

THE INCIDENCE OF HYPOTHYROIDISM FOLLOWING RADIO-ACTIVE IODINE THERAPY FOR HYPERTHYROIDISM

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ABSTRACT

A retrospective study was conducted with the objective of finding out the incidence of hypothyroidism following ^{131}I treatment for hyperthyroid patients.

All hyperthyroid patients treated with ^{131}I at the Nuclear Medicine Unit, Faculty of Medicine, Peradeniya, during the period of 01.01.1997 to 28.02.1999, were selected from records at the unit. Data from 60 patients who were given radioactive iodine (with either $\text{T}_4 > 20 \mu\text{g/dl}$ or $\text{TSH} < 0.3 \text{ mu/l}$), were analysed. Patients who developed blood concentrations of $\text{TSH} > 20 \text{ mu/l}$ were selected as being hypothyroid.

Eighteen patients out of 60 (30%) had developed hypothyroidism during the selected period, which is more than double the value shown among the western countries (6-15%)

INTRODUCTION

The function of the thyroid gland follicles is to produce thyroid hormones; thyroxine (T_4) and triiodothyronine (T_3), which are made by combining iodine with thyroglobulin. These hormones regulate functions of cells in all tissues of the body. Therefore, a continuous adequate supply of thyroid hormones is needed for good health. (Ledingham, Warrel and Weatherall 1996)

In hypothyroidism there is slowing down of metabolic functions while on the contrary in hyperthyroidism there is speeding up of metabolic functions. Prevalence of hyperthyroidism is approximately 20 per 1000 among females and 02 per 1000 among males (Ledingham 1996).

Hyperthyroidism is either treated with surgical methods (Thyroidectomy), or medical methods (Anti-thyroid drugs), or by medical ablation (^{131}I), or by a combination of these. Treatment with radio-active iodine is becoming a popular method over surgical methods and anti-thyroid drugs due to various reasons. However, the main disadvantage of this therapy is the tendency to produce transient and long-term hypothyroidism (Lawrence, Maxine and Stephen 1996). It is about 6-15% within the 1st year following ^{131}I therapy in the Western countries (Lawrence 1996). It has also been stated that 70-100% of patients develop hypothyroidism within 10 years of treatment (Braunwald, Isselbacher and Wilson 1992).

However, the incidence for the Sri Lankan population has not been established as yet due to inadequate research studies. The present study was undertaken to find the incidence of hypothyroidism following ^{131}I treatment for hyperthyroid patients.

METHODOLOGY

Study group

A retrospective study was done using patient data record files and hormonal level registers of the years 1997 to 1999 maintained at the Nuclear Medicine Unit (NMU), Faculty of Medicine, Peradeniya.

All hyperthyroid patients who received treatment with ^{131}I at the NMU during the period of 01.01.1997 to 28.02.1999 were selected.

The selection criteria for hyperthyroidism included a Thyroid Stimulating Hormone (TSH) level of < 0.3 mu/l and a T_4 level of > 20 $\mu\text{g}/\text{dl}$. All hyperthyroid patients who received ^{131}I therapy at the NMU have had a fixed dose of 10 mCi of ^{131}I and they had been advised to have a post-therapy thyroid hormone profile in monthly intervals.

Procedure

Of the selected patients some were excluded according to the exclusion criteria viz: incomplete data, patients treated with other anti thyroid drugs, and patients who received more than one dose of ^{131}I .

Patients of the final study group were followed up for a period of one year with 'post- ^{131}I therapy hormonal assessment values' and they were categorized as hyperthyroid ($\text{T}_4 > 20$ $\mu\text{g}/\text{dl}$, TSH < 0.3 mu/l), and hypothyroid (TSH > 20 mu/l), following radio-active iodine therapy.

RESULTS AND DISCUSSION

Of the total number of 114 patients who received treatment with ^{131}I during the selected period only 60 were included in the final analysis whilst 54 had to be excluded. Of the excluded, in 39 the treatment date was unknown whilst 01 patient had been repeatedly treated with ^{131}I ; of the rest 02 have had other antithyroid drugs whilst in the other 12 the data were incomplete.

In this study 18 of 60 patients (30%) had developed confirmed hypothyroidism within the 1st year following ^{131}I therapy (See Table 1). In contrast, the value among the Western population is 6 - 15% (Lawrence 1996).

Although it is stated that 70-100% of patients develop hypothyroidism within 10 years after therapy (Braunwald 1992) surprisingly in our study, 28.33% of patients developed hypothyroidism within 07 months following ^{131}I therapy.

Probable reasons for this high incidence would be due to various factors which influence the Sri Lankan population but not applicable to the West.

Table 1. Development of hypothyroidism in patients who received ¹³¹I for hyperthyroidism

Months after treatment	Number of patients who developed hypothyroidism
1	2
2	5
3	5
4	1
5	2
6	1
7	1
8	0
9	0
10	0
11	1
12	0
Total	18

The factors which could have possibly influenced our final results are, exclusion of 54 patients, poor compliance of patients towards post-therapy hormonal assessment, difficult accessibility to available data, and unavailability of various information concerning patients.

Our suggestions for improvement are, evaluation of a formulation-based dose regime for the Sri Lankan population instead of a fixed dose of 10 mCi of ¹³¹I, proper recording of data at the NMU with the usage of computer facilities, thorough emphasis on the patients about the importance of post-¹³¹I therapy hormonal assessment, and further conduction of studies regarding the development of hypothyroidism with advanced planning including a larger sample and a longer duration of follow-up study.

ACKNOWLEDGEMENTS

Our heartfelt gratitude goes to Dr. (Mrs.) T.N.C.Athuraliya, Head, and the Staff of the Department of Pharmacology, Dr. J.M.C.Udugama, Head, Dr. D.J.Y.M.W.R.S.Jayasekara and the Staff of the Nuclear Medicine Unit, Dr. P.V.R.Kumarasiri and Prof. C.Ratnatunga of the Faculty of Medicine, Peradeniya.

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