decision.

Obviously If you have any urgent or life threatening symptoms of course let us know. This should never wait.

Q. Doctor, can I see the nodule?

A. If, you would like to see the nodule, please ask the assistant or the ultrasound technician. She will be happy to save a picture for you and show you the nodule after your biopsy is completed.

Q. Doctor, I have a cold or respiratory infection ? Can this affect the result? Should I reschedule my biopsy?

A. We prefer that you do not have cough or fever. If you are sick, having excessive cough or fever, it might be a good idea to reschedule your biopsy to a later day.

Infection in the neck can cause inflammation in the neck and it may affect the pathology result. Having recent radioactive iodine uptake and a scan within the last month or a

CAT-scan with contrast within the last month may also affect the result especially if you have exposure to large doses of iodine during those procedures. Exposure to radiation treatment such as in lymphoma cases, etc. also can result in inflammation, so we would like to postpone your biopsy for a few months after if you have radiation to the neck.

O. I had my biopsy done and I am waiting for the results. What are the possible results from the biopsy?

A. The most important information we need from doing a biopsy is to know whether the nodule is benign (a nodule that is okay to leave in the body and observe) or if this is a nodule that is better to remove and not keep in the body(cancer or suspicious)

The biopsy can come back in the medical terms showing 4 possibilities:

1. A benign nodule. Benign nodule is harmless. There is no cancer and it is okay to keep this nodule in the body if it is not causing too much pressure symptoms. Usually, for those nodules, you will have just followup by examination and ultrasound. Typically, we do ultrasound six months later, but no biopsy anymore unless the nodule significantly grows up in size. After six months, if the nodule is still stable then we do ultrasound every year for two or three years and then after that we may go to every 2 or 3 years depending on the case. If the nodule increases in size significantly even if benign before, we may have to biopsy it again. If it grows to a large size to the degree of causing pressure symptoms, it can be removed surgically even if it is benign. (remove the nodule only not the whole thyroid)
2. The second possibility is if the nodule is cancer. If the nodule is cancer, it has to be removed by surgery. If the nodule is cancer you usually will need to have the whole thyroid removed because the cancer may have already spread in the other side or to other areas of the thyroid. Also in cases of thyroid cancer, removing the whole thyroid will make it very easy during follow up to make sure that there will be no cancer recurrence afterwards. Some surgeons will remove the whole thyroid all in one operation, but some others will remove it in two stages. I mean one side at a time. This sometimes done in order to avoid risk of complications during surgery such as injuring nerves or parathyroid glands during the surgery. You will need to discuss the details of the surgery with surgeon him or herself. We do not control what approach the surgeon may take. We are not surgeons but we will refer you to an experienced surgeon if necessary. Please feel free to inform us if you have a surgeon in mind that you dealt with and prefer. The surgeon will be able to answer for you all details about the surgery. Such as the length of stay in the

hospital, the time it takes to heal, after surgery, wound care and any other details about the surgery etc.

3. The third possibility is a suspicious nodule. These nodules have risk of cancer of about 20%. Most of these nodules will need to be removed by surgery. Not all of them turn out to be cancer

4. The last possibility is a non-diagnostic specimen or non-diagnostic nodule. This means that the aspiration and the biopsy did not yield enough cells to come up with one of the above 3 diagnosis. This does not mean that the biopsy or the procedure have failed. Simply Some nodules are cystic, meaning that they are filled with fluid. So those nodules do not have a lot of cells anyway. Also some nodules are just not cellular by nature. The non-diagnostic nodules will have two options. One option is to repeat the biopsy again after some thyroid rest (usually 1 to 3 months), and the other option is to just observe the nodule by ultrasound particularly if it is cystic or has more benign features. We will guide you with the right decision if your biopsy comes back non diagnostic. With our extensive experience dealing with thyroid disorders, it is extremely rare to miss a thyroid cancer given our approach of follow up.

Q. Where else can I read about the thyroid gland and thyroid nodules?

A. We, at the Institute of Endocrinology Diabetes Health and Hormones, care about the safety of our patients and want to make sure that our patients are getting the most accurate information possible. Therefore, we advise our patients to get their information only from websites that have good reputation and use high standard methods of evidence.

We recommend websites such as those of the American Thyroid Association, The American Association of Clinical Endocrinologists, the Website of the Endocrine Society, and The Mayo Clinic. We in particular advice not to depend on websites that use poor quality studies and those that are not based on evidence based medicine.

Unfortunately, the internet is full of websites that give false information about the thyroid disorders. Some of those websites may even appear on the top pages of famous and common search engines.

Please depend on us and trust us to answer any question you may have about your thyroid. At the Institute of Endocrinology Diabetes Health and Hormones, we always follow up to date evidence based medicine that will optimize your results and minimize any possible adverse reactions to you.