An 8 Year Review of Radio-Iodine Therapy in the Management of Thyrotoxicosis

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Thyroid dysfunction is the commonest endocrine disease. In view of continuing debate regarding the best definitive treatment for management of thyrotoxicosis, we reviewed 86 cases of radio-iodine therapy in Nuclear Medicine Center, Dinajpur over a period of 8 years from I99I to I998 and evaluated the results. There is no evidence that thyroid carcinoma or leukemia is induced by ^{I3I}I, or that its use results in an increased frequency of congenital malformation among subsequent offspring. A single dose successfully controlled thyrotoxicosis in 87.3% cases up to December 2000. The rate of hypothyroidism was to be maximum within one year after radio-iodine treatment (5.8%). The female and male patients ratio was 2.2:1. It is premature to comment over the long term result of radio-iodine treatment for thyrotoxicosis, as the period of follow-up is only 8 years. Still the result is encouraging because of advantage of being a cheap and simple form of treatment. In our opinion radioactive iodine therapy should be given priority in the treatment of thyrotoxicosis.

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Key words: Radio-iodine, thyroid, thyrotoxicosis, Dinajpur

Introduction

Thyrotoxicosis is a very common endocrine disease. In over 90% of patients the hyperthyroidism is due to Graves diseases, multinodular goitre or an autonomously functioning solitary thyroid nodule.[1] Among these Graves diseases which is an autoimmune disease accounts for about 76% cases, Yersinia *enterocolitica*, Escherichia *coli* and other Gram-negative organisms may play a role.[2] With the advent of modern investigating facilities, more and more cases of thyrotoxicosis are being diagnosed. Radioactive iodine (^{I3I}I) has been introduced as a treatment of hyperthyroidism since 1941. In earlier days radioactive iodine treatment was used only in older patients and was thought to be harmful for fear of malignant disease and genetic abnormalities. But there is no evidence that thyroid carcinoma or leukemia is induced by ^{I3I}I. Now a days, the use of radio-iodine is more liberal than before and has been found to be more effective in the management of many cases of thyrotoxicosis than by anti-thyroid drugs or surgery.[3] Treatment of thyrotoxicosis with radio-iodine is safe and highly effective and is now the predominant definitive therapy for primary treatment or following relapse after medical therapy.[4,5] The approach for the treatment of the patient has several condition,

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as the type of hyperthyroidism, age of the patient and size of the gland. The etiological factor is also sometimes important for treatment of thyrotoxicosis.[6,7,8] Since the long term remission rate for Graves diseases after drug therapy alone is low and since anti-thyroid drugs do not induce remission in toxic nodular goitre, most patient with thyrotoxicosis proceed to radio-iodine therapy.[9] Major complication resulting from radio-iodine therapy is hypothyroidism though it is not uncommon after surgery. So, long term follow-up of thyroid function is essential. For patients treated with radio-iodine, many protocols have been advocated by different authors, each attempting to reduce the incidence of hypothyroidism with the aim to control the hyperthyroidism.[I0-I4] In our study, we presented 86 toxic patients who were treated with ^{I31}I. All the patients suffered from either diffuse goitre, single nodular of multinodular toxic goitre. The aim of our study is to decide the best treatment of thyrotoxicosis and incidence of hypothyroidism after the ^{I31}I therapy and to correlate our findings with similar studies done in the other institute.

Methods

The usual procedure of diagnosis of thyrotoxicosis include clinical examination, radioactive iodine uptake (RAI Uptake) test, thyroid scan, radio immunoassay for thyroid hormones. Clinical examination included age, sex, chief complaints, present, past, history and pulse, tremor, eye sign, hot sweaty hands etc. Thyroid uptakes were usually done at 2 hours, 24 hours and 48 hours. Thyroid gland size was mainly estimated by palpation and then by thyroid scan, using rectilinear scanner. Patients in this study were diagnosed and treated between I991and 1998.

The thyroid gland size estimated by palpation and graded as not felt (0), or 1.0 (normal) to 5.0 (five time the size of a normal gland) multiplied by 20 g for translation to weight.[I5] Laboratory tests like T_3, T_4, TSH estimation was done. Before starting the therapy, RAI uptake and thyroid scan were obtained in all patients. The patients were selected for ^{I31}I therapy on the basis of their clinical findings, suitability for other methods of treatment and finally with the consent of the patient. ^{I31}I dose was calculated on the basis of gland size and RAI uptake in 24 hours. Usually 80-I20 μCi/g dose was given.[16] Patients were given single dose of 4-I2 mCi (6.4 mCi) of ^{I31}I according to the above mentioned criteria. Among 86 patients, 11 patients were given a second dose. Post therapy follow-up were done every 6 weeks after the first dose for 3 months. If it was found to be ineffective in controlling the ailments symptoms of the disease or if physical condition of the patient deteriorated, 2nd dose of ^{I31}I was considered, after clinical and laboratory investigation. When the patients were found to be euthyroid or hypothyroid, they were assessed every two months for first year and then every half-yearly for the rest of the period of their life.

Results

The number of patients in different groups according to age and sex is shown in the Table 1. Majority of the patients were in the age groups of 41 and above. Female patents were more in each age group. RAI taken at 12 and 24 hours are shown in the Table II. Average uptake is more at 24 hour. Table III shows the doses of RAI.. Table IV shows the number of hypothyroid reported after therapy.

Table I: Number of patient grouped according to their age, sex

Below 25 years		25 – 30 years		3I – 35 years		36 – 40 years		41 years and above	
M	F	M	F	M	F	M	F	M	F
0	5	2	8	9	11	8	16	9	18

Table II: RAI uptake of the patients (n = 86)

Uptake taken at	Average uptake percentage
24 hours (n=86)	52.73 (±11.7 i.e. 1 sd)
48 hours (n=4I)	51.4 (±I5.5 i.e. 1 sd)

Table III: Dose of ^{131}I given to the patients

Dose of ^{I31}I in mCi	No. of patients	%
4 to 4.5 mCi	9	10.5
5 mCi	18	20.9
5.5 to 7.5 mCi	29	33.7
8 to 10 mCi	20	23.3
> 10 mCi	10	11.6

Table IV: Number of hypothyroid reported after ^{I31}I therapy

Time period	No. of patients	%
Within 6 months	3	3.5
Within 2 year	4	4.7
Within 1 year	5	5.8
After 2 years up to 8 years after therapy	2	3.0

Discussion

There are three main line of treatment of thyrotoxicosis – ant-thyroid drugs, surgery and radio-iodine therapy each having some advantage and disadvantages.[17] Bangladesh is one of the poorest countries in the world. Most of the people live bellow the poverty line. So in most of the cases, the patients could not afford to maintain long term anti-thyroid drug treatment, and in case of surgery, it is difficult to get proper attention by a qualified doctor or in the hospital, where the doctor vs. patient ratio is about 1 : 5054. The aims of our study choose is to show the results of ^{I31}I therapy in a period of 8 years. Due to more experience in ^{I31}I therapy with passing days and due to its advantage over other therapies, it is becoming popular.[I8] As experience with radio-iodine treatment has increased, many thyroidologists, now feel that the use of ^{I31}I need no longer be restricted but may be extended to younger adults. However, attitude towards radio-iodine therapy are rather liberal now-a-days and it is considered to be the first choice of treatment of thyrotoxicosis, unless otherwise contraindicated. The major complication of ^{I31}I therapy is hypothyroidism, and if it dose occur, immediate hormone replacement therapy is the only choice. In our study 14 patients became hypo-thyroid and the highest number(s) of hypothyroid were reported within 1 year of commencing the treatment. Single dose cure rate is 87.2% in our study. Rate of hypothyroidism is 16.3% and highest is within 1 year which is 5.8%. The incidence of hypothyroidism was found to be I3.5% in one of the laboratory in our country.[I9] It is true that our reporting period of follow-up is inadequate to make any conclusion but our experience shown ^{I31}I appears to be the treatment of first choice for thyrotoxicosis unless it is otherwise contraindicated.

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