

## THE THYROID: MEDICAL SURVEILLANCE OF EXPOSED WORKERS

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### ABSTRACT

In this study the authors: 1) outline a rational approach to diagnosis and management of thyroid diseases; 2) evaluating the prevalence of thyroid diseases on a group of 207 radiation workers observed over a six years period, identify abnormalities which require a careful evaluation and a more restrictive judgement of fitness.

### INTRODUCTION

In the system of dose limitation, closely correlated to the hypothesis of a linear relation between dose and occurrence probability of stochastic damage, medical surveillance undoubtedly acquires obligations with regard to tumour prevention (secondary prevention). ICRP 90/77 places the thyroid in the group of organs of most oncological competence. The American Cancer Society, in its recommendation on the early diagnosis of cancer in asymptomatic people, extends the diagnostic indication to numerous sites (thyroid included), which also coincide fairly closely with the sites having a high risk coefficient. Based on the above considerations, thyroidology should not be neglected. The only factor that has been shown unequivocally to cause thyroid cancer is radiation exposure.

### THYROID CANCER AND THYROID BENIGN ABNORMALITIES AT INCREASED RISK OF CANCER

The thyroid is an uncommon site of cancer accounting for 0.6% of cancers among men and women respectively. In 95% of cases, thyroid cancer presents as a nodule in the thyroid. In contrast to rare thyroid cancer, thyroid nodules are extremely common particularly among women. The prevalence of thyroid nodules is about 5% of the adult population with a female: male ratio of 4:1. Thus most thyroid nodules are benign and the problem is to identify those that are likely to be malignant. Many studies have considered the possibility that thyroid cancer is preceded by other thyroid abnormalities, including endemic goiter, sporadic goiter, benign thyroid nodules, lymphocytic thyroiditis, and Graves' diseases. The findings remain inconclusive; nevertheless, this question is of great interest from the point of view of radiation protection, since these thyroid diseases are common and it is important to know whether such patients should be considered at increased risk of developing thyroid cancer.

## CASE CONTRIBUTION

In the period 1889-1995 a total of 207 exposed workers 87 females and 120 males, ranging in age from 19 to 65 years, were tested with clinical examination, FT3, FT4, TT3, TT4, TSH and ultrasound. Selected cases, in the presence of doubtful thyroiditis, were tested with thyroglobulin autoantibodies and thyroid microsomal autoantibodies. Workers known, by palpation or ultrasound, as carriers of alterations of the glandular morphology were tested with scintigraphy,  $^{131}\text{I}$  thyroid uptake and eventually T3 suppression test in case of doubtful differential diagnosis between hot and cold nodules. Nodules less than 5 mm were not considered. Only in the presence of cold, solid and palpable nodules a fine-needle aspiration biopsy was performed to diagnose malignant nodules, benign nodules or follicular neoplasms. A total of 69 cases of thyroid diseases were found, with a prevalence of about 33% (females 36%, males 29,5%), (Table 1).

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**Table 1: Prevalence of thyroid diseases in 207 exposed workers, 1989-1995.**

	DIFFUSE: 5(2.4%)	
NONTOXIC GOITER:		MONO: 6(2.4%)
	NODULAR: 23(11,1%)	
		MULTI: 17(8.2%)
DIFFUSE TOXIC GOITER:	2(0.97%)	
HASHIMOTO'S THYROIDITIS:	3(1.5%)	
		MALIGNANT 2(0,97%)
		PALPABLE:FOLLICULAR ADENOMA 1(0.5%)
		COLLOID NODULES 7 (3,4%)
SOLITARY NODULES:	30(14.5%)	
		UNPALPABLE 20(9.7%)
MULTIPLE NODULES:	6(2.9%)	UNPALPABLE

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## DIAGNOSTIC DISCUSSION

With the exemption of hot nodules that as a rule are not malignant and have not been suspected of malignancy, we found 5 groups of thyroid diseases that, representing special problems, require some considerations.

1 - **MULTINODULAR GOITER:** Two patients evaluated for single nodules were found to have additional small thyroid nodules. It is commonly stated that demonstration of multiple nodule on ultrasound in a patient with a single palpable nodule makes malignancy unlikely. No carefully controlled study supports this contention, however, and the malignant potential of any nodule should be based on other criteria. In most cases, this should include a FNA biopsy.

2 - **CISTIC NODULES:** 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 echographic surveillance of cystic lesions every periodical visit.

3 - **HASHIMOTO'S THYROIDITIS (HT):** A high prevalence of HT was confirmed. Since a patient with HT may develop, even if rarely, lymphoma of the thyroid gland, a protocol of caution for the follow up is recommended. Ultrasound should be carry out semiannually.

4 - **FOLLICULAR ADENOMA:** Considering the limits of FNA biopsy in the presurgical differential diagnosis between follicular adenoma and follicular carcinoma, we have referred to the surgeon the case of follicular adenoma. In this 1 case there was an increased chance of malignacy (large lesion over 2 cm firm nodule, young patient, values of nuclear parameters - area and perimeter - 30% over the normal.

5 - **HISTORY OF RADIATION THERAPY:** In 1 case of benign solitary nodule there was a history of radiation therapy to the neck area. Although any given nodule has essentially the same chances of being malignant regardless of whether there has been previous upper body radiation, caution is in order.

## **CONCLUSION**

The case report, in particular the two papillary carcinomas, show how the diagnostic protocol suggested above could become useful also from the point of view of the secondary cancer prevention.

The diagnostic protocol by us conciliates with due economy but with the right balance, the real requirements of medical surveillance, reducing as far as possible undesirable effects such as damage from excessive protection and patient/physician delay, which is extremely dangerous in the early diagnosis of tumours.

## **MEDICAL JUDGEMENT OF FITNESS FOR RADIATION WORK**

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.