Molecular tests to guide thyroid nodule treatment

Keila Rivera Roman, MD, FCAP, FASCP
Specialist in Anatomical and Clinical Pathology
Subspecialist in Genetic Molecular Pathology

A fairly common and frequent clinical picture after performing an aspiration biopsy for fine needle (FNA) to a nodule in the thyroid gland is to obtain a diagnosis that is read or interpreted as "indeterminate." This is the categorical denomination of all the nodules to which they are assigned, characteristically, categories III [("atypia of undetermined significance (AUS) / follicular lesion of undetermined significance (FLUS) ”] or IV [(" suspicious for follicular neoplasm (SFN) / follicular neoplasm (FN) ”] within the Bethesda System. The next step more adequate to be able to determine the course of the best Treatment for the patient in these cases is molecular genetic testing.

Biopsy sample and technical aspects
The type of sample used in these tests molecular is the residual material itself that was acquired during the aspiration procedure by routine fine needle. This sample should be placed in a solution that preserves nucleic acids, ideally at the time the biopsy is performed.

Currently, there are different testing options to be able to do this. Most of this type of testing consists of panels that include aberrations most common genetics associated with malignancies of the thyroid gland. The reports of these tests usually they will include the result on the status of mutations and also a figure (in percentage) of the probability of risk of developing a malignancy, of according to the pattern of mutations to be interpreted.

Mutations and their interpretation
The most common type of carcinoma of the thyroid gland is the papillary type, which regularly presents the following mutations (frequencies in parentheses): mutations in the RET gene (13% to 43%), mutations in BRAF (29% to 69%), genetic rearrangements in NTRK1 (5% to 13%) and mutations in different isoforms of Ras (0% to 21%). Follicular carcinoma, for your part, you can commonly express the following mutations: mutations in different isoforms of Ras (40% to 53%) and rearrangements in the PPARG gene (25% to 63%). In addition, about 25% of tumors of the thyroid gland will not present aberrations known, which makes the interpretation of this type difficult test.

Recommendations based on results
In those nodules with a diagnosis of AUS / FLUS and whose mutational status is positive (and therefore have a high risk of malignancy), the recommendation is to perform a total thyroidectomy. However, to be negative for mutations (with a relatively low cancer risk) the recommendation is a lobectomy, repeat the FNA in a parameter of appropriate time or maintain close clinical control.

With a diagnosis of FN / SFN and a positive mutational status (and a high risk of malignancy), the recommendation is to perform a total thyroidectomy. If he result is negative for mutations (with a risk of low cancer) the recommendation is a lobectomy.

Commentary
In this way, molecular test results of the thyroid gland are decisive for the stratification of the risk of malignancy and allow, in turn, determine the next step in management of these types of injuries.