Original Article

OUTCOME OF HYPERTHYROIDISM TREATED BY RADIOACTIVE IODIN

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ABSTRACT

Objectives: To study the outcome of Radioactive Iodine (RAI) in treatment of hyperthyroidism.

Methodology: It is a retrospective study of all patients of hyperthyroidism treated by Radioactive Iodine (RAI) seen in endocrinology clinic at King Abdulaziz University Hospital and DR Soliman Fageeh Hospital in Jeddah, Saudia Arabia. Two hundred and sixteen (216) patients were treated by RAI. They proved to have hyperthyroidism by thyroid function test (TSH, FT4 and T3) and isotopes scanning of the thyroid gland. All received 10 mci of RAI and were then followed up after one month and every two months thereafter for at least one year. The efficacy of the therapy was assessed by the improvement of the clinical features and by the thyroid function tests.

Results: A total of 216 patients were seen, the mean age was 36.5±10.64 years. One hundred fifty three were female and sixty three were male. Graves disease was the underlying cause in 163 patients [65.55%], toxic multinodular goiter in 37 patients [25.1%] and toxic adenoma in 16 patients [9.3%]. The symptoms improved after one month only in 11 patients but others required antithyroid treatment for two months. Only 17 patients remained hyperthyroid after six months of treatment.

Conclusion: Radioactive iodine is very effective in treatment of hyperthyroidism with minor side effects such as weight gain, fatigability and hypothyroidism.

KEYWORDS: Hyperthyroidism, Radioactive Iodin.

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INTRODUCTION

Hyperthyroidism is a common endocrine disorder worldwide with prevalence of two per thousand (2/1000) in iodine sufficient areas. Several different disorders can cause hyperthyroidism. It is essential that the correct cause should be identified and the severity of the symptoms be clinically assessed as this will guide physicians in selecting treatment. Radioactive iodine has been used to treat hyperthyroidism since 1940. The efficacy, safety and low cost of radioactive iodine has made it the definitive treatment in most patients with this disorder. Radioiodine is the most popular treatment for hyperthyroidism in the United States but less popular elsewhere. Radioactive iodine is the preferred treatment in our patients with hyperthyroidism, if there is no contraindication and the patients gave informed consent.

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METHODOLOGY

All patients who presented to the clinic with symptoms suggestive of thyrotoxicosis such as palpitation, decreased weight, tremor or profuse sweating had their TFTs (TSH, Ft4, and Ft3) done by third generation radio immune assays. If the result showed high FT4 or FT3 with low TSH, thyroid scan was done to determine the cause of thyrotoxicosis. The patients with high uptake either focal or diffuse were advised to go for radioactive iodine therapy if there was no contraindication [pregnancy or breast feeding]. The effect and side effects of Radioactive Iodine were explained clearly to the patient while informing them about the other modalities of treatment (Surgery or Anti-thyroid drugs). The doses of radioactive iodine were given according to the assessment of size of the thyroid gland 5 MCI, 10 MCI or 15 MCI in accordance with the increasing size of negative patients were received radioactive iodine were advised to be away from their children for 48 hours and women were advised against pregnancy for 6 months post radioactive iodine. The patients were followed after one month with TFTs and then every three months with registration of all the symptoms and examination. Patients, who were still thyrotoxic six months post radioactive iodine, were given another dose of radioactive iodine. If there was no response after three doses of RAI surgical treatment was undertaken.

Relevant data such as patient's age, sex, cause of hyperthyroidism. [Graves disease, toxic multinodular goiter, toxic adenoma], clinical presentation, mode of therapy (medical, radioactive iodine or surgical) and outcomes (euthyroid, hypothyroid or hyperthyroid) were recorded. Statistical analysis was performed using the SPSS 7-5 (Statistical Package for Social Science). Mean±SD was determined for quantitative data, and frequency was determined for categorical variables. Chi-square was used to analyze group differences for categorical variable and a P value <0.05 was considered significant.

RESULTS

A total 322 patients were diagnosed in three years and followed up for at least one year and all findings and the out come were analyzed. The mean age was 36.5 +/- 10.64 years with female: male ratio of [242: 80] 3.o25: 1. Graves' disease was the diagnosis in 211 patients [65.55%], while 81 [25.1%] patients had toxic multinodular goiter and 30 [0.09%] had toxic adenoma. As shown in Table-I, palpitation, tremor, weight loss, nervousness and cold intolerance were the most common clinical manifestation. Two hundred ninety patients

Table-I: Clinical feature of 322 patients with thyrotoxicosis

Symptoms	*Patient No.*	*Signs*	*Patient No.*
Palpitation	291	Diffuse goiter.	171
Tremors	290	Multinodular.	57
Weight loss	271	Single nodule.	36
Nervousness	301	Tremors.	301
Heat intolerance	243	Exophthalmoses.	243
Increased sweating	253	Lid lag	183
Increased appetite	187	Lid retraction	157
Dyspnea	121	Opthalmoplegia	21
Menstrual irregularities	273	myopathy	44
Diarrhea	173		
Fatigue	123		
Dysphagea	13		

[90%] were below 50 years and [49%] patients above 50 years. Two hundred sixteen patients 216 [65%], used antithyroid in 73 [22.6%] and subtotal thyroidectomy was done in 33 [10%] patients. The outcome of different treatment modalities is shown in Table-II. One hundred fifty seven patients (72.68%) treated by radioactive iodine became hypothyroid within 2 to 6 months. Thirteen patients became hypothyroid within 2 to 3 months. Forty two [19.44%] patients who were treated by radioactive became euthyroid after six months but 17 [10.82%] remained hyperthyroid clinically and biochemically, 12 of them were male and five female. All of them received another dose of radioactive iodine [10 mci] which showed good response in 14 of them who became hypothyroid. Three patients remained hyperthyroid after the second dose of radioactive iodine and were advised for a third dose with higher dose [15 mci] but only one of them agreed and showed a good respons. Of the patients given antithyroid drug treatment [neomercazole] 43 patients became euthyroid after three months of treatment [58.9%], 17 patients [23.28%] became hypothyroid but 13 [17.8%] patients remained hyperthyroid. Eleven patients [33.33%] treated surgically became euthyroid [Table-II], 17 patients [51.5%] hypothyroid and 6 patients [18.18%] remained hyperthyroid. Salbinditis has been reported in 31 [14.3%] patient one week after radioactive iodine with pain in their neck. Weight gain and fatigability were the common side effects of all modalities of treatment but was more common in patients treated by radioactive iodine (70%) and patients treated surgically only 40%. Two patients treated surgically developed bilateral vocal cord paralysis. Both of them required permanent tracheotomy. This makes radioactive iodine a preferred treatment in patients with hyperthyroidism. Hypocalcaemia was observed in 31 patients treated by radioactive iodine and 11 patients were treated surgically.

DISCUSSION

Hyperthyroidism is a common endocrine disorder worldwide with prevalence of 2:1000 in iodine sufficient areas.[1] It is essential that the correct cause of hyperthyroidism should be identified and the severity of the symptoms should be clinically assessed as this will guide physicians in selecting treatment.[2,3] Causes and clinical manifestations of thyrotoxicosis in our patients were comparable with those reported in the literature. Graves, disease is the commonest cause followed by toxic multinodular goiter, a finding similar to that reported by other.[7,8] Clinical manifestations due to sympathetic over activity are a common mode of presentation which is consistent with what has been reported.[7,8]

In Saudi Arabia, we noticed an increase in the female predominance of hyperthyroidism over the last 10 years from 1.7.[7] and 1.4[9] to 3.8[8] and 3.1 as noticed in our study. Radioactive Iodine (RAI) has been used to treat hyperthyroidism since 1940.[4] The efficacy, safety, and low cost of this therapy have made it the preferred definitive treatment in most patients with this disorder.[5] A retrospective study in Saudi Arabia has showed efficacy of Radioactive Iodine but no prospective study which was conducted to see the efficacy and safety. Radioactive iodine is administered orally as sodium 131 – I in solution or capsule. The radioiodine is rapidly incorporated into the thyroid, and its beta – emissions result in extensive local tissue damage. We chose high dose for all of our patients because the cure rate in >90% whereas low dose is more likely to result in treatment failure.[10-12] The net effect

Table-II: Outcome of different modes of therapy

Therapy	*Euthyroid*	*Hypothyroid*	*Hyperthyroid*
Medical (73)	43 (58.9)	17 (23.28)	13 (17.8)
Radioiodine (216)	42 (19.44)	157 (72.685)	17 (10.82)
Surgical (33)	11 (33.333)	16 (51.515)	6 (18.18)

is ablation of thyroid function over a period of 2- 6 months. We recommend checking TFTs after one month of radioiodine, to start thyroxin even with low TSH, to prevent weight gain which is the most bothersome complication of radioiodine therapy. Patients who remain thyrotoxic clinically and biochemically need to take antithyriod treatment for one month to be evaluated after that. The efficacy of all different modalities of therapy are comparable with better results in radioiodine group but has increased incidence of hypothyroidism [72.6%].

Radioactive iodine is an absolute contraindication in pregnancy. Fetal thyroid tissue is present by 10 – 12 weeks and would be destroyed by the radioiodine, resulting in cretinism. The occurrence of menses within the 10 days before treatment makes pregnancy unlikely[13] but we prefer to exclude pregnancy definitely by either careful history or by doing pregnancy test. Resistant cases to radioactive treatment were seen in 17 patients [10.82], who remained hyperthyroid six months after treatment were given another dose in 14 patients and two patients required 3rd dose. Radioactive iodine appears to be quite safe except from hypothyroidism.[14] Radioactive iodine showed the best treatment for our patients. Weight gain and fatigability are the common side effects which were related to hypothyroidism. The other side effect is radiation thyroiditis. It can cause severe thyroid pain which lasts 2 – 3 weeks, and may be associated with exacerbation of hyperthyroidism. The Cooperative Thyrotoxicosis Therapy Follow – up Study Group has followed 35,593 patients from 26 centers for cancer mortality after radioiodine therapy. They reported no increase in the incidence of leukemia or cancer after mean follow – up of 8.2 years.[15] A more recent analysis of data through 1990, representing a mean follow – up of 21 years, also revealed no increase in overall cancer mortality.[16] However, in contrast to their earlier data[17] and other report,[18] prolonged follow – up demonstrated a small increase in thyroid cancer risk . Another analysis of 7417 patients in the United Kingdom also found a significant increase in the incidence of thyroid cancer.[19] In the earlier report from the Cooperative Study Group, adolescents given radioiodine had an increased risk of thyroid adenoma, but not cancers.[17] Whether radioiodine therapy affects the development or progression of Graves's ophthalmopathy is controversial. Early studies noted progression or onset of ophthalmopathy during or after treatment for Graves hyperthyroidism but did not demonstrate an increased risk with radioiodine.[20,21] A subsequent retrospective uncontrolled study found that ophthalmopathy, when present, occurred coincident with hyperthyroidism most of the time and appeared equally frequently before and after hyperthyroidism in the remainder;[22] it therefore seemed unrelated to radioiodine therapy. In contrast, two prospective randomized trails of antithyroid treatment suggested a relationship between radioiodine and development or worsening of ophthalmopathy.[23,24] In our patients 187 had ophthalmopathy only four patients showed worsening in exophthalmos which was insignificant. The principle used to follow the effect of treatment of hyperthyroidism is the measurement of serum T4 concentration. Measurement of serum TSH can be misleading in the early follow – up period because it remains low for weeks or even months, even when the patient is clinically euthyroid and has a serum T4 value well within the normal range.[25,26] Hypothyroidism developed in 72.6% of our patients in first year which is close to what has been reported (67%).[27] In conclusion radioiodine is very safe for our patients with early benign complications like hypothyroidism and we recommend it for all cause of hyperthyroidism if there is no contraindication.

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