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Original Research Article

An Observational Study on the Role of Surgery in Autoimmune Condition of Thyroid in Department of Surgery in National Institute of Medical Sciences & Research, Jaipur

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Abstract

BACKGROUND: Autoimmune conditions of thyroid are frequent causes of thyroiditis. Hashimoto's thyroiditis is the most common cause of hypothyroidism and grave's disease is the most common cause of hyperthyroidism. These diseases are diagnosed clinically with a detailed history and physical examination, biochemically using laboratory autoimmune antibody levels or radiographically. Although an operation is not always the primary consideration for treatment, certain situation make surgery essential to the management of these diseases.

METHODS: Patients with thyroid disease are clinically examined and evaluated with biochemical investigations and further FNAC is done in required cases. Patient is managed either medically or surgically. Various conclusions were drawn.

RESULT: Patients younger than age 40 have much lower remission rates with medical treatment for Graves' disease. While in children, thyroidectomy is recommended as the first-line therapy. Up to 80% of children fail medical therapy and experience a high rate of recurrence or hypothyroidism with RAI.

CONCLUSION: Patients with thyroid disease is managed medically mostly and surgical management is required for specific indications. The surgical management of Hashimoto and Grave's disease will render patient hypothyroid but ultimately is able to provide symptomatic relief safely under experienced surgeon.

INTRODUCTION

Autoimmune conditions of the thyroid are frequent causes of thyroiditis or inflammation of the thyroid. Hashimoto's thyroiditis is the most common cause of hypothyroidism, whereas Graves' disease is the most common cause of hyperthyroidism. These diseases are diagnosed clinically with a detailed history and physical examination, biochemically using laboratory autoimmune antibody levels, or radiographically with ultrasound and thyroid uptake scans. Although an operation is not always the primary consideration for treatment, certain situations make surgery essential to the management of these 2 diseases.

HASHIMOTO'S THYRODITIS

Chronic lymphocytic thyroiditis, or Hashimoto's thyroiditis, is the most common cause of diffuse goiter and hypothyroidism in the United States. [1] Later, in the 1950s, the presence of thyroid autoantibodies suggested an autoimmune component of Hashimoto's thyroiditis. [2] A diffuse, lymphocytic inflammatory process characterizes Hashimoto's thyroiditis, and clinical manifestations are variable due to differing amounts of gland destruction.

Epidemiology

Hashimoto's thyroiditis is diagnosed in approximately 30 to 60 people per 100,000 each year, resulting in a prevalence estimated at about 4%. 45 Women are 10 to 20 times more likely to develop Hashimoto's thyroiditis compared with men.
Pathogenesis: The cause of Hashimoto's thyroiditis is not fully understood, but both environmental and genetic factors contribute. Anti-thyroid antibodies, including anti-thyroperoxidase (anti-TPO), anti-thyroglobulin (anti-Tg), and thyroid-stimulating hormone (TSH) stimulation blocking antibody (TSBAb), lead to inflammatory reactions. Hashimoto's thyroiditis starts with gradual atrophy of follicular tissue secondary to infiltration of primarily mature lymphocytic cells.

Clinical Presentation

The development of hypothyroidism in Hashimoto's thyroiditis is slow and insidious. Nearly 20% of patients eventually present with overt hypothyroidism, and 5% present with an initial, transient hyperthyroidism, otherwise known as Hashitoxicosis from gland destruction releasing thyroxine. [3] In some cases, patients may experience cyclic hyperthyroidism secondary to alternating thyroid stimulating and inhibiting autoantibodies (Table 1). On physical examination, a firm, diffusely enlarged painless thyroid gland is palpated, although some patients progress toward a small, atrophic gland. [4] Patients may complain of compressive symptoms, such as dysphonia and dysphagia, and rarely, pain.[5]

Table 1
Signs and symptoms of hypothyroidism and hyperthyroidism

	Hypothyroidism	Hyperthyroidism
General	Fatigue, weight gain, cold intolerance	Fatigue, increased appetite, weight loss, heat intolerance, increased basal metabolic rate, flushing
Neurologic	Poor memory, depression, psychosis, paresthesias	Mania, anxiety, nervousness, irritability
Head and neck	Hoarseness, neck pain, periorbital edema, hair loss, goiter	Hoarseness, goiter, hair thinning, periorbital edema, [a]eyelid retraction, [a]proptosis, [a]excessive tearing, [a]exophthalmos, [a]ocular dysmotility [a]
Cardiovascular	Bradycardia, peripheral nonpitting edema, pericardial effusion, hyperlipidemia, hypertension	Palpitations, tachycardia, atrial arrhythmia
Pulmonary	Dyspnea, pleural effusion	Shortness of breath
Gastrointestinal	Dysphagia, constipation	Dysphagia, nausea, diarrhea
Genitourinary	Decreased glomerular filtration rate, elevated creatinine, infertility, menstrual irregularities, infertility	Oligomenorrhea, erectile dysfunction
Musculoskeletal	Muscle weakness, muscle cramping, joint pain, ataxia, carpal tunnel syndrome, delayed tendon reflexes	Pretibial myxedema, peripheral tremors, hyperactive deep tendon reflex
Dermatologic	Cool, dry, rough, brittle nails	Warm, moist skin, smooth, pretibial dermopathy, [a]brittle nails

GRAVES' DISEASE

Graves' disease is the most common cause of hyperthyroidism in the United States. The triad of tachycardia, goiter, and exophthalmos was further characterized in the nineteenth century by Robert James Graves in Ireland as signs of the same disease. Graves' disease was classified as an autoimmune disease when a long-acting thyroid stimulator was identified in 1958 by McKenzie and was confirmed as an autoantibody by Adams in 1965. [6]

Epidemiology

Graves' disease represents up to 80% of hyperthyroid patients. [7] Similarly to Hashimoto's thyroiditis, women have a much higher incidence (0.5 per 1000) compared with men (0.05 per 1000). [37] Peak incidence occurs around 40 to 60 years of age, but it can present much younger. [8] Graves' disease is diagnosed more commonly in smokers and in those with personal and family history of autoimmune diseases.

Pathogenesis

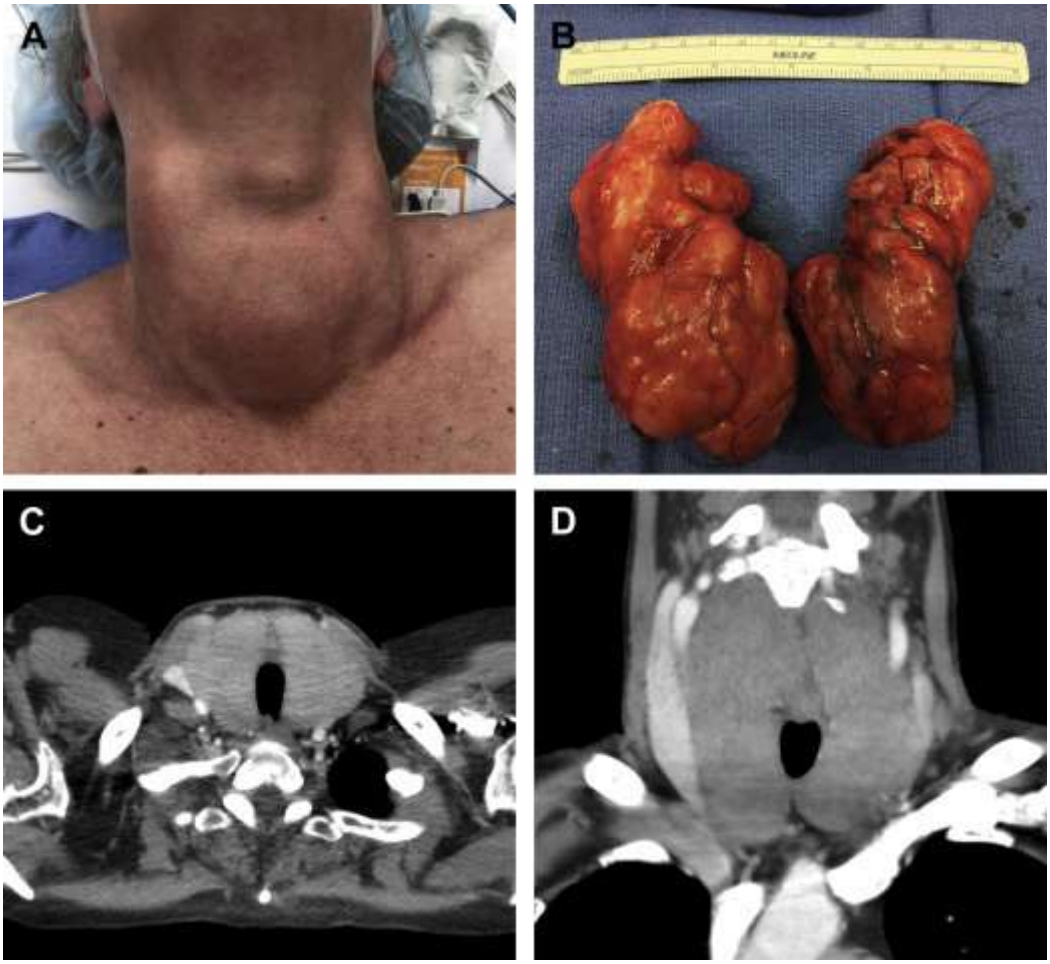
Thyrotoxicosis in Graves' disease occurs secondary to thyrotropin receptor antibodies (TRAb), which constitutively stimulate TSH receptors to synthesize excessive thyroxine. [9]Twin studies suggest that 80% of Graves' disease are due to genetic factors, and the other 20% are due to environmental factors. [10]

Clinical Presentation

Patients with Graves' disease can present with the spectrum of subclinical to overt hyperthyroidism (Table 1). Most common signs include tachycardia, atrial arrhythmia, tremor, warm moist skin, hyperreflexia, and pretibial myxedema.

Graves' ophthalmopathy occurs in up to 60% of patients with Graves' disease and is associated with high TRAb titers. [11] Clinical signs of Graves' ophthalmopathy include eyelid retraction, proptosis, excessive tearing, exophthalmos, and motility disorders. Most patients have mild symptoms, but up to 5% may experience severe symptoms, including intense pain, corneal ulceration, and compressive optic neuropathy. [12]

Thyroid dermopathy occurs in patients with Graves' disease from the accumulation of glycosaminoglycans in the pretibial area. Although a classic sign of Graves' disease, it only occurs in about 2% to 3% of patients. When it does occur, it usually clusters in patients with Graves' ophthalmopathy with very high TRAb titers. [13]



Fibrosing Hashimoto's thyroiditis. Patient has significant palpable firm goiter (*A*). Patient experienced compressive symptoms, including dysphagia, shortness of breath, and decreased neck mobility. Note bilateral lobes with irregular shape on final specimen (*B*). Computed tomography scan of neck demonstrating significant compression of trachea and esophagus as source of symptoms. Axial view (*C*), coronal view (*D*).

AIMS AND OBJECTIVES

1. To determine clinical profile of thyroid disease patients.
2. To determine the significance of different modalities in management of thyroid disease patients.
3. To analyze the results of surgical treatment of patients, who underwent surgery and to compare surgical complications (postoperative bleeding, postoperative hypoparathyroidism, lesions of the recurrent laryngeal nerve) in relation to medical management.

MATERIALS AND METHODS

Study design: Retrospective study

Study settings: Department of Surgery at tertiary care centre, National institute of medical science and attached hospitals, Jaipur

Study duration: 1.5 year

Study population: It includes cases with thyroid disease with following inclusion criteria:

Inclusion criteria:

1. Patient with symptomatic thyroid nodule.
2. Clinically diagnosed thyroid disease.
3. Who willing to give written informed consent.

Exclusion criteria:

1. Patient with another cancer.
2. Pregnant women.
3. Childrens.

SAMPLE SIZE: A sample of 30 patients with thyroid disease was included.

SAMPLE TECHNIQUE: Using purposive sampling technique, a total of 30 cases with confirmed diagnosis of thyroid disease was included in this study.

STUDY PROCEDURE

The study was conducted in the surgery department of tertiary care centre, NIMS hospital, who satisfied the above said inclusion and exclusion criteria and the study was conducted from march 2022 to october 2023. This study includes 30 patients of hyperthyroidism in whom after clinical investigation, Grave's disease was diagnosed and followed for their outcome after their medical or surgical management. The diagnosis was based on clinical presentation, thyroid hormones (T3, T4, TSH), and values of TSH-receptor antibodies (increase above 1.0 IU/L). Out of 30 patients, 20 patients were managed medically by giving antithyroid drugs and rest 10 patients underwent surgical management. The indications for surgery included patients with large goitre, relapse after antithyroid drug (ATD) therapy, allergic reactions to ATD, non-compliance and finally an associated nodule with suspicion of carcinoma. Patients were rendered euthyroid with ATD before surgery and were pretreated with Lugol's iodine. Standard subtotal thyroidectomy was performed. The weight of the thyroid remnant on either side was estimated emperically between 3 g and 5 g.. Preoperatively, all patients were treated preoperatively with Lugol's solution of iodine with 3–5 drops of iodine/a day for 2–3 weeks before surgery. All patients signed a consent form for the surgical procedure which comprises their consent for the storage and use of their data.

Data analyzed were patient sex, age, indications for surgery, type of surgery, the incidence of carcinoma and microcarcinoma and the frequency of complications (postoperative permanent hypoparathyroidism, unilateral recurrent nerve paralysis and postoperative hematomas), as well as the occurrence of associated complications with the same patient. Postoperative permanent hypoparathyroidism was confirmed 3 months after surgery and was defined by the values of the parathyroid hormone below the lower limit of the normal range of hormones (normal parathyroid hormone from 10.0 to 65.0 pg/mL).

Obtained data (incidence of complications and the incidence of associated complications), are presented in tables with absolute numbers and the percentages of corresponding structure in relation to the type of applied surgical methods. Comparison between the frequencies waS performed with nonparametric Fisher's test. Statistical analysis was performed at the level of statistical significance of $p < 0.05$.

RESULT AND OBSERVATION

The research is a retrospective study in which data were analyzed for patients surgically treated for hyperthyroidism. This study included 30 patients with a mean age of 49.3 years followed for 1.5 year. Of these, 76.66% were women and rest men 23.33%. The initial therapy was ATDs in 75.4%, RIA in 16.4%, and thyroidectomy in 8.2%. For the duration of follow-up, ATDs had an overall failure rate of 43.3% compared with 23.33% for RAI (hazard ratio = 7.6; $p < 0.0001$). Surgery had a 100% success rate; 38.46% of ATDs land up in surgical management. Adverse effects developed in (17.4%) patients treated with ATDs, most commonly dysgeusia (7.4%), rash (3.8%), nausea/gastric distress (3.4%), pruritus (1.6%), and urticaria (1.2%). Thyroidectomy resulted one (1.85%) superior laryngeal nerve damage, with no permanent hypocalcemia. There was no postoperative death or thyrotoxic crisis. There was no case of permanent recurrent laryngeal nerve damage or hypoparathyroidism. 2 patients (20%) had temporary unilateral vocal cord palsy. One patient (10%) developed recurrent hyperthyroidism. Postoperative transient hypothyroidism developed in 40% cases, all within the first postoperative year. The functional results at 1.5 years were as follows: Out of 10 cases followed 6 patients (65.9%) became euthyroid while 4 (31.9%) were still hypothyroid and requited long term substitutive treatment. Thyroidectomy has reasonable role in the management of Graves' disease, because the patients have had their diseases rapidly terminated, were hospitalised for an average period of only 3.5 days and have had no permanent functional insult except for hypothyroidism. There was no permanent recurrent nerve damage or hypoparathyroidism.

TABLE 1: Showing Distribution of Patients with Age and Gender

GENDER	NUMBER	AGE
MALE	7 (23.33%)	>45YEARS
FEMALE	23 (76.66%)	>40YEARS
TOTAL	30 (100%)	MEAN 49.5YEARS

TABLE 2: Shows Different Type of T/T Received by The Patients

Antithyroid drugs	13 (43.33%)
RIA	7 (23.33%)
Surgery	10 (33.33)
Total	30 (100.00%)

TABLE 3: Showing Success Rate of Different Type of Modalities

MODALITIES	CURED	RELAPSED	LEADS TO SX	TOTAL
ATD's	4 (30.76%)	4 (30.76%)	5 (38.46%)	13 (100%)
RIA	5 (71.42%)	1 (14.28%)	1 (14.28%)	7 (100%)
SURGERY	10 (100%)	0 (0.00%)	0 (0.00%)	10 (100%)

TABLE 4: SHOWS THE INDICATIONS OF SURGERY; which includes thyromegaly, confirmed nodule >1 cm in diameter and resistance to antithyroid drug therapy. The indication for surgery in the majority of 65% patients operated was thyromegaly, while a smaller number, 10% and an ultrasound diagnosed nodule >1 cm.

THYROMEGALY	8 (50%)
NODULE >1CM	2 (12.5%)
FAILED RIA	1 (0.62%)
RELAPSE FROM MEDICAL MANAGEMENT	5 (31.25%)
TOTAL PATIENTS	**16**

TABLE 5 SHOWS INCIDENCE OF THYROID CANCER IN PATEINTS OPERATED: In 2 patients definitive pathohistological examination revealed thyroid cancer. Carcinomas of less than 1 cm (microcarcinomas) were represented in 3 patients, while greater than 1 cm were present in 2 patients.

TUMOUR <1CM	3 (18.75%)
TUMOUR >1CM	2 (1.25%)
WITHOUT TUMOUR	11 (68.75%)
TOTAL PATIENTS	16 (100.00%)

TABLE 6 SHOWS THE INCIDENCE OF COMPLICATIONS IN RELATION TO THE SURGICAL MANAGEMENT. Postoperative hypothyroidism, was most frequent in patients who underwent thyroidectomy.

HYPOCALCEMIA	1 (0.62%)
VOCAL CORD PALSY	1 (0.62%)
HAEMATOMA	0 (0.00%)
SUPERIOR LARYNGEAL NERVE DAMAGE	1 (0.62%)
HYPOTHYROIDISM	4 (25.00%)
RECURRENT LARYENGEAL NERVE	0 (0.00%
HYPOPARATHYROIDISM	0 (0.00%)
NO COMPLICATIONS	9 (56.25%)
TOTAL	16 (100.00%)

DISCUSSION

- Postoperatively, our patients had no complications except for hypothyroidism, surgery remains a reasonable approach. The biology of thyroid cancer represents a spectrum of behavior ranging from well-differentiated lesions with an excellent prognosis to anaplastic carcinoma, which is almost fatal. For this reason, it is important that clinicians have methods at their disposal to assess the characteristics of patient's thyroid malignancy.
- Graves' disease is primarily treated by anti thyroid drugs, and only in the case of failure of this method of treatment are other types of therapy, such as the use of radioactive iodine, taken into account. Decision of subtotal thyroidectomy is recommended only after treatment with radioactive iodine. However, surgery with a low complication rate plays an important role in the treatment grave's disease.
- Even when the initial treatment is surgery, the choice of the primary treatment option depends on the adequate cooperation of an endocrinologist, a specialist in nuclear medicine and an endocrine surgeon. The choice of an

adequate operation for GD is still the subject of debate, although after the year 2000, TT has become the treatment of choice for Grave's disease in many highly specialized centres in the world.

- Total or near total thyroidectomy is recommended for patients with ongoing thyroid cancer, those who refuse radio-ablation as a therapeutic procedure, or have a life threatening reaction to antithyroid drugs such as vasculitis, agranulocytosis and liver failure. Total thyroidectomy is recommended to patients with Graves' ophthalmopathy to eliminate the autoimmune stimulus from the orbital antigens.

CONCLUSION

1. Typically, hypothyroid Hashimoto's thyroiditis is well controlled medically with thyroid hormone replacement for those who develop hypothyroidism, but operative management plays a role in specific cases.
2. Patients may experience mild to debilitating symptoms that may become lifelong. Diagnosis requires a combination of clinical, laboratory, and imaging techniques.
3. Although most are managed medically, these diseases are immeasurably complex, and surgical management is required for specific indications.
4. The surgical management of Hashimoto's thyroiditis and Graves' disease will render the patient hypothyroid, but ultimately is able to provide symptomatic relief safely under an experienced surgeon.
5. Surgery was also very effective and relatively safe in the hands of experienced surgeons and is applied after exhausting other treatment modalities, and represents a definitive treatment where the reasons for surgery are various. The rate of relapse after surgery is significantly lower than for treatment with radioiodine, or anti thyroid drugs.
6. Antithyroid drugs on one hand have good tolerance, but the rate of recurrence of hyperthyroidism is up to 69% after termination of the treatment. Radio ablation is a cost effective method, good for patients at risk for surgery, but in order to achieve euthyroidism it takes up to 6 months.
7. Surgical interventions, on the other hand, carried out in patients with significant goitre give the fastest results and lead to the rapid regression of the symptoms of hyperthyreosis.
8. Surgical treatment of GD achieves a quick and efficient therapeutic effect and interventions performed by an experienced surgeon are considered a safe procedure.

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