**THYROID GLAND NODULES AND FINE NEEDLE ASPIRATION BIOPSY**

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The thyroid gland is located in the center of the neck. Its shape, similar to a butterfly, includes the left and right lobes (which would be the wings) and a central section called the isthmus. The thyroid hormone, generated in this gland, exerts its function in a large number of systems in the human body. Among its most important functions, stimulate metabolism, growth and development.

Thyroid nodules are common. Studies show that, using a sensitive tool, such as an ultrasound machine, between 19% to 68% of people have thyroid nodules smaller than 1 cm (with a higher incidence in women and older adults) 1. On the other hand, only 5% of women and 1% of men show palpable nodules (greater than 1 cm) 2. Between 7-15% of thyroid nodules show malignancy3, requiring that they be removed by means of surgery. Although the vast majority of thyroid nodules are benign, some of these can grow to alter the patient's daily life, causing discomfort to swallow and / or breathe among others. This would also be a possible reason for removing the nodules by surgery.

A picture containing indoor, hairpiece, doll

Description automatically generated

Historically, it was only possible to determine whether this type of mass was benign or malignant after removing the gland (or part of it) surgically. Since most nodules are benign, less invasive diagnostic methods were sought to avoid removal of such an important gland. In the case of being a benign nodule, to avoid subsequent surgeries and in the case that the nodule is malignant, avoid a partial removal.

Fine needle aspiration biopsy (or FNA for its acronym in English) has become the most widely used method to study this type of nodules due to its simplicity and high diagnostic value. The procedure is simple. Using a 0.413 mm diameter needle, inserted through the skin and guided by an ultrasound machine, individual cells and small pieces of the tissue that make up the nodule are removed. These are fixed on a slide, stained and verified at the moment by the pathologist, who determines if a sufficient sample was extracted to reach a diagnosis. If necessary, additional aspirations are made to obtain more material or to carry out special studies. Then, in the pathology laboratory, additional stains are applied and the pathologist arrives at a diagnosis with all the information at hand (history, material obtained, special studies, etc.).

Another way in which unnecessary surgeries are avoided is by using guidelines that govern when an FNA is recommended and when to follow up with subsequent sonographic studies. The American Thyroid Association (ATA) and the American College of Radiology (ACR) have developed and maintain these guidelines, based on size and other sonographic characteristics that increase the risk of malignancy of a nodule, such as such as irregular edges and microcalcifications, among others. The most recent of these guides is the TI-RADS Thyroid Imaging Reporting and Data System) developed by the ACR. Recently, these guidelines recommend FNA in larger nodules than in the past based, broadly, on the negligible risk of malignancy in small nodules.

Additionally, there are subtypes of thyroid tumors that, although classically considered malignant, do not necessarily increase mortality (lead to death) or morbidity (affect general health) of the patient, and therefore do not require imminent surgery. The differences between these tumors are seen at the DNA level of malignant cells, and for this reason molecular studies have been developed that can help differentiate between these variants. Today these studies can determine if a tumor has a mutation that increases its propensity to be aggressive.

The FNA has achieved a significant reduction in unnecessary surgeries and together with the new advances in molecular studies, the medical community continues to chart a path in the diagnosis and treatment of these conditions.

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