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Operative Treatment of Thyroid Nodules

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Abstract: ***A thyroid nodule is a growth within the thyroid gland. Thyroid nodules are extremely common and can be seen in 5 to 10 percent of women and 1 to 5 percent of men. Fine-needle aspiration biopsy (FNAB) is the gold-standard diagnostic investigation. The objective of this study was to describe the diagnosis and surgical treatment of nodular disease and cancer of the thyroid gland. This is a prospective study of 124 consecutive patients treated surgically for thyroid nodules at Regional Hospital, of Shkodra, Albania over the period 20110-2013. There were (22%) males and (78%) females, with a mean age of 46.3 years old with a range 18-75 years old). The female-to-male ratio was 3.5/1.. The mean history period was 4. 4 years and the mean duration of hospitalization was 7.9 days. The reason for surgery was presence of mechanical complications (12%), hyperthyroidism (15%), solitary nodules (52%) and suspected cancer (21%). Fine-needle aspiration biopsy are the best diagnostic tools for differentiating benign nodules from suspicious or malignant nodules.***

Keywords: thyroid nodules, diagnosis, biopsy, radiology, images

1. Introduction

Studies have shown that the chance of having a thyroid nodule increases with increasing age and that up to 60 percent of women over the age of 60 years may have a thyroid nodule. A patient may find a nodule on their own by feeling their neck (palpation), a physician may note it on physical exam, or it can be incidentally found by an imaging study (ultrasound, CT scan, etc.). Before two decades, the diagnostic strategy was fairly straightforward. Only palpable nodules were investigated, and radionuclide scanning was used to distinguish hot nodules at low risk of malignancy from cold nodules, which included most malignancies. All palpable cold nodules were removed surgically; only 10% were found to be benign upon histology. Over the last years, the development of high-resolution ultrasonography and fine-needle aspiration biopsy (FNAB) has provided surgeons with valuable guidance. However, these investigations have been used either selectively on the basis of rational criteria or, more often, according to a school of thought. As a result, a number of complex diagnostic strategies have emerged, and the best strategy is not agreed on. The combined use of several diagnostic investigations has resulted in a substantial cost burden. Furthermore, the widespread use of ultrasonography as a noninvasive diagnostic tool has led to the diagnosis of nonpalpable thyroid nodules (1,2), which prompt further investigations, generating additional costs and causing psychological stress in patients who usually require no treatment (3). A rational strategy for managing thyroid nodules is needed to distinguish common benign conditions from malignancy in a highly reliable and cost-effective manner. To this end, a number of guidelines have been developed using the principles of evidence-based medicine. Evidence-based medicine consists in using the best current evidence to make preventive, diagnostic, and/or therapeutic decisions about the individual patient. This approach was developed by researchers working on a new teaching strategy based on self-learning by small groups of students closely supervised by a senior tutor, clinical problem-solving as the main focus of training, and use of the best current evidence to guide decisions. In a (5), evidence-based medicine is described not only as a new teaching approach, but also as a tool for improving the quality of clinical practice. It was defined evidence- based medicine as the "conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (6). In the field of diagnostic management, evidence-based medicine involves an evaluation of diagnostic investigations based on measures that are directly relevant to everyday clinical practice, such as pretest probability, posttest probability, and likelihood ratio. The results of this evaluation help clinicians to select the investigations best suited to each individual patient. The objective of this study was to evaluate the management of thyroid nodules in our department, using the principles of evidence-based medicine. More specifically, we evaluated the performance of diagnostic investigations in determining which patients with asymptomatic thyroid nodules required surgery.

2. Material and Methods

This is a prospective study of 124 consecutive patients treated surgically for thyroid nodules at Regional Hospital, of Shkodra, Albania over the period 2011-2013. All surgical decisions were made by the same clinician. Diagnostic investigations were ordered by hospital- based physicians. Echography of the thyroid gland was obtained routinely. When performed, FNAB was done under ultrasound guidance, and each nodule larger than 1 cm in diameter was aspirated three times. We divided the patients into three categories based on the reason for surgery: mechanical complications (compression of the aerodigestive tract), hyperthyroidism (with any pattern of thyroid lesions from solitary nodule to multinodular goiter), and suspected cancer (potentially malignant nodule). In this last category, which formed the basis for the present study, most of the patients were free of symptoms but required an evaluation of the risk of cancer within the nodule or nodules. We used a standardized diagnostic strategy, differentiating cases where surgery was mandatory from those where the surgeon or patient deemed that surgery was preferable over other options. We collected detailed descriptive data on the clinical features, laboratory test results, echography and

FNAB findings, radionuclide scan images, and histology of thyroid nodules treated surgically. We then compared the findings from diagnostic investigations in patients with and without malignant disease as assessed histologically, and we looked for factors significantly associated with malignancy. Statistical analysis was carried out using SPSS software. Odds ratio was used to assess the association of malignancy with FNAB. A p value ≤ 0.05 was considered statistically significant.

3. Results and Discussion

There were 27 (22%) males and 97 (78%) females, with a mean age of 46.3 ± 9.5 years old with a range 18-75 years old). The female-to-male ratio was 3.5/1. The average age for men was 40.6 years old and 45.7 years old for females. The mean history period was 4. 4 years and the mean duration of hospitalization was 7.9 days (table 1). The reason for surgery was presence of mechanical complications (12%), hyperthyroidism (15%), solitary nodules (52%) and suspected cancer (21%). 67.7% of nodules were hypoechogen, 10.5% hyperechogen and 21.9% were isoechogen. Regarding the structures 14.3% of nodules were solid, 26.7% were cystic and 59% were mixed. FNA was done in 124 patients. Compared with histological findings, among patients with malignant cells or suspicious follicular or papillary cells by FNAB, 44.4% had cancer; among patients with normal FNAB findings, 13.8 % had cancer. This difference was highly significant (OR, 4.9; 95 % CI, 1.8-4.1; $p<0.01$). The recent changes in the management of thyroid nodules, with echography and FNAB gradually superseding radionuclide scanning. These changes are consistent with earlier work showing that FNAB is the diagnostic investigation with the highest yield (7-10) and that echography may be as useful as FNAB in evaluating thyroid nodules for cancer. The prevalence of malignant thyroid lesions in our series of patients treated surgically over a 3-year period was 21%. Other studies have reported a lower prevalence of cancer (11). This increase in the cancer rate among patients referred to head and neck surgeons probably reflects better patient selection. The analysis and comparison of our data on morbidity study concludes that thyroid gland in our country is a major problem that seems real or treated (12-15). We focused only on the patients treated with surgical intervention; therefore we do not pretend that this is not a representative study, of all hospital or outpatient with pathologies of thyroid gland. A large proportion of patients who presented for intervention, were not referred by family doctor or specialist endocrinologist but they presented individually or from other specialists to whom they are presented for complains or other pathologies rather than thyroid ones. Also, there is a great difference in male-female ratio involved in this study. It is true that women have a greater disposition to be affected by thyroid diseases and in literature is reported in a ratio F:M (3:1) similar as in our study (16-20). In our study the mean history period was 4.9 years and only 10% of patients presented to the doctor within a year from the onset of the disease. Treatment in old ages increases the risk of thyroid cancer and the prognosis worse. Echography is a cozy examination to be carried out, it is cost-effective and highly valuable about diagnostic results to diagnose the thyroid nodes. We have made this examination in 100% of cases, and in many cases it was repeated. Also, echography is used to guide FNAB. Features such as hypoechogenity, solid structure, adding vascularization inside the nodes, unruly lips or not well determined, the presence of micro calcification within noduless are signs of thyroid cancer (21,23). The directed or alone FNAB realisation by echography increases the accuracy of diagnosis before surgery. During the study we conducted 103 FNAB and on the basis of the responses we have defined surgical position. Compared with histological findings, among patients with malignant cells or suspicious follicular or papillary cells by FNAB, 44.4% had cancer; among patients with normal FNAB findings, 13.8 % had cancer. This difference was highly significant (24,26).

4. Conclusion

The risk of cancer in a thyroid nodule is evaluated on the basis of physical findings and diagnostic investigations, most notably FNAB and echography. FNAB is currently the gold standard investigation and should be performed routinely. Recently developed immunohistochemical and genetic techniques for examining FNAB specimens may produce nearly 100% reliability in the near future. Technical advances in echography have benefited the diagnosis of thyroid nodules. HRUS can be expected to remain a key tool for assisting in surgical decisions. It extends physical findings and constitutes the first step in the evaluation of gross nodule appearance. However, Echography remains unstandardized and heavily operator-dependent, explaining why a diagnostic classification has yet to be developed.

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Table 1: Characteristics of the study patients

Variables	N	%
Gender		
Male	27	21.8
Female	97	78.2
Age (mean, SD)	46.3 (± 9.5)	
Reason for surgery		
Mechanical Complications	10	12
Hyperthyroidism	12	15
Solitary Nodules	18	22
Suspected Cancer	41	51
Echographic features		
Hypoechogen	55	67.6
Yperechogen	8	10.5
Isoechogen	18	21.9
Structure of nodules		
Solid	12	14.3
Cystic	22	26.7
Mixed	48	59