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Original Research Article

Profile of Graves Disease in a Tertiary Care Hospital

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Abstract:

Background: Graves' disease is an autoimmune disorder characterized by excessive thyroid hormone production and is the most common cause of hyperthyroidism. It presents with diverse clinical manifestations and biochemical abnormalities. Early diagnosis and appropriate treatment are essential to achieve biochemical remission and prevent complications. This study evaluates the laboratory profile, treatment modalities, and outcomes of Graves' disease in a tertiary care hospital.

Aim: To study the laboratory profile of Graves' disease, compare different treatment modalities, and assess treatment outcomes in terms of achievement of euthyroid or hypothyroid states and disease relapse.

Materials and Methods: An observational study was conducted over two years in the Department of General Medicine in collaboration with Biochemistry, Nuclear Medicine, and General Surgery. A total of 110 patients aged above 18 years with biochemical evidence of thyrotoxicosis and scintigraphically confirmed Graves' disease were included. Patients with non-Graves' thyrotoxicosis, pregnancy, or beta-blocker use were excluded. Clinical findings, hemoglobin levels, and thyroid function parameters were evaluated. Thyroid scintigraphy was performed using Technetium-99m pertechnetate. Treatment modalities included antithyroid drugs (ATD), radioactive iodine (RAI) therapy, and surgery. Treatment outcomes were assessed during follow-up.

Results: The most commonly affected age group was 40–59 years, with a female predominance and a male-to-female ratio of 1:1.75. Weight loss (79.0%) and palpitations (72.7%) were the most common symptoms. Tremor (56.3%) was the predominant clinical finding. Serum TSH was below 0.005 IU/L in 98.1% of patients. Total T3 levels ranged from 2.1–4.0 ng/mL in 40% of patients, while total T4 levels ranged from 14.11–20.0 µg/dL in 40.9%. Of 104 treated patients, 47 received ATD, 54 underwent RAI therapy, and 3 underwent surgery. Among 45 patients followed up, 17 of 24 patients in the RAI group developed hypothyroidism by the third month. Three patients experienced persistent disease requiring further treatment.

Conclusion: Graves' disease predominantly affects adults aged 40–59 years and is characterized by suppressed TSH and elevated thyroid hormone levels. RAI therapy was associated with a higher frequency of early hypothyroidism. Regular biochemical monitoring and individualized treatment are essential for achieving optimal outcomes.

Keywords: Graves' Disease; Laboratory Profile; Thyroid Function Tests; Treatment Outcomes.

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Introduction

Graves' disease is caused by autoantibodies that bind to the thyrotropin receptor (TSHR-Ab), stimulating growth of the thyroid and overproduction of thyroid hormone. It is the most common cause of hyperthyroidism.

Clinical manifestations of Graves' disease include diffuse goiter and symptoms and signs resulting from hyperthyroidism. Triad of Graves' disease include goiter, ophthalmopathy and dermopathy. It is often associated with ophthalmopathy, which is not found in other etiologies of hyperthyroidism and is not caused by the high serum thyroid hormone concentrations. [1] Population studies in India, have suggested about 12.1% have anti-thyroglobulin (TG) antibodies. [2]

Technetium Pertechnetate (99mTc) scan and TSH receptor antibody can help in the differentiating Grave's disease from Thyroiditis and Multinodular goiter, but are costly and not available widely thus limiting their use. [3]

This study done to see the laboratory parameters of Graves' disease in a tertiary care hospital, comparison of treatment modalities and complications of treatment.

Aims and Objectives:

- To study the laboratory profile of Grave's disease in a tertiary care hospital.
- To study the different treatment modalities (ATD, RAI, Surgery)
- To study the outcome in one year, in terms of time lag to achieve euthyroid state/ hypothyroid state /relapse.

Materials and Methodology: This was an Observational study done for 2 years in Department of General Medicine along with Biochemistry, Nuclear Medicine, and General Surgery.

Inclusion Criteria: Low TSH (< 0.2 µiu/ml), High TT3 (> 2ng/ml), High (>14.1 µg/ml). Graves' disease which was diagnosed by scintigraphy and Age more than 18 years.

Exclusion Criteria: Thyrotoxicosis other than Graves' disease, pregnant woman, Patients on beta blockers. Patients who were diagnosed to have Thyrotoxicosis by biochemical tests were advised for thyroid scintigraphy.

Static images were obtained 20min post IV Inj. of 5mCi dose of Technetium 99m Pertechnetate. Diffuse uptake on scintigraphy was labelled as Grave's disease.

Results

Most common age group affected was 40 – 59 years of age.

Table 1: Chief Complaints

Chief complaint	Frequency	Percentage
Weight loss	96	87.2%
Fever	93	84.5%
Palpitation	80	72.7%
Increased appetite	76	69.0%

Table 2: Symptomatology in Descending Order

General symptom	Frequency	Percentage
Weight loss	87	79.0%
Palpitation	80	72.7%
Fatigue	68	61.8.0%
Increased sweating	64	58.1%
Increased frequency of stools	40	36.3%
Fever	40	36.3%
Disturbed sleep	39	35.4%
Heat intolerance	35	31.8%
Dyspnea	34	30.9%
Increased appetite	30	27.2%
Oligomenorrhea	19	27.1%
Amenorrhea	15	21.4%
Angina like chest pain	22	20.0%
Muscle weakness	18	16.3%
Irritability	11	10.0%
Ophthalmopathy	11	10.0%
Dermopathy	3	2.7%

Table 3: General Examination

Findings	Frequency	Percentage
Pallor	15	13.6%
Ankle edema	14	12.7%
Clubbing	4	3.6%
Warm & moist skin	54	49.0%
Diffuse Goiter	37	33.6%
Thyroid bruit	6	5.45%
Tremors	62	56.3%
Pretibial myxedema	3	2.72%
Eye signs	33	30.0%
Proximal myopathy	2	1.81%
Tachycardia	50	45.4%
Increased pulse pressure	36	32.7%
©Compressive features	15	13.6

Most common finding was tremor (56.3%) followed by sweating (49%), tachycardia (45.4%). Ophthalmopathy (proptosis, lid lag), which are found in Graves' disease, but almost never in other forms of thyrotoxicosis. Pretibial myxedema found in 3 patients (2.72%), who are also having clubbing (3.6%). Thyroid acropachy (clubbing + soft tissue swelling of hand) found in one patient, who was having pretibial myxedema and lid lag also.

Table 4: Association with Other Autoimmune Diseases

Auto immune disease	No patients (n = 6)
Auto immune hepatitis	1
Auto immune hemolytic anemia	1
Vitiligo	1
Myasthenia gravis	1
Rheumatoid arthritis	1
Type 1 diabetes mellitus	1

Table 5: Laboratory Profile

Hemoglobin (gm/dl)	Frequency	Percentage
7-10	6	5.45%
10-13.5	78	70.9%
>13.5	26	23.6
	110	100%

Table 6: Thyroid Function Tests

TSH (IU/L)	Frequency	Percentage
<0.005	108	98.1%
0.005-0.3	2	1.81%
Total T3 (ng/ml)	**Frequency**	**Percentage**
2.1-4.0	44	40%
4.01-6.0	28	25.4%
>6	19	17.27%
Total T4 (µg/dl)	**Frequency**	**Percentage**
14.11-20.0	45	40.9%
20.01-24	20	18.18%
>24	6	5.45%

Out of 110 patients, Sinus tachycardia present in 50 patients (45.4%), atrial fibrillation in 13 patients (11.8%), LVH in 4 (3.63%). Out of 110 patients 13 patients had AF, 3 were females, and males were 10, with female to male ratio of 1:3.3. Out of 10 male patients with AF, 8 were more than 50 years of age, and all 3 females were more than 55 years of age. After treatment in AF patients, 5 were reverted to NSR, 3 in ATD and 2 in RAI group.

Out of 13 AF patients LA enlarged in 9, RA enlarged in 8, Biatrial in 7, increased EDD in 3, increased ESD in 2, decreased EF in 2, MVP, moderate to severe MR, TR and PAH in6, 7, 9, 11 patients respectively. LVH seen in 6 patients**.**

Out of 110 patients, only 104 patients were received treatment, 47 patients received ATD, 54 were RAI. Only 45 cases were followed after treatment initiation. 21 patients were on anti-thyroid treatment and 24 were post thyroid ablation therapy. After treatment initiation, in ATD group, few patients went into euthyroid state within first month (7 out of 21; 33.3%) hence ATD dose being adjusted. In the RAI group, more patients went into euthyroid state within the first month (11 out of 24; 45%). In RAI group, most patients went into hypothyroidism; 9 by the end of 2nd month and 8 more by the end of 3rd month (total 17 out of 24). In ATD group, only one out of three developed hypothyroidism by the end of third month. (7 out of 21), in whom dose of ATD optimization required.

Among 45 follow up cases, 2 from ATD group and one from RAI group did not go into remission. These patients were treated with RAI. One of those patients went into thyrotoxic crisis and was administered Lugol's Iodine and beta blockers.

Discussion

This study was conducted on 110 patients of Graves' disease to determine clinical, laboratory profile and treatment comparison.

The age of the patients included in this study ranged from 18 years and above. The majority of patients were aged between 40-59 (56) followed by 20 – 39 (44). Most of Graves' disease patients presented by the age of 40 to 60 years. This correlates with the data from earlier studies. Y. S. Hussain et

al in their study of 659 patients of Graves' disease, mean age of presentation 46±11 years. Sarfo-Kantanka et al, in their study of 182 patients with GD mean age of presentation was 39.9 ± 14.7 years.

In this study of 110 patients, male to female ratio was 1:1.75. Although the female prevalence was slightly less than the many previous studies, the fact that a significant number of admissions tend to be made which could explain this phenomena. However even here there is a clear female preponderance shown. Y. S. Hussain et al [5] in their study of 659 patients of GD, male to female ratio was 1:3.4. This is correlated with Syed Fasih Ahmed Hashmi et al, shown male to female ratio 1:1.5

Most common symptom in this study was weight loss (79.0%) followed by palpitation (72.7%), fatigue (61.8%), sweating (58.1%) and increased stools (36.3%) in the order. A study done by Sarfo-Kantanka et al, of 182 patients with GD, most common symptom was palpitation(87%) followed by weight loss (80%), thyroid swelling (80%), and fatigue (76%) in the order. Other common symptoms observed in this study were fever (36.3%), disturbed sleep (35.4%), heat intolerance (31.8%), dyspnea (30.9%), increased appetite (27.2%), amenorrhea (21.4%), muscle weakness (16%), compressive features (13.65), ophthalmopathy (10%) and dermopathy (2.7%). These results correlated with various western studies and an Indian study done in Kasturba Medical college Hospital, Manipal by Sai Krishna M; George K Varghese.

Most common sign observed in this study was tremor (56.3%) followed by sweating (49%), tachycardia (45.4%). This is correlated with signs, study done by Christian M Girgis et al, include diffuse goiter, fine resting tremor, and tachycardia. Signs observed in this study, eye signs were 33 patients (30%) but Christian M Girgis et al observed in 50% of his patients, pallor (13.6%), clubbing (3.6%), increased pulse pressure (32.7%), pretibial myxedema (2.7%) which are correlated in same study. Extra thyroidal manifestations of Graves' disease are orbitopathy, pretibial myxedema and acropachy which are seen in 33, 3, 0.3 percent respectively. A study done by Changgui Lan et al and Fatourechi V shown 25, 1.5, and 0.3 respectively. GD association with other autoimmune disorders like AH, AIHA, MG, T1DM, Vitiligo, and RA, were < 1%.

In this study ECG shown tachycardia in 50 patients (45.4%), AF in 13 patients (11.8%). This is correlated with Syed Fasih Ahmed Hashmi et al, which shown tachycardia, AF were 56%, 19. % respectively.

Thyroid function tests: In this study of 110 patients, almost all patients (98%) shown TSH value less than 0.005, TT3, TT4 were elevated which correlated with many other studies. Zargar A H et al in their study of 203 subjects also shown same correlation.

Treatment Modalities: In this study of 110 subjects, only 104 patients were received treatment, 47 patients received ATD, 54 were RAI, 3 were surgery, only 45 cases were followed after treatment initiation, 21 were on anti-thyroid treatment and 24 were post thyroid ablation therapy. Few patients went into euthyroid state within first month (7 out of 21; 33.3%), 7 more in second month (33.3%), two patients in third month in ATD group, where dose of ATD was adjusted. In the RAI group, more patients went into euthyroid state within the first month (11 out of 24; 45%), two patients in second month (8.3%). This is study correlated with Chen DY, Chen TH et al [4], in the study of 80 patients shown RAI therapy superior of ATD group.

In this study, 45 patients under follow up, most patients went into hypothyroidism; 9 by the end of 2nd month and 8 more by the end of 3rd month (total 17 out of 24) in RAI group. In ATD group, only one out of three developed hypothyroidism by the end of third month. (7 out of 21), dose was optimized. A study done by Bernard Corvilain et al, shown non negligible number of cases developed hypothyroidism by end of one month in RAI group. [6]

Among 45 follow up cases, 2 from ATD group and one from RAI group did not go into remission. One of those patients went into thyrotoxic crisis and was administered Lugol's Iodine and beta blockers. A study done by Chen DY, Chen TH et al, in the study of 80 patients shown RAI therapy superior of ATD group in terms of relapse. [7]

Conclusions

Graves' disease affects female patients' more than male patients. The peak incidence of Graves' disease was in the age group of 40 to 60 years. Most common presentation of symptom was weight loss followed by palpitation, fatigue, therefore when these individuals come with symptoms, the index of suspicion needs to be high and appropriate testing advised. Atrial fibrillation present in 11.8% of patients, which increases with age, which can be reverted with treatment. Sinus tachycardia was most common finding on ECG. Left Atrial enlargement was most common ECHO finding followed by right atrial enlargement. Most common valvular lesion was tricuspid regurgitation. Most of the patients went into hypothyroid state by early second month, after radioactive iodine therapy.

Limitations of study: Follow up of the patients. Most of the patients will be referred for thyroid scan, later they will be continued their follow up, at family physician. Sample size is small to compare the treatment modalities as only three patients were underwent for surgery.

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