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Original Research

Clinical Manifestations, TSH and FT4 Levels During Initiation and Maintenance Therapy in Patients with Graves' Disease at Dr. M. Djamil General Hospital, Padang, 2017–2022

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Abstract

***Background**: Graves' disease is an autoimmune cause of hyperthyroidism marked by characteristic symptoms and abnormalities in TSH and FT4 levels. Management consists of an initial treatment phase followed by long-term maintenance, and variability in immune responsiveness may influence therapeutic outcomes. This study aimed to describe clinical manifestations and thyroid hormone profiles during initial and maintenance therapy among patients treated at Dr. M. Djamil General Hospital, Padang, from 2017 to 2022. **Method**: A descriptive cross-sectional design with total sampling was applied. Forty patients diagnosed with Graves' disease were included. Clinical and laboratory variables were extracted from medical records, and univariate analysis was performed using SPSS v26. **Results**: The majority of patients were women aged 40–60 years. Palpitations were the most frequent symptom in both treatment phases, followed by excessive sweating, tremor, and exophthalmos. Treatment duration exceeded 24 months for the majority. Mean TSH increased from 0.11±0.17 µIU/mL in the initial phase to 0.62±1.03 µIU/mL during maintenance, while mean FT4 decreased from 47.09±32.79 pmol/L to 21.73±13.10 pmol/L. **Discussion**: The observed rise in TSH and decline in FT4 indicate biochemical improvement consistent with antithyroid drug responsiveness. The reduction in symptom frequency parallels hormonal stabilization, supporting the clinical utility of long-term therapy. The extended duration of treatment aligns with standard recommendations that emphasize sustained disease control to minimize the risk of relapse. **Conclusion**: Transition from initial to maintenance therapy was associated with symptomatic improvement and progressive normalization of thyroid function, emphasizing the importance of prolonged and well-supervised treatment in Graves' disease.*

***Keywords**: Clinical manifestation; Graves' disease; Hyperthyroidism; Thyroid function*

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1. INTRODUCTION

Graves' disease is the leading autoimmune cause of hyperthyroidism and accounts for 60–80% of hyperthyroid cases worldwide, with a global incidence of 20–50 per 100,000 population.[1-3] The condition predominantly affects women (2–2.5%) compared to men (0.2–0.6%) and occurs most frequently between the ages of 20 and 50 years.[3] In Indonesia, the prevalence of hyperthyroidism is 6.9%, and the Basic Health Research (2013) reported a 0.4% national prevalence, including 10,283 cases in West Sumatra.[4,5] A hospital-based study in Padang showed that 39.5% of thyroid disorders were attributable to Graves' disease.[6]

The pathogenesis involves autoimmune stimulation of T and B lymphocytes, leading to the production of thyroid-stimulating antibodies (TRAb) that activate the TSH receptor. This results in follicular hypertrophy, hyperplasia, and increased thyroid hormone synthesis.[7] Clinically, Graves' disease may present with diffuse goiter, ophthalmopathy, and dermopathy, along with systemic symptoms such as weight loss, tremor, palpitations, heat intolerance, and fatigue.[8-11] These varying symptoms highlight the heterogeneity of disease expression among patients.

Diagnosis is established through clinical manifestations supported by laboratory testing, including serum TSH and FT4 as primary indicators of hyperthyroidism.[12,13] Management options include antithyroid drugs, radioiodine, or thyroidectomy, with thionamides such as methimazole, carbimazole, and PTU being the preferred first-line agents.[14] Treatment consists of an initial phase (4–12 weeks) to achieve euthyroidism, followed by a maintenance phase with gradual dose reduction, with total recommended duration ranging from 12 to 18 months.[14,15]

The clinical response to antithyroid drugs varies; most patients experience improvement in palpitations, tremors, and metabolic status within weeks, but normalization of TSH may take months.[16] Remission rates also differ, with studies reporting 19.6–68% hormonal normalization after long-term therapy, while relapse and treatment failure remain common.[17,18] These differences reflect persistent underlying immunological activity, making it difficult to determine the optimal timing for treatment cessation and increasing the risk of recurrence.[19,20]

Given these variations, understanding the dynamics of clinical symptoms, TSH, and FT4, as well as treatment duration across therapy phases, is essential. This study, therefore, aims to describe the clinical presentation and thyroid hormone

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profiles during initial and maintenance therapy in patients with Graves' disease at Dr. M. Djamil General Hospital, Padang, from 2017 to 2022.

2. METHODS

This study employed a descriptive observational design with a cross-sectional approach, utilizing secondary data obtained from the medical record system of Dr. M. Djamil General Hospital in Padang, covering the period from 2017 to 2022. Data were reviewed retrospectively to describe clinical symptoms, TSH levels, FT4 levels, and treatment duration among patients with Graves' disease undergoing initial and maintenance therapy.

Study Subjects

Inclusion Criteria

1. Outpatients of the Endocrine–Metabolic Clinic aged ≥18 years.
2. Diagnosed with Graves' disease by an internist during 2017–2022.
3. Complete documentation of clinical symptoms, TSH levels, and FT4 levels during both initial and maintenance therapy.

Exclusion Criteria

1. Patients who received only initial therapy without continuation to maintenance therapy.
2. Incomplete medical record data for any study variable.

Sample Size and Sampling Technique

All eligible records were included using a total sampling method, as the population size was fewer than 100. A total of 40 patient medical records met the inclusion and exclusion criteria and were analyzed in this study.

Data Collection

Extracted variables included:

- Demographic data (age, sex)
- Clinical symptoms (palpitations, excessive sweating, tremor, exophthalmos)
- TSH levels (μIU/mL)
- FT4 levels (pmol/L)
- Treatment duration (months), categorized as 6–24 months or >24 months

Data were collected using a structured extraction sheet and checked for completeness and accuracy through editing and data cleaning procedures.

Statistical Analysis

Data were analyzed using SPSS. Descriptive statistics were used to summarize frequencies, percentages, means, and standard deviations. Findings are presented in frequency tables and descriptive summaries. No inferential tests were performed, as the study aimed solely to characterize clinical and biochemical patterns.

Ethical Considerations

This study was approved by the Health Research Ethics Committee of RSUP Dr. M. Djamil Padang (Ethical Approval No. LB.02.02/5.7/478/2023). Patient confidentiality was strictly maintained by anonymizing all data, and no identifying information was included in the analysis or publication.

3. RESULTS

Based on Table 1, the majority of patients with Graves' disease during the 2017–2022 period fell within the 40–60-year age group, accounting for 20 patients (50%). A marked sex difference was observed, with females comprising 33 patients (82.5%) and males only seven patients (17.5%).

Table 1. Distribution of Patient Characteristics

Characteristics	n	%
Age (years)		
<40	17	42.5
40–60	20	50.0
>60	3	7.5
Sex		
Female	33	82.5
Male	7	17.5

According to Table 2, palpitations were the most frequently reported clinical symptom, occurring in 25 patients (62.5%) during initial therapy and decreasing to 13 patients (32.5%) during maintenance therapy. Other symptoms, such as excessive sweating, tremor, and exophthalmos, also showed a reduction in frequency during the maintenance phase.

Table 2. Distribution of Clinical Symptoms in Graves' Disease Patients

Therapy Phase	TSH Level (µIU/mL)	FT4 Level (pmol/L)
Initial	0.11 ± 0.17	47.09 ± 32.79
Maintenance	0.62 ± 1.03	21.73 ± 13.10

in mean ± standard deviation

Table 3 shows that the mean TSH level during initial therapy was 0.11 ± 0.17 µIU/mL, increasing to 0.62 ± 1.03 µIU/mL during maintenance therapy. Meanwhile, the mean FT4 level decreased from 47.09±32.79 pmol/L in the initial therapy phase to 21.73±13.10 pmol/L during maintenance therapy.

As presented in Table 4, the duration of treatment for patients with Graves' disease showed that 22 patients (55%) received therapy for more than 24 months, while 18 patients (45%) underwent treatment for 6–24 months.

Table 3. Mean Levels of TSH and FT4 During Initial and Maintenance Therapy

Clinical Symptoms	IT	MT
Palpitations	25 (62.5%)	13 (32.5%)
Excessive sweating	4 (10.0%)	2 (5.0%)
Tremor	9 (22.5%)	3 (7.5%)
Exophthalmos	5 (12.5%)	4 (10.0%)

IT = Initial therapy

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MT = Maintenance therapy

Table 4. Treatment Duration of Patients with Graves' Disease

Treatment Duration	n	%
6–24 months	18	45.0
>24 months	22	55.0

4. DISCUSSION

The present study evaluated clinical manifestations, thyroid hormone profiles, and treatment duration among patients with Graves' disease receiving initial and maintenance antithyroid therapy at Dr. M. Djamil General Hospital. The predominance of patients aged 40–60 years observed in this study is consistent with epidemiological data indicating that Graves' disease most frequently affects adults in their productive years.[21,22] However, several studies conducted in East Asian populations have reported a younger peak age, predominantly in the third to fourth decades of life, suggesting possible influences of genetic background, iodine intake, and earlier disease detection.[23]

The predominance of women (82.5%) also aligns with global and regional epidemiological findings, which demonstrate a substantially higher incidence among females.[21,24,25] This pattern is attributed in part to the immunomodulatory effects of estrogen, which enhance immune activation, predispose women to autoimmune conditions, and influence thyroid follicular function.[26–28]

Palpitations emerged as the most frequent clinical symptom during the initial phase, followed by tremor, excessive sweating, and exophthalmos. These symptoms decreased during maintenance therapy, indicating clinical improvement as thyroid hormone levels became more controlled. Similar trends have been reported by Sarr et al. and Diagne et al., who identified palpitations and tremor as the most common complaints among hyperthyroid patients.[18,29] The physiological basis of these manifestations lies in the hypermetabolic state induced by excessive thyroid hormones, which increase cardiac output, elevate sympathetic activity, and accelerate basal metabolic rate.[30] Furthermore, exophthalmos is related to autoimmune-mediated inflammation in orbital tissues, triggered by TSH receptor autoantibodies that also stimulate the thyroid gland.[31,32]

Biochemically, this study demonstrated an increase in mean TSH levels from 0.11±0.17 µIU/mL during initial therapy to 0.62±1.03 µIU/mL during maintenance therapy, along with a decline in FT4 levels from 47.09±32.79 pmol/L to 21.73±13.10 pmol/L. These findings reflect progressive hormonal normalization and parallel results from prior

investigations by Decroli et al. and Azizi et al., who observed similar TSH elevation and FT4 reduction following antithyroid medication.[17,33] Studies by Konishi et al. and Magri et al. further support this pattern of biochemical improvement over long-term therapy.[27,34]

Despite these improvements, more than half of the patients (55%) required treatment for longer than 24 months. This extended duration exceeds the 12–18 months recommended by major endocrine guidelines, such as the ATA, which suggests this timeframe as optimal for achieving stable remission.[15] However, prolonged therapy is common in clinical practice, particularly in cases where hormonal normalization is slow, TRAb levels remain elevated, or symptoms persist. Previous studies have reported average treatment durations ranging from 23 months to over two years, highlighting the variability in response among individuals.[25,36]

The persistence of hyperthyroid activity or relapse risk may be influenced by several factors, including age below 40 years, male sex, smoking status, thyroid gland size, presence of ophthalmopathy, and high TRAb concentration before or after therapy.[37–39] These variables contribute to heterogeneity in immune activity and complicate decisions regarding discontinuation of therapy. Even when biochemical control is achieved, underlying autoimmune processes may persist, increasing the likelihood of recurrence if treatment is withdrawn prematurely.

5. CONCLUSION

Overall, the findings of this study reinforce that clinical and biochemical improvements occur gradually over the course of antithyroid therapy, supporting the need for individualized treatment durations. Monitoring of symptoms, TSH, FT4, and potentially TRAb levels remains essential to optimize therapeutic outcomes and reduce the risk of relapse in patients with Graves' disease.

6. RECOMMENDATION

Regular monitoring of TSH and FT4 levels should be maintained throughout therapy to ensure optimal treatment response. Patient adherence must be reinforced to reduce the risk of relapse. Clinicians should consider individualized treatment plans, particularly for patients who require therapy beyond 24 months. Further research with larger samples and inclusion of immunological markers is recommended to identify better factors influencing treatment duration and outcomes.

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