



A RETROSPECTIVE STUDY ON THE EPIDEMIOLOGY AND MANAGEMENT OF THYROID DISEASE

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ABSTRACT

A retrospective study on the epidemiology and management of thyroid disease Aim A retrospective study on the epidemiology and management of thyroid disease Materials and methods: This is a retrospective study in a single centre from September 2014 to January 2017. Out of 1195 patients (981-females and 214-males) admitted in our ward 591(520-females and 71-males) patients who underwent thyroidectomy were subjected to study. Inclusion criteria: Patient who underwent thyroidectomy for benign or malignant thyroid disease was included in the study. Exclusion criteria: Patients with recurrent thyroid disease (benign or malignant) were excluded from the study. Results: Out of 591 patients who underwent thyroidectomy done 526 patients had benign disease (470-females and 56-males) and 71 patients had malignant disease (50-females and 15-males). Conclusion: In our study about thyroid disease management was more common than malignancy. Females were most commonly affected. Incidence of thyroiditis has been on rise due to iodine replete. There is increase in papillary carcinoma thyroid with conventional type is most common is also due to iodine replete. In this study the incidence of follicular carcinoma thyroid cases has been decreased because of iodine deficiency has been eliminated. Clinical significance: There was increased incidence of thyroid disease in females (both benign and malignant) in the reproductive age group. Patient should be thoroughly investigated earlier to prevent complications.

KEYWORDS : Thyroidectomy, Papillary carcinoma thyroid, Thyroiditis, Iodine deficiency, Thyroid function test.

Introduction:

India has 42 million people suffering from thyroid disorders and new born children are prone to iodine deficiency. The recommended salt iodine fortification level of 15 parts per million provides 150µg of iodine per day. Iodine intake has been important determinant of the pattern of thyroid diseases; iodine induced hyperthyroidism (IHD) (thyrotoxicosis), autoimmune thyroiditis (AIT), and thyroid carcinoma. There is significant increase in the incidence for papillary carcinomas. The annual incidence is increase by 6.7% for women and 7.9% for men. Ultrasonogram neck guided fine-needle assisted biopsy (FNAB) and measurement of serum thyroglobulin have resulted in the earlier diagnosis of the clinical manifestations of DTC. The less advanced tumour stages are treated with significantly better prognosis and advanced stages are treated aggressively [2]. The rate of thyroidectomy in men was lower than in women, while thyroid cancer in men is increasing more rapidly than in women [3]. There is increased incidence of thyroid cancer particularly papillary thyroid carcinoma [4]. The most common thyroid carcinoma is papillary thyroid carcinoma. Papillary carcinoma thyroid occurs in all age groups and young females were more commonly affected than males [5]. Patient who develop goiter due to iodine deficiency, have high incidence of thyroid cancer. Iodine deficiency is associated with follicular thyroid cancers, whereas iodine excess is associated with papillary thyroid cancers [6]. Well differentiated thyroid carcinoma has an excellent prognosis that depends on surgery postoperative radio iodine ablation therapy [8]. Fine needle aspiration cytology (FNAC) is the first-line diagnostic test for evaluating thyroid nodules. It can effectively distinguish between neoplastic and non-neoplastic lesions of the thyroid except follicular thyroid carcinoma. FNAC can therefore decide the choice of management for neoplastic thyroid nodules [10]. FNAC avoids surgery in patients with benign nodules and is highly sensitive for diagnosing patients with malignant thyroid tumours [11]. FNAC is indicated for nodules ≤10 mm diameter only when suspicious ultrasound signs are present and nodules ≤5 mm should be monitored rather than biopsied [14]. Patient with a symmetrically enlarged thyroid, recent onset of orbitopathy, and moderate to severe hyperthyroidism, the diagnosis of grave's disease is diagnosed and further evaluation for hyperthyroidism is unnecessary [15]. In iodine-replete areas autoimmune disease predominates ranging from primary atrophic hypothyroidism, Hashimoto's thyroiditis to thyrotoxicosis caused by Graves' disease. The prevalence of spontaneous hypothyroidism is between 1 and 2%, and it is more common in older women and 10 times more common in women than in men in iodine-replete region [17]. About

12% of adults have a palpable goiter. Autoimmune thyroiditis includes genetic predisposition, environmental factors, and endogenous factors. Autoimmune thyroid disease is more common than iodine deficiency as a cause of goiter in areas of iodine sufficient [18]. Hypothyroidism is more common in older women and 10 times more common in women than men. The prevalence of hyperthyroidism is more common in women than men [19]. In Western countries, the most common cause of primary hypothyroidism is autoimmune thyroiditis. However, in many parts of the world, iodine deficiency is most common cause of hypothyroidism [20]. Hypothyroidism is characterized by myxedema, end-organ effects and multisystem failure to an asymptomatic or subclinical condition with normal levels of thyroxine and triiodothyronine and mildly elevated levels of serum thyrotropin [21]. In India, thyroid disorders are in a transition zone from iodine deficient region to iodine sufficient region but the prevalence of goiter has not declined [22]. The prevalence of primary hypothyroidism and hyperthyroidism has increased. This is due to an increasing incidence of disease and earlier diagnosis of disease [24]. Surgery followed by radioiodine therapy leads to a very low recurrence rate and decreased cancer death in patients than who do not respond to radioiodine treatment and who have a worse prognosis deserve increased efforts in follow-up and tentative alternative therapeutic approaches [25]. Age more than 45 years, pT size more than 4 cm, higher pT, ETE, positive margins, and distant metastasis at presentation (M1) are worst prognostic indicators. [26]. Hypothyroidism is a predisposing factor for coronary artery disease, infertility, metabolic syndrome, hyperlipoproteinemias. Similarly hyperthyroidism causes atrial fibrillation, ophthalmopathies and other metabolic disturbances [27]. Multifocal involvement of the PTC is associated with poorer prognosis and increased risk of lymph node metastasis and distant metastasis [28]. Anaplastic thyroid cancer (ATC) is an uncommon, malignancy in older adults with no effective systemic therapy and poor prognosis. The mean survival time is frequently less than 6 months from diagnosis [29].

Materials and method:

This is a retrospective study in the department of endocrine surgery in tertiary teaching centre in Chennai Madras Medical College from September 2014 to January 2017. Out of 1195 patients (981-females and 214-males) admitted in our ward 591(520- females and 71-males) patients who underwent thyroidectomy were subjected to study. Preoperatively patients underwent routine investigations, thyroid function test, ultrasonogram neck, fine needle aspiration

cytology, direct video laryngoscopy, if necessary computed tomography neck and chest in case of malignancy and retrosternal extension of thyroid gland for diagnosis. Patients were assessed and posted for surgery. Specimen was routinely sent to pathology department for histopathological examination (HPE) and for immunohistochemistry if necessary. Patients were treated according to their HPE reports. Benign cases were treated with replacement dose of thyroxine and were followed periodically. Papillary thyroid carcinoma were treated with radioactive iodine ablation therapy by nuclear medicine department and then started with suppressive dose of thyroxine and were followed up regularly. Patient with medullary carcinoma thyroid were treated with suppressive dose of thyroxine and were followed up. Patient with anaplastic carcinoma were sent for external beam radiotherapy and treated with suppressive dose of thyroxine and followed regularly.

Inclusion criteria:

Patient who underwent thyroidectomy for benign or malignant thyroid disease was included in the study.

Exclusion criteria:

Patients with recurrent thyroid disease (benign or malignant) were excluded from the study.

Descriptive statistics was done for all data and were reported in terms of mean values and percentages. Suitable statistical tests of comparison were done. Continuous variables were analysed with the unpaired t test. Categorical variables were analysed with the Chi-Square Test and Fisher Exact Test. Statistical significance was taken as P < 0.05. The data was analysed using SPSS version 16 and Microsoft Excel 2007.

Results:

591 suitable study subjects who underwent thyroidectomy were selected to participate in the study. The sample group consisted of 71 male patients (12.01%) and 520 female patients (87.99%). The demographic and clinical characteristics of the participants were tested for significant differences.

Table-1: Age and gender

Age Groups Distribution	Male	Female	Male %	Female %
< 20 years	9	32	12.68	6.15
21-40 years	23	252	32.39	48.46
41-60 years	31	211	43.66	40.58
61-80 years	8	25	11.27	4.81
Total	71	520	100	100

In our study while analysing the age distribution in thyroidectomy patients, majority of the male subjects belonged to the 41-60 years age class interval (n=31, 43.66%) with a mean age of 41.27 years. In the female group majority belonged to the 21-40 years age class interval (n=252, 48.46%) with a mean age of 39.46 years (Table-1). Females in reproductive age group are commonly affected. Females were affected by thyroid disease more predominantly than males in ratio of F: M - 7:1. In extreme age groups < 20 years and > 60 years the incidence of thyroid disease is low in both females and males. The standard deviation (SD) for males is 14.74 and for females is 12.25. The p value by unpaired test is 0.2551 is considered to be non-significant since p value is > 0.05 as per unpaired t test.

NCG- Nodular colloid goiter, NCG TC- Nodular colloid goiter with toxic changes, HT-Hashimoto's thyroiditis, LYT-Lymphocytic thyroiditis, AH-Adenomatous hyperplasia, HPE- Histopathological examination

Most of the benign cases were found to be nodular colloid goiter 317 patients [females 292 (62.13%) and males 25 (44.64%)]. 64 patients [females 49 (10.43%) and males 15 (26.79%)] had nodular colloid goiter with toxic changes. 59 [females-55 (11.7%) and males 4 (7.14%)] patients had hashimoto's thyroiditis. 64 patients [females

54 (11.49%) and males 10 (17.86%)] were diagnosed as adenomatous hyperplasia. 22 patients [females 20 (4.26%) and males 2 (3.57%)] had lymphocytic thyroiditis (Figure-1). Females are most commonly affected than males in benign thyroid disease.

Figure-1: Diagnosis based on HPE- Benign thyroid disease

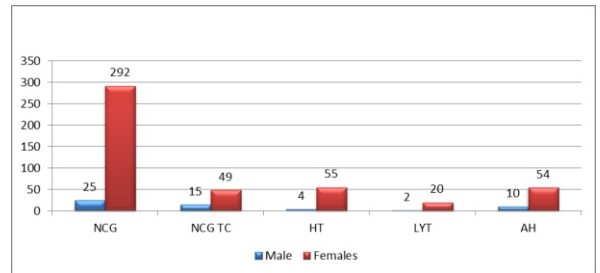
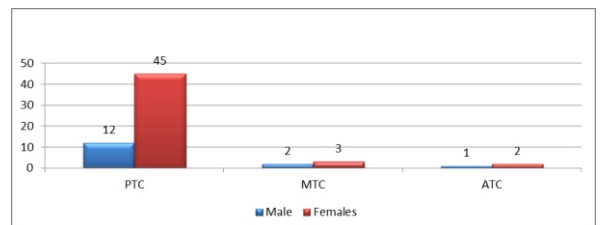


Figure-2: Malignancy



PTC-Papillary thyroid carcinoma, MTC-Medullary thyroid carcinoma, ATC- Anaplastic thyroid carcinoma In 71 diagnosed as thyroid malignancy, 57 patients [females 45 (90%) males 12 (80%)] had papillary thyroid carcinoma. In papillary thyroid carcinoma most of the patients have conventional type followed by follicular variant of papillary thyroid carcinoma and micro papillary thyroid carcinoma. 5 patients [females 3 (6%) and males 2 (13.33%)] had medullary carcinoma thyroid and were not associated with multiple endocrine neoplasia syndrome. 3 patients [females 2 (4%) and male 1 (6.67%)] had anaplastic carcinoma (Figure-2).

Discussion:

In our study the increase in the incidence of thyroiditis especially hashimoto's thyroiditis is due to earlier diagnosis by ultrasonogram imaging and increased accuracy of fine needle aspiration cytology/ biopsy which decides the adequate treatment. The iodine supplementation has changed the geographical area of India from iodine deficiency to iodine sufficient which leads to increased incidence of thyroiditis. The increased incidence of nodular colloid goiter is due to prolonged duration of thyroid swelling with irregular treatment which causes waxing and waning of thyroid stimulating hormone and negligence of the patient to seek medical/surgical advice in earlier. The increased incidence of papillary thyroid carcinoma is due to use of ultrasonogram with Doppler studies and specific features of malignancy (hypoechoic nodule, increased intrathyroidal vascularity, punctate microcalcification, absence of halo and extra thyroidal extension) and use of ultrasonogram guided fine needle aspiration cytology/ biopsy has made diagnosis easy and accurate. Papillary thyroid carcinoma has good prognosis following specific surgery, postoperative radio iodine ablation and suppressive dose of tablet thyroxine and regular followup with clinical examination, ultrasonogram, thyroid function test and serum thyroglobulin. The incidence of follicular thyroid carcinoma has been reduced because of elimination of iodine deficiency by iodine supplement and public awareness. The increased incidence of micro papillary thyroid carcinoma is due to increased use of ultrasonogram with Doppler study to identify nodules less than 10mm in size. In our study medullary thyroid carcinoma patients are not associated with multiple endocrine neoplasia syndrome or with family history medullary thyroid carcinoma. All patients with medullary thyroid carcinoma are sporadic.

Conclusion:

In our study there is increased incidence of hashimoto's thyroiditis and papillary thyroid carcinoma which is due to iodine sufficiency or due to excess iodine intake. So the people at risk (excess iodine intake or low iodine intake) should be tested for mean urinary iodine value reflects iodine over recent days (normal value- 100 to 120µg/L in school children), serum thyroglobulin (iodine intake over weeks to months) or change in goiter prevalence (iodine status for long term in years) and managed appropriately. In iodine excess regions iodine supplementations can be avoided and adequate iodine intake is recommended (100 to 200µg/day). Thus the incidence of papillary thyroid carcinoma and the incidence of thyroiditis can be decreased. In iodine deficient regions iodine supplementation foods rich in iodine like fish, sea food and seaweed are recommended. The cause of iodine deficiency in endemic goiter regions due to intake of goitrogens like cabbage, turnips, cassava, maize, millet, bamboo shoots and sweet potatoes should be avoided. Also protein energy malnutrition which coexists frequently with endemic goiter should be corrected. Patients who develop hypothyroidism initially develop goiter (hyperplasia) and later to nodules. If patients identified in hyperplasia stage they can be treated with tablet thyroxine so the goiter is reversible and surgery and surgery related complications can be avoided. The incidence of patients presenting with nodules can be reduced. So the patients presenting with goiter should be thoroughly evaluated clinically and investigated appropriately and managed specifically thereby reducing morbidity and mortality.

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