

## Thyroid Nodule: To Puncture or Not to Puncture

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Medicine has evolved a lot, and in the same way, the methods we use to diagnose different diseases has changed so much. Many procedures of diagnosis are performed every day around the world. As a result of this situation, many lesions are discovered through procedures asked for problems very different from the signs or symptoms which began all the process.

Thyroid nodules are common. The possibility of finding them in an imagen technique is very high. Endocrinologists know that even in the case of the diagnosis of a malignant nodule, the complications are infrequent, and the rate of deaths directly related to a thyroid carcinoma is anecdotal. However, for most people, a nodule found in our body is a synonym of cancer. Furthermore, most of the time, cancer is a synonym of death.

The diagnosis of thyroid cancer has increased worldwide over the last decades. In the US, a retrospective study found that the incidence increased from 3.6 per 100000 in 1973 to 8.7 per 100000 in 2002 [1]. Most of the cases correspond to papillary thyroid cancer (PTC) histology. In this analysis, 49% of the increase consisted of microcarcinomas ( $\leq 1$  cm) and 87% were tumors less than 2 cm.

Even though mortality from thyroid cancer remained constant, some countries have developed programs of screening, such as South Korea. This circumstance has led to an epidemic of thyroid cancer in this country [2]. Thyroid cancer has risen 15-fold between 1993 and 2011, with most of the cases related to PTC and no change in thyroid cancer mortality.

European countries are not an exception. For example, the Italian Tumor Registries Association (AIRTUM) recently analyzed data of thyroid cancer (TC) from 1998 through 2012 [3].

The incidence rose by as much as 74% in women and by 90% in men. This incidence was due almost exclusively to PTC as in other parts of the world. A negligible increase was seen for follicular and medullary TC, and no significant changes were found for anaplastic TC.

Italian researches consider that the possibility of a "PTC epidemic" related to greater exposure to contributors to thyroid cancer or new risk factors is improbable. This trend is likely attributed to many different factors: changing PTC assessment procedures (including histology) and the extensive use of diagnostic procedures such as ultrasonography, which are sometimes performed "opportunistic" and with no apparent medical indication [3].

Otherwise, it would be necessary to consider many settings in the wild context. Diagnoses have changed with increased access to healthcare, improved diagnostic technology, and increased surveillance. It might explain more than 60% of thyroid cancer diagnoses in a selection of high-income countries [1].

Healthcare expenses of overdiagnosis of thyroid cancer are considerable. One study has estimated that the cost of in 2013 in the U.S. for all patients diagnosed after 1985 was \$1.6 billion. The highest proportion of expenditure was related to diagnosis, surgery, and adjuvant therapy for newly diagnosed patients (41%), followed by surveillance of survivors (37%) and non-operative deaths costs attributable to thyroid cancer care (22%). Projected 2030 costs (in 2013 \$US) based on current incidence trends exceed \$3.5 billion [4].

As most of the costs derived from PTC correspond to the initial and continuing phases of care, with the projected increase in population and survival trends, the cost will rise exponentially.

The U.S. data are worrisome; nonetheless, they are associated with a mainly private healthcare system. In other parts of the world, for example in Spain, with a universal public health system, every action with this and other growing diseases should be as efficient as possible. Every step in the diagnosis and treatment of a thyroid nodule must have a suitable cost-benefit relationship.

The primary treatment of PTC is surgery (total or near-total thyroidectomy) with or without the additional administration of radioiodine (131I). This approach is now widely discussed in all global forums. The current challenge is to get the most effective and less harmful treatment and the most crucial issue at this point is to individualize patients according to tumor stage and risk of recurrence. It will allow finding patients who will need more aggressive therapies and who could be handled with a more conservative approach [5].

With all the arguments on the table, it is necessary to establish international cost-benefit guidelines for the management of thyroid nodules and PTC. Independently of public or private health care, endocrinologists should have in mind all this information before asking for a fine needle aspiration biopsy of a thyroid nodule. Besides, it would be essential to promote prospective essays to evaluate the efficacy of conservative models, for example, the use of molecular tests in case of inconclusive results and conservative approaches without surgery even with PTC confirmed biopsies.

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