

THYROID SCINTIGRAPHY: AN OVERUSED INVESTIGATION

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ABSTRACT

Background: Thyroid disorders are commonly encountered in general surgical practice. The purpose of this study was to determine how closely thyroid scintigraphy was ordered according to its indications in patients with thyroid diseases and the magnitude of its impact on the management.

Material & Methods: This cross-sectional study was carried out mainly at Isra University Hospital, Hyderabad over a period of 3 years from May 2005 to April 2008. All patients presenting with thyroid swelling and undergoing any type of thyroid operation were included in the study. Special emphasis was made on the indication of thyroid scintigraphy in these patients and its impact on the treatment.

Results: Out of 140 patients, 98 had thyroid scintigraphy done. Among these only 26 patients (26.5%) had it according to the indication. In remaining 72 patients, thyroid scintigraphy did not reveal any added information to help in treatment plan.

Conclusion: Thyroid scintigraphy is an overused investigation in thyroid patients. Routine use of thyroid scintigraphy in all goiter patients should be discouraged.

Key Words: Scintigraphy, Thyroid nodule, Goitre.

INTRODUCTION

Thyroid disorders are commonly encountered in general surgical practice. 70-90% of these are benign in nature.¹ The prevalence of a palpable thyroid nodule is approximately 5% in women and 1% in men in iodine sufficient parts of the world.² Goitre is a nonspecific term which describes any swelling of the thyroid. It does not imply any particular pathological change so it is important that every goiter is properly assessed and the diagnosis carried beyond that of goiter. It is also important that surgeon develops a consistently reliable technique of examination by which he can properly assess the whole gland and relevant lymph nodes. In addition to this surgeon must be familiar with the various tests by which the thyroid is assessed anatomically and functionally.³ Apart from thyroid function tests, thyroid ultrasonography, Fine needle aspiration cytology (FNAC) and isotope scan are important investigations used in the work up of various thyroid disorders. However their order of preference and indications differs from case to case. Until 15 years ago scintigraphy with iodine¹³¹ and/or technetium⁹⁹ was the only method for studying the thyroid size, marker uptake and/or presence of nodules.⁴ Today scintigraphy is mainly indicated when there is nodularity with toxicity but it has been observed that most of the patients with goiter have this investigation done as first line of investigation.

The purpose of this study was to determine how closely thyroid scintigraphy was ordered according to its indications in patients with thyroid diseases and the magnitude of its impact on the management.

PATIENTS AND METHODS

This was a cross-sectional study carried out at Isra University Hospital, Hyderabad and in one other private hospital of Hyderabad over a period of 3 years from May 2005 to April 2008. All patients presenting with thyroid swelling and undergoing any type of thyroid operation were included in the study. Detailed information including name, age, sex, clinical status (hypothyroid/ hyperthyroid/ euthyroid), any previous history of thyroid surgery, relevant investigations like FNAC, thyroid scintigraphy, ultrasound report and operative procedure were noted on a proforma.

Special emphasis was made on the indication of thyroid scintigraphy in these patients and its impact on the treatment.

RESULTS

Over all, 140 patients fulfilled the selection criteria during the above mentioned period. The gender distribution was predominantly females (n=126) making up to 90% of total population. Female to male ratio was 9:1. The mean age was 32 years with range from 16-68 (32±8.22) years.

In all, 112 (78.8%) out of 142 patients were clinically and biochemically euthyroid. Among these 112 patients, 33 patients (29.4%) were having solitary thyroid nodule and 79 (70.6%) had multinodular goiter on the basis of ultrasonography. Out of these 112 clinically and biochemically euthyroid patients, 68 (60.7%) underwent thyroid scintigraphy. Among 33 patients with solitary thyroid nodule, 23 (69.6%) underwent thyroid scintigraphy while 45 (56.9%) among 79 patients with multinodular goiter underwent thyroid scintigraphy.

Thirty (21.2%) patients out of total of 142 were clinically and biochemically hyperthyroid. All these patients underwent thyroid scintigraphy. Among these 4 (13.3%) were having Grave's disease (diffuse goiter), 19 (63.3%) were having multi-nodular goiter and 7 (23.3%) were having solitary toxic nodule.

Only 26 out of 98 patients (26.5%) had thyroid scintigraphy according to the indication, i.e. toxicity with nodularity. In remaining 72 patients (73.5%) had thyroid scintigraphy but it did not reveal any added information to the treatment plan and did not fulfilled the indication criteria of thyroid scintigraphy.

DISCUSSION

A useful investigation is one in which the result will alter the management or add confidence to clinical diagnosis. About two decades ago, scintigraphy with iodine¹³¹ and/or technetium⁹⁹ was the only method for studying the thyroid size, marker uptake and/or presence of nodules. Today scintigraphy is primarily used in thyroid function tests and is only indicated in patients with toxicity with nodularity. A hot nodule is almost always benign and does not require further diagnostic evaluation, whereas nodules with low or no uptake have a 5-8% risk of being malignant.⁵ Considering that nodules are cold in approximately 70% of cases, this parameter has an extremely low predictive value for malignancy.⁴ Thyroid scintigraphy is a moderately expansive investigation which should be requested only when the result is to be of practical impact.

In this study 98 patients out of 142 underwent thyroid scintigraphy but only 26.5% fulfilled the exact criteria for having thyroid scintigraphy. In the remaining 73.5% patients, thyroid scintigraphy did not alter or affect the treatment plan.

In one study of 1037 patients with thyroid scintigraphy, Demena et al⁶ found scintigraphy as unnecessary investigation in the evaluation of goiters in euthyroid patients. He found it beneficial in patients with toxic solitary nodule, ectopic thy-

roid tissue and retrosternal goiters. In another study of 471 patients who underwent thyroid scintigraphy pre-operatively and 140 patients who underwent FNAC, Sabel et al found 23% incidence of carcinoma in nodules excised on the basis of scintigraphy, whereas it was 37% in nodules excised on the basis of FNAC. Sabel concluded that thyroid scan add little in determining which nodules require surgical excision, it should no longer be a routine part of evaluation of a solitary thyroid nodule.⁷

Oommen et al in a study of 400 patients with thyroid scintigraphy did not find any additional information from scintigraphy and it did not affect the management of the patients.⁸ In our study, 73.5% patients had thyroid scintigraphy without real indication for scintigraphy and it also did not affect the over all outcome of treatment plan. These results are consistent with studies already mentioned.⁶⁻⁸

The routine use of thyroid imaging in patients with euthyroid goiters, hypothyroidism or suspected non-palpable nodules has been shown to provide little information beyond that which could be obtained from careful clinical palpation, yet in two old series, these categories still accounted for nearly half of the requests for scintigraphy.^{9,10}

With the advancement in the interpretation of FNAC, it has pushed all other thyroid investigations far behind in the diagnosis of thyroid malignancy. FNAC has become the initial diagnostic test in evaluation of non-toxic solitary nodules. FNAC has been proved to be a better predictor of thyroid malignancy than scintigraphy; the later provides little additional information about cytologic findings.^{7,11}

The practice of routine thyroid scintigraphy of all patients referred for hyperthyroidism is controversial. The results of all patients referred with hyperthyroidism were analyzed in a previous study,¹² which showed that the vast majority of patients were confirmed as having Grave's disease, but there was a significant number of patients with other diagnoses including 12% with autonomously functioning nodules (Plummer's disease), 3% of Grave's disease in a multi-nodular goiter, while the remainder had either viral thyroiditis or iodine-induced thyrotoxicosis. Only 20% of the patients with Plummer's disease had palpable nodules and therefore 80% of cases would have remained undiagnosed without a "routine scan" in those patients with out a clinical suspicion of nodularity.¹³

Thyroid scintigraphy should be an essential investigation for the patients with toxicity with nodularity. It has been shown to be of little practical value in the management of euthyroid patients

with diffuse or multi-nodular goiter or patients with hyperthyroidism.¹⁴

Thyroid scintigraphy should be used more selectively and economically in patients with toxicity with nodularity (either toxic nodules either solitary or multiple Plummer's disease). The surgeons should not request this investigation when they know in advance that the outcome will not influence the management.¹⁴

CONCLUSION

Thyroid scintigraphy is an overused investigation in thyroid patients. It should only be used in selective patients with proper indication of toxicity with nodularity. Routine use of thyroid scintigraphy in all goiter patients should be discouraged.

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