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Global Health Involvement in Thyroid Cancer Incidence Increase

Lucio Mango[1,*]

[1]Head of Higher Education in Healthcare, International University of Rome (UNINT) Italy, Via San Godenzo, 154 00189 Rome, Italy

Abstract

In recent decades was observed a gradual increase in the detection of thyroid nodules in the adult population. Given the increase in prevalence of nodules, a similar trend to the growth in the incidence of thyroid cancers was found. The reasons for this increased incidence for thyroid cancer are controversial. Increased incidence is caused by an improvement in diagnostic techniques or does not result from an overdiagnosis, but represents a real increase in the incidence of thyroid cancer? Whatever the reality, the fact of an increased incidence of thyroid cancer for certain involves problems to global health which in any case must be evaluated and corrected.

Corresponding author: Lucio Mango, Head of Higher Education in Healthcare, International University of Rome (UNINT) Italy, Via San Godenzo, 154 00189 Rome, Italy. Phone: +393358456518. Email: lucio.mango@unint.eu

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Introduction

In recent decades, the epidemiology of nodular thyroid disease has changed, with a gradual increase in the detection of thyroid nodules in the adult population [1].

In Italy, for example, the prevalence of thyroid nodules in this population is 50% with peaks of up to 75% in some regions [2]. Given the increase in prevalence of nodules, a similar trend to the growth in the incidence of thyroid cancers was found [3].

The observed increase is more pronounced in women (8.1%/year) than men (6.2%/year) [4]. This trend is also observed in other countries despite the geographical variability of the phenomenon with an average global increase of 58.1% with the exception of Sweden where there is an 18% decrease for both sexes [5-7].

Compared to the various histological forms in which thyroid carcinoma occurs, the truly significant increase concerns papillary carcinoma [8], an increase that affects all racial groups and the two sexes. Regarding the rate of increase in papillary carcinoma, the increase in the incidence of the disease tends to be faster among females than males. However, it was seen that rates have also increased for larger tumors and more advanced stage. Some Authors claim that although the largest increases were observed between early and smaller cancers, they did not observe reduction in larger and more advanced tumors; they found that cancers of all sizes have increased over time [9].

However, with increasing incidence of thyroid cancer, mortality from this disease has remained stable at about 0.5 deaths per 100,000 population [3]. Anyhow, if compared to the mortality of other carcinomas, which is decreased, there is a slight increase for thyroid tumors.

Discussion

The reasons for this increased incidence for thyroid cancer are controversial.

Many experts say that the increased incidence is caused by an improvement in diagnostic techniques [10,11], first of all the ultrasound with high frequency probes and the diffusion of the cytological examination of the fine needle aspiration(FNA). This therefore configures an overdiagnosis which would lead to overtreatment with possible negative consequences. For example, in terms of costs that would increase, but also of the risks resulting from invasive treatments such as surgery.

However, there is the possibility that the increase does not result from an overdiagnosis, but represents a real increase in the incidence of thyroid cancer. In favor of this hypothesis contributes the mentioned detection of increase of not only small tumors and in an early stage of development, but also medium or large and in a more advanced stage. Also the finding of an increase almost only for papillary carcinomas contributes to the hypothesis that in any case the increased incidence also derives from real reasons. The increase of some specific papillary carcinoma carcinogens might explain the above phenomenon, think eg. the increase of the presence of BRAF-positive papillary carcinomas [12,13].

Even if a different screening intensity depending on the age and sex can not be excluded, the different trend observed in the two sexes and the age coincidences suggest that the detection gain is not the only cause of the increased incidence of thyroid cancer. Race-specific trends also do not support a detection effect as reason for the increasing incidence [14].

One of the causes of real increase may be due to the increase in radiation, especially those arising from medical diagnostics. The effect of radiation as a cause of cancer is known and the thyroid gland is very exposed for its position in the human body. Moreover, as demonstrated by the increase in thyroid cancers, especially in children after the Chernobyl disaster for131 iodine fallout [15] the thyroid gland of young people is very radiosensitive.

It has also been found that high TSH values can influence the onset of thyroid cancer [16].

And yet autoimmune thyroiditis could influence cancer risk, not only by increasing TSH levels but also by the autoimmune process itself, through the production of proinflammatory cytokines and oxidative stress [17].

Furthermore, there is a striking correlation between thyroid cancer, obesity and insulin resistance. These associations can be explained by various

proposed pathophysiological mechanisms. So the increase in the prevalence of thyroid cancer is not only due to better detection, but from the known increase in the prevalence of obesity worldwide, which is associated with insulin resistance [18].

Conclusions

Thyroid nodules are extremely common and can be detected by accurate and sensitive imaging in more than 60% of the general population. They are often identified in symptom-free patients who are evaluated for other diagnostic problems.

The indiscriminate evaluation of thyroid nodules with thyroid biopsy may cause harmful epidemic of thyroid cancer diagnosis, but an inadequate selection of thyroid nodules for biopsy can lead to failed diagnosis of clinically relevant thyroid carcinoma [19].

So even if there is a documented increase in incidence due to a better more performing diagnostic process, it also appears true that there is a real increase due to some of the factors mentioned above.

In any case, whatever the reality, the fact of an increased incidence of thyroid cancer for certain involves problems to global health which in any case must be evaluated and corrected. In fact, if the increase is due to hyper diagnosis, certainly the phenomenon must be alleviated, and mostly concerns the richest and most developed countries.

But the presence of a real increase leads instead to serious problems in the less developed or developing countries that certainly have less advanced health systems [20] with less diagnostic and therapeutic possibilities. Thus occurring underdiagnosis and undertreatment, with serious social consequences.

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