ORIGINAL ARTICLE

A STUDY ON CLINICAL, LABORATORY MANIFESTATION AND EFFECT ON MAJOR ORGAN SYSTEM IN HYPOTHYROIDISM IN TERTIARY CARE HOSPITAL OF SURAT CITY

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ABSTRACT

Background: In addition to common classic manifestation of hypothyroidism, there are many additional manifestation of hypothyroidism that is less commonly acknowledged. The present study was planned with an objective to study the clinical profile, biochemical abnormalities and effect on major organ system of hypothyroidism.

Methodology: All the patients were examined & symptoms and sign of hypothyroidism noted and then subjected to investigation, which includes routine investigation (RBS, S.Creatinine, CBC, ESR, Urine Analysis, Chest X-ray, ECG, S.cholesterol, S. protein. Specific investigation like echocardiography is also advised accordingly.

Results: Facial puffiness in present in 24 (48%), Pedal edema in 20 (40%) and dyspnea and chest discomfort was present in 30% of patient. Among the neurological manifestations, delayed nerve jerk was present in 8 (16%), Hoarseness Of voice in 15 (30%) and deafness and impairment of memory was present in 2% of patient. Sinus bradycardia was present in 2 cases. Low voltage ECG in 5(10%).Low voltage with T wave changes observed in 4 cases.ST-T changes in 5 patients. Left ventricular hypertrophy presents in 4 cases.

Conclusion: ST-T changes in the form of flat or inverted T wave was the most common abnormality in electrocardiogram i.e.14%, Sinus bradycardia was present in 4% of cases. Menorrhagia was the most common menstrual problem observed in 20% of cases, Anemia (Hb <11gm %) in 40 (80%), Serum cholesterol level was more than 200 mg % in 26(52%) cases.

Keywords: Clinical Manifestation, Laboratory Manifestation, Hypothyroidism

INTRODUCTION

Thyroid is an endocrine gland. It synthesizes & secretes thyroid hormone. Thyroid hormone exerts direct effects on essentially all of the organ system of the body. Hypothyroidism is a clinical state that results from failure of adequate production of thyroid hormone within the thyroid gland.[1]

Hypothyroidism is a frequently diagnosed endocrine disorder. Population survey has shown that 7 to 8% of people have significant thyroid failure. New methods for estimating serum thyroid hormone level have provided the major advances in thyroid function testing in the past decade.[2] Despite increasing knowledge of patho-physhiology of the thyroid disorder and the advent of highly sensitive assay for investigation of thyroid gland function, hypothyroidism has frequently remained undiagnosed.[3] This is probably because of wide variety of presenting sign and symptoms. In addition to common classic manifestation of hypothyroidism, there are many additional manifestation of hypothyroidism that is less commonly acknowledged. Hypothyroidism is not an uncommon disorder and one should always vigilant in diagnosis of this condition.

The present study was planned with an objective to study the clinical profile, biochemical abnormalities and effect on major organ system of hypothyroidism.

METHODOLOGY

The present study includes 50 patient of hypothyroidism taken from the indoor and outdoor patient of the medicine department of New Civil Hospital, Surat during the period from November 2008 to October 2010. Those who are included in the study are more

than 14 years of age and patient with confirm laboratory diagnosis of hypothyroidism by T3, T4, and TSH estimation while those below 14 years of age, pregnant female, patient not willing to give informed consent and those with known primary disorder of Cardiovascular system, Respiratory system and Neurological involvement.

All the patients were examined first & all the symptoms and sign of hypothyroidism noted and then subjected to investigation, which includes routine investigation (RBS, S.Creatinine, CBC, ESR, Urine Analysis, Chest X-ray, ECG , S.cholesterol, S. protein. Specific investigation like echocardiography is also advised accordingly. Anemia was defined as hemoglobin below 11 gm %, S. cholesterol level more than 200 was considered abnormal, Systolic hypertension indicated by systolic blood pressure more than 140 mm of Hg, Diastolic hypertension indicated by diastolic blood pressure more than 90 mm of Hg.

RESULTS

It was observed that maximum number of patients was in the age group of 31-40 years, in which female were 19 (38%). 3(6%) cases presented below the age of 20 years.5 (10%) cases presented above the age of 50 years. It was seen that 45 (90%) patient were female and 5(10%) patient were male. Male to female ratio in my study is 1:9.

Out of 50 patients, 45 cases were of Idiopathic primary hypothyroidism, No definitive cause were found. Two cases (4%) developed hypothyroidism after treated with radioactive iodine for hyperthyroidism. One patient each develops hypothyroidism after thyroidectomy for thyroid carcinoma and hypothyroidism after treatment with antithyroid drug for hyperthyroidism.

Major clinical manifestation is as following: Weakness (88%), Dryness of skin (68%), Lethargy (58%), Weight gain (54%), Puffiness of face (48%) and Pedal edema (40%) of cases. It was observed that 20% of patient complained of menorrhagia (Heavy, painful, irregular), Oligomenorrhoea present in 4.44% and amenorrhoea in 2.22% of cases.

Facial puffiness in present in 24 (48%), Pedal edema in 20 (40%) and dyspnea and chest discomfort was present in 30% of patient. Among the neurological manifestations, delayed nerve jerk was present in 8 (16%), Hoarseness Of voice in 15 (30%) and deafness and impairment of memory was present in 2% of patient. (Table 3)

Electrocardiogram was within normal limit in 31 cases. Sinus bradycardia was present in 2 cases. Low voltage ECG in 5(10%).Low voltage with T wave changes observed in 4 cases.ST-T changes in 5 patients.

Table 1: Age and gender distribution of cases

Age (in years)	Gender		
	Male (%)	(n=5)	Female (n=45)(%)
15-20	0 (0)		3 (6)
21-30	3 (6)		10 (20)
31-40	2 (4)		19 (38)
41-50	0 (0)		8 (16)
Above 51	0 (0)		5 (10)

Table 2: Symptoms and Sign of Hypothyroidism

Symptoms	No. (%)
Weakness	44 (88)
Lethargy	29 (58)
Anorexia	15 (30)
Weight gain	27 (54)
Intolerance to cold	12 (24)
Constipation	18 (36)
Menstrual disturbance	11 (22)
Chest pain	15 (30)
Dyspnea	15 (30)
Dryness of skin	34 (68)
Hoarseness of voice	15 (30)
Puffiness of face	24 (48)
Pedal edema	20 (40)
Arthralgia	5 (10)
Falling of hair	6 (12)
Deafness	1 (2)
Impaired memory	1 (2)
Pallor	12 (24)
Thyroid swelling	10 (20)

Table 3: Cardiovascular and neurological manifestations

Characteristics	No. (%)
Cardiovascular Manifestations	
Pedal Oedema	20 (40)
Facial Puffiness	24 (48)
Dyspnea On Exertion	15 (30)
Chest Pain	15 (30)
Neurological Manifestations	
Delayed Ankle Jerk	8 (16)
Hoarseness Of voice	15 (30)
Deafness	1 (2)
Impairment Of Memory	1 (2)

Table 4: Electrocardiographic Changes among the participants

ECG	No. (%)
Normal tracing	31 (62)
Sinus bradycardia	2 (4)
Low voltage complex	5 (10)
Low voltage with T wave changes	2 (4)
LVH	4 (8)
Arrhythmia	1 (2)

ST-T Changes	5 (10)

Left ventricular hypertrophy presents in 4 cases. Supraventricular tachycardia was finding in one patient. 12 cases show changes of hypothyroidism in the form of low voltage complexes and t-wave changes. Out of these 12, 5 show low voltage complexes, 7 cases show only t-wave changes while 2 cases show low voltage complexes with t-wave changes in the form of flat or inverted t-waves.

Table 5: Laboratory findings among the cases

Investigations	No (n=50) (%)
Hb in gm %	
3-7 gm%	2 (4)
7.1-11 gm%	38 (76)
>11.0 gm%	10 (20)
Serum cholesterol (mg%)	
<150	7 (14)
151-200	17 (60)
201-300	25 (50)
>300	1 (2)
Total S.Protein	
4-5	8 (16)
5.1-6	38 (76)
>6.1	4 (8)

Only one patient had hemoglobin level less than 7.0 gm%.In 38 (76%) cases hemoglobin level between 7 - 11 and 10 (20%) cases had hemoglobin more than 11 gm%. Majority of patient 30 (60%) cases have their S.cholesterol level between 151-250. One case had serum cholesterol level above 300 mg%.7 cases have their serum cholesterol below 150 mg%.150 cases have serum cholesterol in the normal range of 151-250.

All patients had serum T_4 level below 4.5 ng/dl, Normal value of T_4 is 4.5-12 ng/dl. TSH level was elevated in all patient, that was more than 4.67mu/ml.Normal value of TSH is 0.49-4.67 mu/ml. Serum T_3 in all patient was below 0.5ng/ml. Normal value of serum T_3 is 0.5-1.65ng/ml.

DISCUSSION

In the present studies, the majority of patients were in the age group 31-50 yrs, which were close to observation made by Saha Pradip Kumar et al[4] who found it in 31-60 and 26-56 year age group in their study. Peak age incidence observed in present study was between 31-40 years, in which 21(42%) cases were noted, which is comparable to observation made by Saha Pradip Kumar et al [4], who found maximum number of cases in 36-45 year age group.

It was seen that 45 (90%) patient were female and 5(10%) patient were male. Male to female ratio in my study is 1:9 which is very close to observation made by D. Raju, S. Soni [5] et al who found it 1:8 in his study. The male to female ratio observed by Indra R. Patil[6] et al and Saha Pradip Kumar et al[4] was 1:3.4, and 1:3.5 respectively, the difference might be due to large sample size. However hypothyroidism is more common in female all over the world.

In present study majority of patient i.e. 45 (90%) have idiopathic primary hypothyroidism which is close to incidence of idiopathic primary hypothyroidism observed by Romshoo Ghulam Jeelani et al [7] in 96.61% patient in their study. In present study 2(4%) patient develop hypothyroidism after thyroid surgery for thyroid malignancies, which is close to 6.6% incidence found by B.B. Samantha et al in his study.

In present study systolic hypertension was noted in 2 (4%), diastolic hypertension in 10 (20%), both systolic+diastolic in 5 (10%) of cases out of 50 patient. In present study hypertension was present in 38% of cases, which is very close to observation made by DH Streeten, GH Anderson et al [8] in 40% of cases.

In present study ST-T changes noted in 7 (14%) of cases, which is close to 16.6% incidence of ST-T changes noted by B.B. Samantha et al in his study. In present study bradycardia was present in 2 (4%) of cases, which is comparable to observation made by S.Sampath et al[9] in 4.16% of cases. In present study pericardial effusion were noted on 2D-echocardiography in 3 (6%) of cases , which is close to the observation made by Kumar SP et al[4] in 6.6% of cases in their study.

CONCLUSION

ST-T changes in the form of flat or inverted T wave was the most common abnormality in electrocardiogram i.e.14%, Sinus bradycardia was present in 4% of cases. Menorrhagia was the most common menstrual problem observed in 20% of cases, Anemia (Hb <11gm %) in 40 (80%), Serum cholesterol level was more than 200 mg % in 26(52%) cases. Microcytic Hypochromic morphology was the most common type of morphology of RBC in anemic patient. Diastolic blood pressure was high in 20% of cases. Pericardial effusion observed in 6% of cases.

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