

# Treatment for Graves' Disease in Children and adolescents: A Long-Term Retrospective Study at a Single Institution

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## Introduction

### Graves' Disease

Most common cause of thyrotoxicosis in children.  
 Incidence: 0.1-1 per 100,000 in children  
 Treatment options include antithyroid drug (ATD) treatment, thyroidectomy, and radioactive iodine (RAI) therapy.

### Management of GD for children and adolescents

- First-line treatment is ATD
- Propylthiouracil (PTU) may cause severe adverse events
- Prevalence of side effects of methimazole is estimated up to 25%
- The American Thyroid Association has considered RAI therapy for children five years of age and over.
- Limited treatment options
- Potential adverse effects
- Optimal treatment option is controversial

### The aim of this study

- To describe the clinical and biochemical characteristics and the outcomes
- To determine predictive factors predicting remission

## Method

### 107 Persons (May 2011- June 2018)

- 0-19 years old
- Diagnosed as Graves' disease
- At least 6 months of follow-up period
- At Samsung Medical Center

### Patients' Data

- All patients were initially treated with an ATD.

### Patients' Outcome

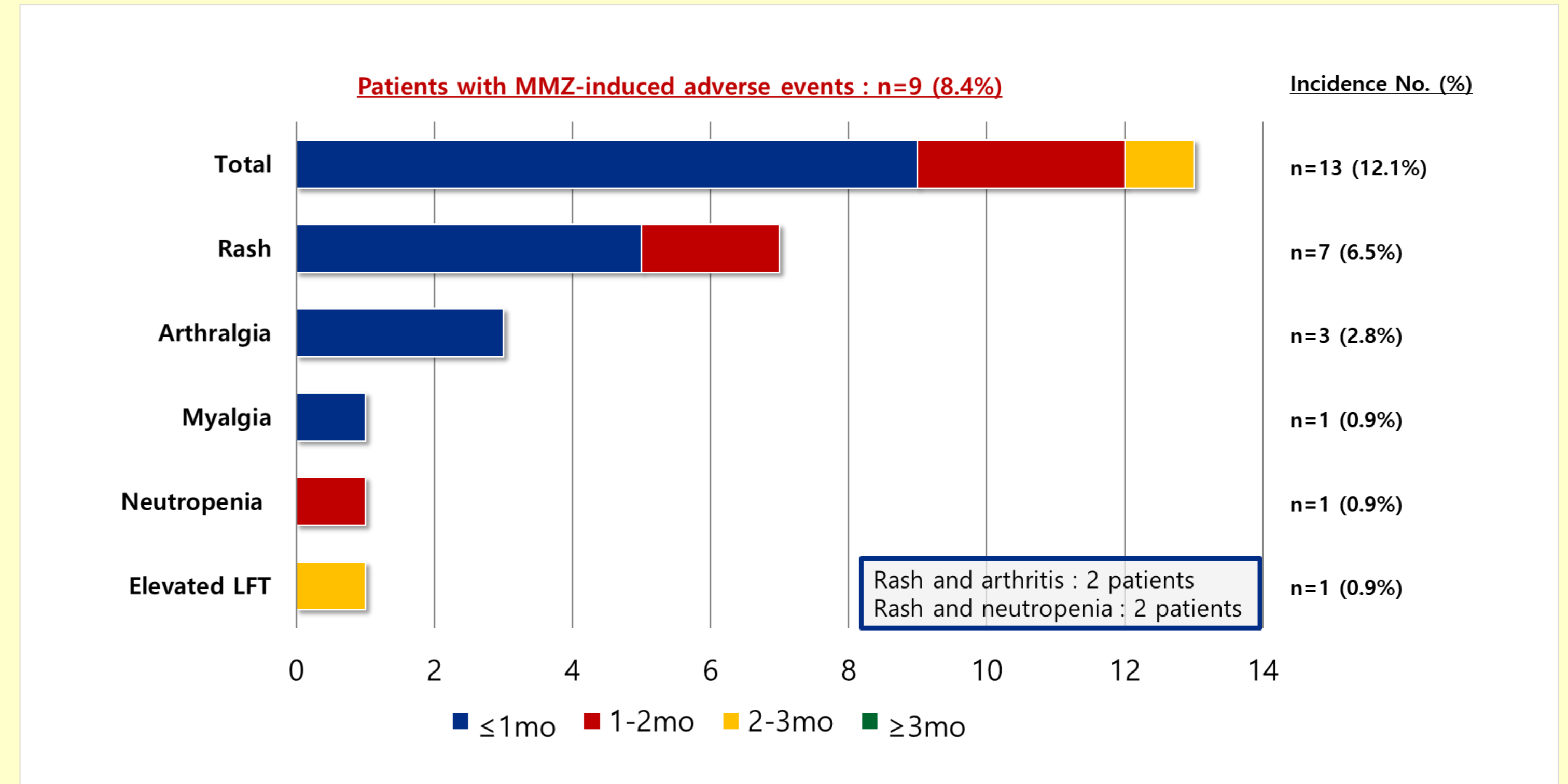
- Remission, Relapse

## Results

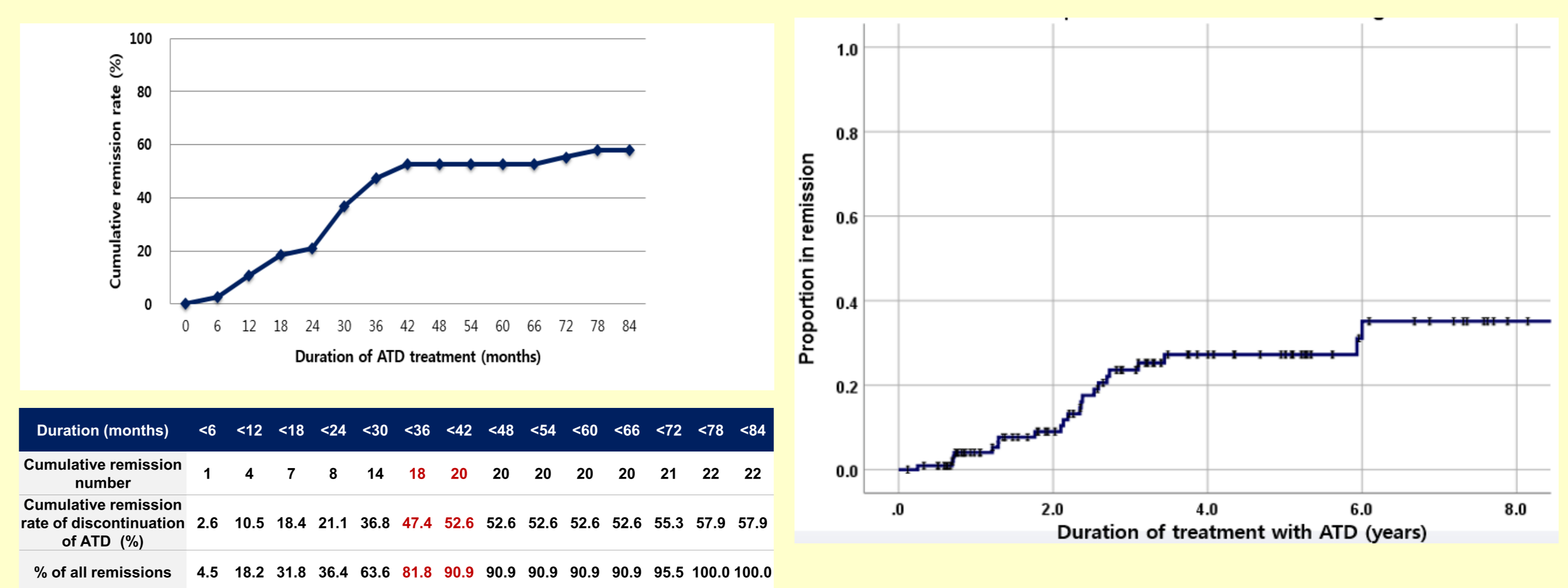
### Clinical and Biochemical characteristics

	Total (n = 107) [Median (range)]
Male / Female (%)	19 (17.8 %) / 88 (82.2 %)
Age at diagnosis (years)	13y 6m (2y 8m-18y 8m)
BMI score at diagnosis	18.5 (12.7-29.4)
Duration of follow-up (years)	3.3 (0.5-14.0)
Duration of ATD treatment (years)	2.6 (0.1-10.8)
Presence of goiter (%)	60 (56.1 %)
Presence of ophthalmopathy (%)	35 (32.7 %)
Past medical history of AID (%)	4 (3.7 %)
Familial history of AITD (%)	33 (30.8 %)
Thyroid storm (%)	5 (4.7 %)
Adverse effect of ATD (%)	9 (8.4 %)
Thyroidectomy (%)	4 (3.7 %)
RAI (%)	2 (1.9 %)

### MMI-induced Adverse effect



### The Remission rate and time with ATD treatment



### Factors associated with remission

Variable	Odds ratio [95% confidence interval]	P value
Total T3 at diagnosis	0.998 [0.994-1.002]	.199
FT4 at diagnosis	0.988 [0.736-1.326]	.647
Thyroglobulin Ab at diagnosis	1.000 [1.000-1.000]	.477
Microsomal Ab at diagnosis	1.000 [0.999-1.000]	.338
<b>TSH receptor Ab at diagnosis</b>	<b>0.963 [0.933-0.993]</b>	<b>.017</b>

### Factors associated with 3 years remission

Variable	Odds ratio [95% confidence interval]	P value
Total T3 at diagnosis	0.998 [0.994-1.001]	.195
Microsomal Ab at diagnosis	1.000 [0.999-1.000]	.195
<b>TSH receptor Ab at diagnosis</b>	<b>0.960 [0.925-0.997]</b>	<b>.033</b>

## Discussion

The estimated 25 percentile remission time is 3.1 years.

All ATD-induced adverse events (100%) in our study developed within the first 3 months of ATD treatment.

In our study, TSH receptor Ab at diagnosis was identified as a prognostic factor for remission of GD.

## Conclusion

The incidence of adverse effects of MMI in children 8.4%.

TSH receptor Ab at diagnosis was the statistically significant prognostic factor associated with remission.

ATD treatment may be continued for up to 3 to 4 years if the Graves disease is controlled with ATD.

The definite treatment may be considered if long-term ATD treatment is required for more than 3-4 years.