

Outcome of Fixed Dose Radioiodine Therapy in Hyperthyroid Patients –Three Years Follow up Study at INMAS Mitford

¹Samira Sharmin, ¹Manbub ur Rahman, ²Jasmine Ara Haque, ³Syed Muhammad Baquki Billah, ¹Hosne Ara Rahman, ¹Jamiul Hossian, ¹Jasmin Ferdous, ⁴Monir Uddin and ¹Farida Yasmine

¹Institute of Nuclear Medicine and Allied Sciences, Sir Salimullah Medical College Campus, Mitford, Dhaka.

²National Institute of Nuclear Medicine and Allied Sciences, Bangabandhu Sheikh Mujib Medical University Campus, Shahbag Dhaka

³Institute of Epidemiology Disease Control and Research, Mohakhali, Dhaka

⁴Radiology and Imaging Department, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka

Correspondence Address : Dr. Samira Sharmin, Senior Medical Officer, Institute of Nuclear Medicine and Allied Sciences, Sir Salimullah Medical, College Campus, Mitford, Dhaka, Email: samira958@gmail.com

ABSTRACT

Background: Hyperthyroidism is a morbid condition. Radioiodine therapy is very safe, popular and effective treatment of hyperthyroidism. This study was design to determine the outcome of fixed dose radioiodine (RAI) therapy in hyperthyroid patients in a single institute.

Patients and Methods: This was a retrospective study conducted from January 2014 to December 2016 at Institute of Nuclear Medicine and Allied Sciences, Sir Salimullah Medical College Campus, Mitford, Dhaka. A total 71 patients were enrolled for this study. All the patients were pretreated with antithyroid drugs then underwent fixed dose of RAI therapy. They were followed up at regular interval. Chi-square and paired t test were done to see the level of significance.

Results: Mean age of the patients were 41.61 years (range 19-60 years). Male were 29 (40.8%) and female were 42 (59.2%). Mean months of pretreated with antithyroid drugs were 30.59 ± 23.68 months, range (2-96 months). Before RAI therapy mean TSH was $0.12 \pm 0.14 \mu\text{IU/ml}$ range (0.0001-0.54 $\mu\text{IU/ml}$) and after RAI therapy mean TSH was $1.6 \pm 1.5 \mu\text{IU/ml}$ range (0.002-5.00 $\mu\text{IU/ml}$). Before RAI therapy mean FT4 was $26.26 \pm 10.25 \text{fmol/ml}$, range (7.86-47.78 fmol/ml) and after RAI therapy mean FT4 was $23.45 \pm 8.22 \text{fmol/ml}$, range (8.78-40.45 fmol/ml). All patients divided into three groups: Graves' disease (29), toxic multinodular goiter (28) and toxic autonomous nodule (14). After three years of follow up 27 (38%) patients were euthyroid, 2 (2.8%) remain hyperthyroid, 3(4.2%) were relapse cases and 39 (54.9%) were hypothyroid.

Conclusion: This follow up study showed that patients treated with RAI therapy became hypothyroid in the long run. Relapse and persistent hyperthyroid state were very common phenomenon after RAI therapy.

Key words: Hyperthyroid, Radioiodine (RAI) therapy.

INTRODUCTION

Hyperthyroidism is one of the most frequently encountered condition in clinical endocrinology. The modes of treatment available are antithyroid drugs, surgery and

radioactive iodine (RAI) therapy. Although over the last three decades RAI therapy has replaced surgery (1). Oral administration of RAI therapy is safe and cost effective treatment option for patients with hyperthyroidism (2). The aim of this study was to see the overall success rate of fixed dose of RAI therapy after three years follow up.

PATIENTS AND METHODS

This retrospective study was carried out in the Institute of Nuclear Medicine and Allied Sciences, Mitford, Dhaka from January 2014 to December 2016. Total 71 hyperthyroid patients were included in this study. The age range was 19 to 60 years. All patients were divided into three groups: Graves' disease (n=29), toxic multinodular goiter (n=28) and toxic autonomous nodule (n=14). All patients were pretreated with antithyroid drugs. Antithyroid drugs stopped at least 03 days before therapy. Then all the patients were given RAI therapy of fixed dose (10, 12 and 15 mCi) and followed up routinely. Collected data were compiled and analyzed using computer based software SPSS program, version 21. Bivariate analysis such as chi-square test and bar diagram were performed to find the follow up outcome of hyperthyroid patients after RAI therapy. In each analysis, level of significance was 0.05 and P value was <0.05 was considered as statistically significant.

RESULTS

Total 71 patients with hyperthyroidism were enrolled for this study. Mean \pm SD of age was 41.61 years (range 19 to 60 years).

Male were 29 (40.8%) and female were 42 (59.2 %). Female were predominant in Graves' disease (62.1%) and toxic autonomous nodule (78.6%) whereas male were predominant in toxic multinodular goiter (53.6%). But the result was not significant ($P > 0.05$).

Following 06 months after RAI therapy, 36 (50.7%) patients became hypothyroid and the rest 28 (39.4%) were remain hyperthyroid and 7(9.9%) were euthyroid. Most of the Graves' patient (58.6%) became hypothyroid after 06 months, most of the patients (57.1%) remained hyperthyroid in toxic multinodular goiter group and no patient became hypothyroid in toxic autonomous nodule group (Figure 1). The result was found significant ($P < 0.05$).

At the end of the one year, 40 (56.3%) were become euthyroid, 9(12.7%) were remain hyperthyroid, 10 (14.1%) were relapse and 12 (16.9%) were become hypothyroid. Most of the relapse (27.6%) found from the patients having Graves' disease, most of the patients remain hyperthyroid 6 (21.4%) in toxic multinodular goiter group. Still no hypothyroid patient was found in toxic autonomous nodule group (Figure 2). The result was significant ($P < 0.05$).

At the end of two years, 35 (49.3%) were euthyroid, 4 (5.6%) remain hyperthyroid, relapse found in 11 (15.5%) patients and 21 (29.6%) were hypothyroid. In Graves' disease 10 (34.5%) patients had relapsed and 2 (6.9%) were remain hyperthyroid. Most of the hypothyroid patients 10 (35.7%) were in toxic multinodular group (Figure 3). The result was significant ($P < 0.05$).

After the end of three years most of the patients (54.9%) were hypothyroid and 27 (38%) patients became euthyroid, 3 (4.2 %) had relapsed and 2 (2.8%) were remain hyperthyroid. Relapse case and remain hyperthyroidism occur only Graves' disease patient. Most of the euthyroid 12 (41.4%) patients were found in Graves' disease group and hypothyroid (67.9%) were in toxic multinodular goiter group (Figure 4). But the result was not significant ($P > 0.05$).

Paired t test showed that significance of difference ($P < 0.05$) of the value of FT4 and TSH among the study subjects at the beginning of the study and at the end of the follow up of this study.

DISCUSSION

In this study mean age of the patients were 41.61 ± 9.8 with a range of 19 – 60 years with female predominant (59.2%). A study conducted by Khalid et al. (2011) found the similar results had showed that mean age of the study subjects was 56 years with a range of 20-90 years (3).

In this study, 29 (40.8%) were Graves' disease, 28 (39.4%) were toxic multinodular goiter and 14(19.7%) were toxic autonomous nodule. This findings were consistent with a study conducted by Shinto et al. (2010) showed in their study that most of the patient were Graves' disease (84.8%) , 8.2% were toxic multinodular goiter and 7.6% were toxic adenoma (4).

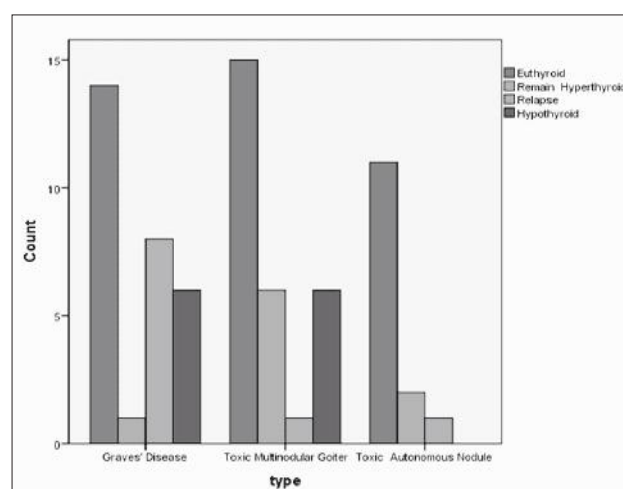


Figure 1: Outcome of RAI therapy after 06 months

Low fixed dose activities are associated with the reduced early incidence of hypothyroidism and unacceptable low cure rate (5). The present study showed that after 06 months of RAI therapy 28 (39.4%) were remain hyperthyroid state. This findings were matched with a study conducted by Bertelsen et al. (1992) showed that 33% remain hyperthyroid after 1st RAI therapy and another study conducted by Kareem & Husseni (2016) showed remain hyperthyroid state after 1st dose of RAI therapy was 32% (6,7).

A study conducted by Lewis et al. (2013) showed that one year after therapy 74.4% patients were hypothyroid, 18.9% were euthyroid and 6.7% patient's required further dose of RAI therapy (8).

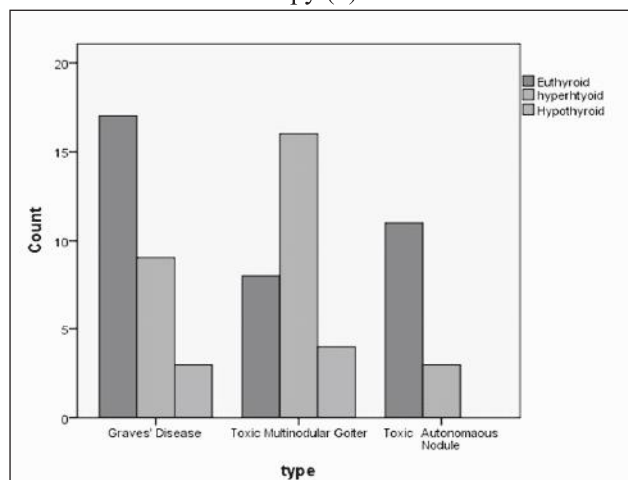


Figure 2: Outcome of RAI therapy after 01 year

In this study showed that 56.3% of the patients were euthyroid, 12.7 % remained hyperthyroid, 14.1 % were relapse cases and 16.9 were hypothyroid.

Regarding toxic autonomous nodule at the end of one year after RAI therapy this study showed that relapse occur in 1(7.1%) patients whereas remain hyperthyroid state were 14.3% patients. This was similar with a study conducted by Huysmans et al.(1991) showed that 1 patient had relapsed hyperthyroid state at end of the 1.5 years during follow up after RAI therapy (9).

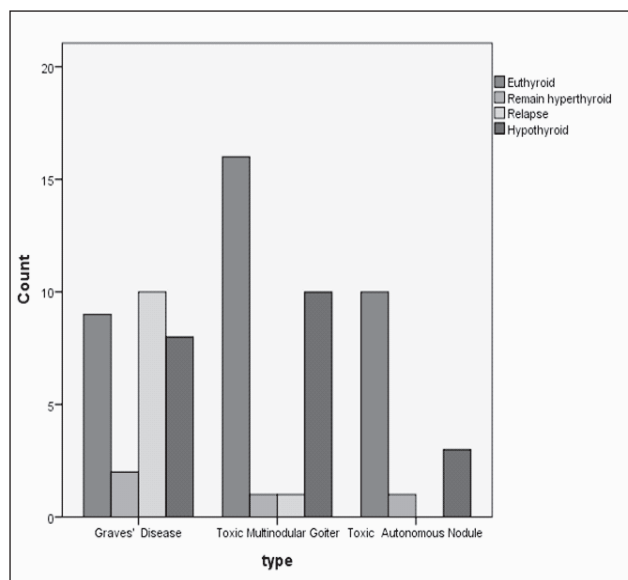


Figure 3: Outcome 02 years after RAI therapy

Initially the focus was to achieve euthyroidism utilizing adjacent dose regimens, however it is now recognized that the development of hypothyroidism is progressive, with annual incidence of 2-3 % many years after therapy (10). This study showed that at the end of the two year after RAI therapy, 38.1% patients of Graves' disease were hypothyroid whereas 47.6% multinodular goiter were hypothyroid. 25.7% were euthyroid from Graves' disease group and 45.1% were euthyroid from toxic multinodular goiter group.

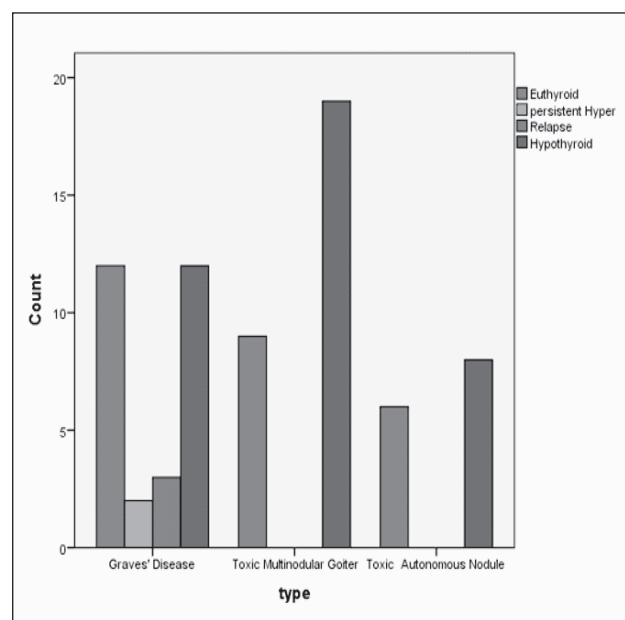


Figure 4: Outcome after 03 years of RAI therapy

At the end of three years after RAI therapy this study showed that, most of the patients were hypothyroid (54.9%) than euthyroid (38.1%) followed by 3 (4.2%) relapse cases, 2 (2.8%) were persistent hyperthyroidism. All relapse cases from the Graves' disease group. A study conducted by Kareem & Husseni et al.(2016) showed that incidence of hypothyroidism several years after RAI therapy was 50.7% which was consistent with present study (54.9%) (7).

Higher incidence of hypothyroidism had been reported in case of toxic autonomous nodule several years after treatment. They showed Goldstein et al. (1983) 8 out of 22 patients became hypothyroid after cumulative dose of RAI therapy (11). This study also showed that higher incidence of hypothyroidism (8 out of 14 patients) three years after treatment.

CONCLUSION

RAI therapy in hyperthyroid patients is very popular method of treatment. It is very safe and cost effective. This study showed that most of the hyperthyroid patients became hypothyroid after RAI therapy which was almost unavoidable. But relapse and remain hyperthyroid state were common phenomena even after RAI therapy in hyperthyroid patients. Cumulative RAI therapy was very much effective in those cases.

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