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A study on management of multinodular goiter at a tertiary care hospital

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Abstract

Worldwide, nodular goitre remains a problem of enormous magnitude affecting less than 5% of the population. Neither a well formulated nor a simple procedure is available for the management of MNG. This was a prospective study of 50 cases of MNG with an adequate follow up to look for post op complications. FNAC was done all patients and was found to be 100% accurate. Majority of the patients were treated with STT, followed by HT and NTT. Complications included wound infection and RLN palsy. FNAC is an invaluable and highly accurate tool in the diagnosis of MNG. Surgery, STT was found to be an adequate and safe treatment for non-toxic MNG with minimal complications.

Keywords: MNG, FNAC, Goitre, STT, NTT, HT

Introduction

Though the thyroid and its diseases were known to the physicians from the time immemorial, the subject still continues to evince great interest even today from the clinician and the pathologist alike. As Willis stated, for the thyroid gland, working in continuous state of interest having alternate periods of cellular activity and quittance in response to an array of exogenous and endogenous stimuli, it is not so surprising that it suffers from a wide variety of disease. A constant supply of thyroid hormones is necessary for growth, development and maintenance of metabolism and functional activity of most organs. Diseases of thyroid are manifested either qualitative and quantitative alterations in hormone secretion or enlargement of thyroid (goitre) or both.^[1]

The thyroid gland, reddish brown and highly vascular, is placed anteriorly in the lower neck. Level extends from the 5th cervical to the 1st thoracic vertebra. Its weight is usually 25 grams. The gland is slightly heavier in the female sex and enlarges during pregnancy and menstruation.^[1] The thyroid gland functions primarily to produce thyroid hormones. It stimulates the oxygen consumption of most cells in the body, helps regulate lipid and carbohydrate metabolism and are necessary for normal growth and maturation.^[2]

Nodular goitre is probably the most common endocrine problem in the world today. The commonly accepted definition of Goitre "A Thyroid Gland i.e., at least twice its normal size". In general, the term is applied to the benign enlargement of thyroid gland.^[3]

Worldwide, nodular goitre remains a problem of enormous magnitude. It is estimated that no less than 5% of the world's population have goitres. Depending on the population studied, multinodular goitre occurs in upto 12% of adults. Multinodular goitre is more common in women than men and increases in prevalence with age. The incidence of carcinoma in multinodular goitre has been reported as 5% to 10%.^[4]

Neither a well formulated nor a simple procedure is available for the management of patients with MNG. The main reason for such situation to exist is, nodular lesions may represent one of the many different cell types that cannot be distinguished from one another without histologic study. These nodules may be benign or malignant. Ultimately, it is this threat of malignancy that poses a major problem.

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FNAC is a diagnostic tool in which cells are extracted from the palpable swelling using FNAC gun, syringe and fine needle. It is simple, quick, safe and cost-effective. FNAC is increasingly being used for evaluation of thyroid swellings.

The study of multinodular goitre is essential, as it is a commonly encountered endocrine problem in clinical practice. The major concern in modern thyroid gland surgery is morbidity. Besides haemorrhage and hypoparathyroidism, damage to the recurrent laryngeal nerve is the complication most feared by both patient and surgeon. It represents a serious complication inducing, when bilateral, serious functional sequelae such as phonatory, respiratory and psychological problems that limit working capacities and social relationships of the patients. Post-operative respiratory complications may need either lifesaving endotracheal intubation followed by tracheostomy or immediate tracheostomy.^[5]

Methodology

This is a randomized prospective clinical study of multinodular goitre patients admitted in General Hospital, attached to Medical Collage. A total number of 50 cases studied in a span of 24 months. Complete clinical examination, and necessary

laboratory investigations were performed.

Inclusion criteria

Patients with enlargement of thyroid gland, with more than one nodule palpable or enlarged thyroid gland with nodular surface. Both toxic and non-toxic multinodular goitres were included in the study.

Exclusion criteria

Diffuse hyperplastic goitre, Solitary nodule of thyroid, Thyroid enlarge me nt with the clinical features suggestive of malignancy and multinodular goitre patients not undergoing surgery were excluded.

The pre-operative treatment in most cases consisted of supportive treatment to control of toxicity in cases of toxic multinodular goitre. Patients operated after getting medical fitness for surgery. The operated specimen was sent for histopathologic examination in all cases. Movement of vocal cords were noted at the end of the operation in every case.

Results

Table 1: Distribution of secondary thyrotoxicosis

Type of goiter	Number of cases		Total	Percentage
	Male	Female		
Nontoxic multinodular goitre	3	41	44	88
Toxic multinodular goiter	0	6	6	12

Out of 50 cases, 44 cases (88 percent) were nontoxic multinodular goitre and 6 (12 percent) were toxic multinodular goitre. Fine needle aspiration cytology was done in all cases. Majority reported as nodular colloid goitre, 2 cases as Hashemite's thyroiditis and 1 case had a nodular goitre with cystic changes.

Indirect laryngoscopy was done in all the cases, and bilateral vocal cord movement was normal.

Thyroid function tests (T3, T4, and TSH) were done in all

patients. In 6 cases, thyrotoxicosis was confirmed by thyroid function tests.

Sleeping pulse rate were within normal limits in all patients except in 6 who had secondary thyrotoxicosis.

All cases were operated. Surgery was advocated for reasons of cosmos, pressure symptoms and secondary thyrotoxicosis. In toxic cases, the toxicity was controlled with carbimazole 10mg, 3- 4 times daily for a period ranging from 4- 12 weeks and Propranolol 40 mg, 3 times daily along with carbimazole.

Table 2: Types of Surgery done

Types of Surgery	Number of Cases	Percentage
Subtotal thyroidectomy	37	74
Hemithyroidectomy	7	14
Near total thyroidectomy	5	10
Total thyroidectomy	1	2

Subtotal thyroidectomy was done in 37 cases (74 percent) followed by Hemithyroidectomy 7 cases (14 %), Near total

thyroidectomy 5 cases (10%) and total thyroidectomy 1 case (2%).

Table 3: Postoperative Complications

Type of Complications	Number of Cases	Percentage
Recurrent laryngeal nerve palsy (bilateral)	1	2
Parathyroid insufficiency	0	0
Wound infection	2	4
Mortality	0	0

No pre-operative and per operative complications occurred in the present series. Recurrent laryngeal nerve palsy (bilateral) was found in 1 case (2 percent), which was transient and recovered after 1 month. There is no parathyroid insufficiency. Wound infection in 2 case (4 percent) was the other complication found in the present study. No mortality occurred in the present study.

According to histopathological analysis in present study of 50 cases, 37 cases (76 percent) showed features of benign goiter, toxic goitre showed sec toxic changes in 6 cases (12 percent), 7 Hashimoto's thyroiditis.

Follow up

Follow up ranged from 2 months to 24 months.

All 7 cases of Hashimoto's thyroiditis and majority of other cases who underwent subtotal thyroidectomy were put on tablet Levothyroxine 0.15 mg once daily.

Discussion

FNAC was found to be very useful in the evaluation of MNG. In majority of the cases where the FNAC was benign it proved to be benign MN G on postoperative histopathological examination.

This shows that FNAC is 100% accurate. FNAC is an invaluable, minimally invasive, highly accurate and cost effective procedure for pre-operative assessment of patients with thyroid lesions.

One of the cases was reported as thyroid cyst on ultrasound on scan and it was finally diagnosed as MNG.

Patient with vocal cord palsy diagnosed on indirect laryngoscopic examination and positive neck lymph nodes associated with thyroid swelling were excluded in this study.

The main indication for surgery in our series was the swelling itself either due to cosmetic reasons or fear of malignancy on the part of the patient. Subtotal thyroidectomies were done 37 (74%) cases, Hemithyroidectomy in 7 (14%) near total 5 (10%) and total thyroidectomy in 1 (2%) were carried out when there was high suspicion of malignancy.

We encountered no complication of surgery, apart from irritation of the throat in early postoperative periods. Which subsided without any active management. The average duration of stay in the hospital was 8 days.

According to histopathological analysis in the present study of 50 cases, 37 (74%) cases showed features of benign goitre, 7 (14%) cases of Hashimoto's thyroiditis. and 6 (12%) case of toxic multinodular goitre.

Rao and Reddy reported 7% distribution of Hashimoto's thyroiditis and Ahuja reported 9%. The present study with 14% is comparable to above studies.

The most important investigation of thyroid function is meticulous clinical assessment of the patient. But clinical diagnosis has to be confirmed by investigations to know exactly the hormonal status of the thyroid and also its relation with the anterior pituitary and hypothalamus.

There are a variety of tests of thyroid function available. The number of investigations requested should be the minimum necessary to reach a diagnosis and formulate a management plan. Only a small number of parameters needs to be measured as a routine although this may require supplementation or repeat when inconclusive. [6-7]

The serum TSH may be used as a single, initial test of thyroid function because of the high sensitivity of the TSH assay to diagnose both hyperthyroidism and hypothyroidism. TSH levels can be measured accurately down to very low serum concentrations and if the serum TSH level is in the normal range it is redundant to measure the T₃ and T₄ levels. Interpretation of deranged TSH levels however depends on knowledge of the T₃ and T₄ values. [8]

In the euthyroid state, T₃, T₄ and TSH levels will all be within the normal range. Florid thyroid failure results in depressed T₃ and T₄ levels with gross elevation of the TSH. Incipient or developing thyroid failure is characterized by low normal values of T₃ and T₄ and elevation of the TSH. In toxic states the TSH level is suppressed and undetectable. [9]

Thyroxine (T₄) and *tri-iodothyronine* (T₃) are transported in plasma bound to specific proteins (thyroxine - binding globulin, TBG). Only a small fraction of the total (0.03 per cent of T₄ and 0.3 percent of T₃) is free and physiologically active. Assays of

both total and free hormone are available but the total values depend on the level of circulating proteins which are affected by the level of circulating oestrogen. Thus, pregnant women and those on the oral contraceptive pill have elevated total T₄ and T₃ levels without evidence of toxicity. The free hormone levels are unaffected. Similarly some patients have low levels of TBG either as a primary phenomenon or secondary to a reduction in serum protein levels as a result of systemic or liver disease and the total level of circulating hormone may be low. For these reasons the free levels are more meaningful. Highly accurate radioimmunoassay of free T₃ and T₄ are now routine. T₃ toxicity (with a normal T₄) is a distinct entity and may only be diagnosed by measuring the serum T₃, although a suppressed TSH level with a normal T₄ is suggestive, are useful in detecting hypothyroidism or hyperthyroidism, but the majority of patients with thyroid nodules are euthyroid. [1-8] the majority of patients with thyroid nodules are euthyroid. [10]

It gives information about thyroid activity and also shows graphic information about the size and extent of the gland. This method is particularly helpful in showing the retrosternal extent of the gland.

The uptake by the thyroid of a low dose of either radiolabeled iodine (I¹²³) or technetium- 99m (Tc ^{99m}, which is normally taken up like I¹²³) will demonstrate the distribution of activity in the whole gland. This test is inappropriate for distinguishing benign from malignant lesions because the majority (80 per cent) of 'cold' swellings is benign and some (5 per cent) functioning or 'warm' swellings will be malignant. Its principal value is in the toxic patient with a nodule or nodularity of the thyroid. Localization of over-activity in the gland will differentiate between a toxic nodule with suppression of the remainder of the gland and toxic multi nodular goitre with several areas of increased uptake with important implications for therapy. Routine isotope scanning is unnecessary. [11-12]

Conclusion

FNAC is an invaluable, minimally invasive. Highly accurate and cost effective procedure for preoperative assessment of patients with thyroid lesions.

The main indications for surgery in MNG are cosmetic problem and Subtotal thyroidectomy is the ideal treatment of MNG. FNAC had very large correlation. Whereas Hashimoto's thyroiditis, were negatively correlated as per the Goodman-Kruskal Gamma coefficient. FNAC is very useful in the diagnosis and management of MNG.

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