

DIAGNOSIS OF THYROID NODULES AND MEDICAL FITNESS FOR RADIATION WORK: CASE CONTRIBUTIONS

E.STRAMBI* M.VIRGILI**

* RADIOPROTEZIONE MEDICA, UNIVERSITA' CATTOLICA POLICLINICO GEMELLI,
ROME, ITALY

** RADIOPROTEZIONE MEDICA, USL FR/4, FROSINONE, ITALY

ABSTRACT

The nodular thyroid disease frequently involves delicate diagnostic problems, in particular concerning the diagnosis of thyroid cancer. Therefore, in case of a palpable thyroid nodule the physician must first of all perform the proper procedures (ultrasonography, scintigraphy, fine-needle aspiration biopsy, etc.) for a selective approach to diagnosis, as a necessary step before an eventual surgical treatment.

MANAGEMENT OF THYROID NODULES

In this study are discussed the first results obtained by the application of the decision matrix for the management of a thyroid nodule, which has been suggested in previous work (see fig.1).

According to that protocol, workers professionally exposed and known as carriers, at the moment of preventive or periodical visit, of alterations of the glandular morphology have been tested with scintigraphy, ^{131}I thyroid uptake and eventually T_3 suppression test in case of doubtful differential diagnosis between hot and cold nodules. Ultrasonography has been performed to distinguish between cystic and solid cold nodules. In case of solid nodule serum calcitonin level could erase the doubt to be in presence of a medullary thyroid carcinoma.

In presence of cold and solid nodules a fine-needle aspiration biopsy has been performed to diagnose malignant nodules, benign nodules or follicular neoplasms.

Malignant nodules and follicular neoplasms have been referred directly to the surgeon.

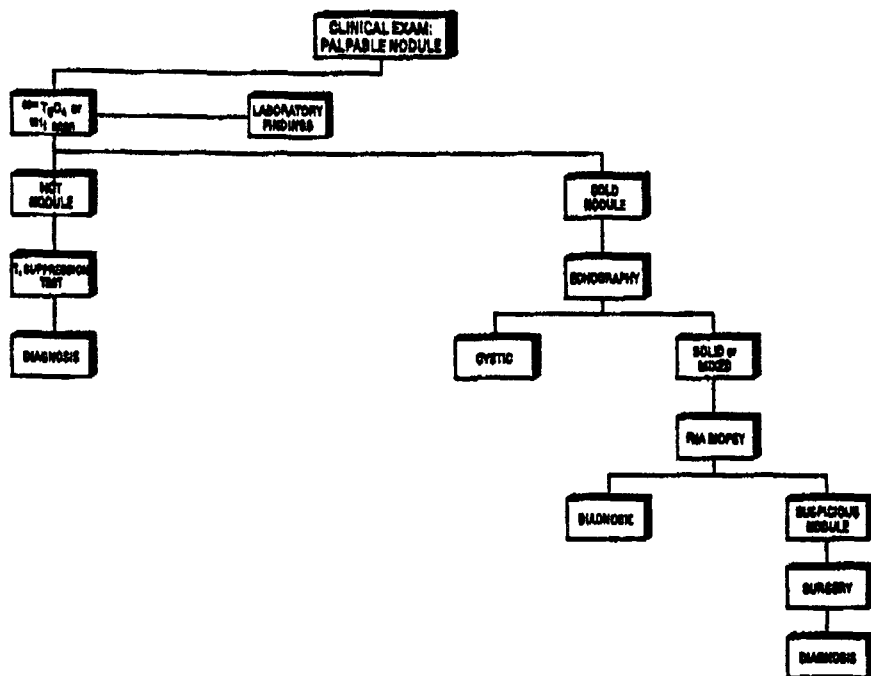


Fig. 1. DECISION MATRIX FOR WORKUP OF A THYROID NODULE

CASE DESCRIPTION

In this study are presented 34 cases of palpable thyroid alterations regarding patients observed in the last 3 years. The following diagnoses have been made:

- a) isolated nodules - 18 cases of which: 4 colloidal nodules, 4 pure cysts, 2 hyperfunctioning adenomas (one autonomous, the other not autonomous), 1 follicular adenoma, 1 papillary carcinoma; in the remaining 6 cases the diagnostic procedure at the moment has not been completed
- b) simple goiter - 7 cases
- c) multinodular goiter - 8 cases

DIAGNOSTIC DISCUSSION

Ultrasonography has allowed to exclude the presence of nodular formations in 2 cases of goiter with palpable irregularities and to recognize as multinodular 2 situations that, based exclusively on the clinical findings, should have been defined as uninodular. For this purpose, it must be noted that the multinodular goiters, even if they sometimes contain suspicious nodules that deserve the same caution of a solitary nodule, have a much smaller probability of cancer compared to the solitary nodules. Hot nodules, that as a rule are not malignant, have not been suspected of malignancy. However, it has to be emphasized that such nodules, although rarely, can hide follicular, papillary and even medullary carcinomas.

For this reason serum calcitonin level and eventually also fine-needle aspiration biopsy should be performed in such cases. Also cystic nodules, that as a rule are not cancer, have not been considered suspicious of malignancy, but since cancer is occasionally found in the wall of the cyst, it has been thought necessary the ecographic surveillance of cystic lesions at the moment of each periodical visit.

Considering the limits of fine-needle aspiration biopsy in the pre-surgical differential diagnosis between follicular adenoma and follicular carcinoma, we have referred to the surgeon the case of follicular adenoma and the case of papillary carcinoma.

The diagnostic scheduled procedure suggested by us then is based on the clinical finding of a palpable nodule. However, it has to be emphasized that the possibility to clinically diagnose the presence of thyroid nodules depends on their size that must be less than 1 cm., while the resolution of ^{99m}Tc pertechnetate scan with the pinhole collimated gamma camera is about 0,5 cm. and the resolution of small parts echography is about 1 mm.

Ultrasonography is of immense value in the early diagnosis of tumors, since it can easily identify small tumoral lesions already in a pre-clinic phase. Consequently, a systematic application of this technique in the medical surveillance of radiation protection on each exposed worker could be proposed.

However it must be considered that a patient with a thyroid carcinoma not clinically detectable (occult) has no risk of metastatic spread

of the tumor, that as a rule remains confined in situ. Therefore, as far as thyroid gland is concerned a systematic application (not aimed) of ultrasound against stochastic effects would not find adequate justification in a correct evaluation of cost/benefits balance.

In conclusion, we think that the physical exam, moreover undoubtedly facilitated by the superficial position of the organ should usually represent the main diagnostic procedure, reserving the instrumental tests to who presents palpatory anomalies.

The 2 cases of follicular adenoma and papillary carcinoma in particular show how the diagnostic protocol suggested above could become useful also from the point of view of the secondary cancer prevention, which is one of the main goals of the radiation protection.

MEDICAL JUDGEMENT OF FITNESS FOR RADIATION WORK

In case of a patient known as a carrier of a thyroid nodule clinically detectable, the physician first of all must approach a precise diagnosis. Before the examinations have been completely performed, the judgement should generally be "in observation" and the subject will be consequently maintained as a rule at his normal work in controlled area without any limitation, considering the possible doses to thyroid outcome from radiation work. At the end of the instrumental diagnostic procedures, as has been said above, anytime surgical treatment is needed for a diagnostic and therapeutic reason, the eventuality that the subject will or will not accept the surgical treatment must be faced. In this last case should not automatically outcome a judgement of unfitness, but the potential risk and actual real damage resulting from such a judgement should be evaluated case by case.

As far as risks are concerned, it should not be considered the possibility of a nodular cancerous degeneration caused by work exposure to ionizing radiation (hypothesis with no probability), but the possibility that in reality we are dealing with a carcinoma not detectable at the moment with the used techniques.

The last hypothesis can involve in some psycho-social contexts the possibility of future legal controversies and therefore can justify a more restrictive judgement.

In any case, as far as the medical judgement of fitness for radiation work is concerned, one has to keep in mind some main criteria, i.e. the clinical findings; the specific risk evaluation; the social, economical and psychological parameters.

Thus, in his evaluation, the physician should always consider the risk/benefits balance.