International Journal of Multidisciplinary Research and Development

Volume: 2, Issue: 9, 63-67
Sep 2015
www.allsubjectjournal.com
e-ISSN: 2349-4182
p-ISSN: 2349-5979
Impact Factor: 4.342

Ramkumar Gupta
Assistant Professor,
Department of Medicine
Gajraraja Medical College
Gwalior (M.P.)

Neelima Singh
Assistant Professor,
Department of Medicine
Gajraraja Medical College
Gwalior (M.P.)

Correspondence
Ramkumar Gupta
Assistant Professor,
Department of Medicine
Gajraraja Medical College
Gwalior (M.P.)

Study of Lipid Profile in Patients of Hypothyroidism

Ramkumar Gupta, Neelima Singh

Abstract
Background- Association of diabetes mellitus with dyslipidemia is well known, many studies have suggest that hypothyroidism is also a culprit of dyslipidemia so we tried to study and find correlation of same.
Aims and objectives-To study the clinical and lipid profile of the patients of hypothyroidism.
Material and methods- This open prospective study was conducted in the Department of Medicine, G.R. Medical College Gwalior (M.P.), India.
This study comprised of 105 patients with hypothyroidism attending Medicine department of gajra raja medical college Gwalior (M.P.) India. Duration was 1 year, from period of January 11 to January 2012.
Results-Hypothyroidism was more common in females than males which is statistically significant. Male to female ratio was 4:1.Maximum number of patients of hypothyroidism belongs to middle age group. Most commonest symptom in female was tiredness 55.24% followed by weight gain 49.52%, while in male patients commonest symptom was tiredness and lethargy. Commonest sign in male was oedema while Dry course skin was the most commonest sign in females. In present study, we found that abnormal lipid profile seen both in subclinical and overt hypothyroidism patients but it was more deranged in overt hypothyroidism. The higher prevalence of hypothyroidism among middle aged women associated with an increase in total plasma cholesterol. Our findings showing that hyperlipidemia is associated with hypothyroidism. It was 59.18% in overt hypothyroidism patients and 50% in subclinical hypothyroidism patients. Hypothyroidism results in a rise in low density lipoprotein (LDL) & decrease in high density lipoprotein (HDL) that enhance the risk for development of atherosclerosis and coronary artery disease. Study showed that comorbidities were more common in female hypothyroidism patients compared to male hypothyroidism patients. Out of 82 female hypothyroidism patients 28 were hypertensive and 4 were diabetic and 4 had coronary artery disease while in out of 23 male hypothyroidism patients 9 were hypertensive and no diabetic and 6 had coronary artery disease.
Conclusion- Our study revealed that Hypothyroidism is more common in females. Commonest symptoms of hypothyroidism is tiredness while commonest sign is nonpitting edema in both males and females. Hypothyroidism is associated with dyslipidemia characterized by elevated total-CH, LDL-CH, TG and low HDL and so it is an independent risk factor for atherosclerosis & coronary artery diseases. Overt hypothyroidism patient have significantly higher dyslipidemia compared to subclinical hypothyroidism.

Keywords: Hypothyroidism, Lipid Profile, Dyslipidemia.

1. Introduction
When thyroid gland produces low amount of thyroid hormone this condition is known as hypothyroidism. Most common cause of hypothyroidism is iodine deficiency and other factors also causes the hypothyroidism [1]. Dyslipidemia is the term given to abnormalities in blood lipid levels in which there is disorder of lipoprotein metabolism, including lipoprotein overproduction or deficiency. Dyslipidemias may be manifested by elevation of the total cholesterol, the "bad" low-density lipoprotein (LDL) cholesterol and the triglyceride concentrations, and a decrease in the "good" high-density lipoprotein (HDL) cholesterol concentration in the blood.[2] association of diabetes mellitus with dyslipidemia is well known, many studies have suggest that hypothyroidism is also a culprit of dyslipidemia so we tried to study and find correlation of same.

Aims & Objective-
To study the clinical profile in patients with hypothyroidism. To study the lipid profile in patients with subclinical and overt hypothyroidism.

Material And Methods-This open prospective study was conducted in the Department of Medicine, G.R. Medical College & J.A. Group of Hospital, Gwalior (M.P.), India. This study comprised of 105 patients with hypothyroidism attending OPD and Medicine Wards of J.A. group of Hospitals, Gwalior (M.P.) India from period of January 11 to January 2012.The

patients were enrolled in the study as per the inclusion & exclusion criteria. **Inclusion Criteria –** Patients who diagnosed with deranged thyroid hormone levels. **Exclusion criteria–**Patient receiving lipid lowering drugs, and with Acute illness.

Method-All the patients with hypothyroidism attending O.P.D. or medicines ward in J.A. Group of Hospital were included. They were examined thoroughly after history taking and then subjected to routine investigations with special emphasis on lipid profile, thyroid profile. Association of hypothyroidism with comorbid diseases like hypertension, diabetes mellitus, coronary artery disease was also observed. Patients with TSH levels above 5.5 μIU/ml were considered to be having hypothyroidism. As per serum TSH level, the cases were divided into two groups. group I : Subclinical hypothyroidism - TSH level 5.5 to 10 μIU/ml, group II : Overt hypothyroidism -TSH level above then 10 μIU/ml

Observations

Table 1; Age & Sex wise distribution of hypothyroidism patient

Age groups (in yrs)	Male		Female		Total	
	No.	%	No.	%	No.	%
<20	00	00	04	3.81	4	3.81
21-40	06	5.71	40	38.1	46	43.81
41-60	10	9.52	25	23.81	35	33.33
>60	07	6.67	13	12.38	20	19.05
Total	**23**	**21.09**	**82**	**78.1**	**105**	**100**

Above table showing total male and female hypothyroidism patients divided into 4 age group.
Maximum number of patients are between 21-40 yrs age group and most of the hypothyroidism patient are female.
Female: male ratio - 4:1.78.1% female and 21.9% male hypothyroidism patient which is statistically significant (p value < 0.05).Maximum number of hypothyroidism including to age group from 21-60 yrs (81) which is statistically significant (p value < 0.05).

Table 2: Distribution of male and female subclinical and overt hypothyroidism with TSH level.

Age group (yrs)	Sub clinical hyperthyroidism TSH- 5.5-10μIU/ml						Overt hypothyroidism TSH- > 10 μIU/ml					
	Male		Female		Total		Male		Female		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<20	00	00	03	2.86	3	2.86	00	00	01	0.95	1	0.95
21-40	04	3.81	21	20	25	23.81	02	1.9	19	18.10	21	20
41-60	04	3.81	14	13.33	18	17.14	06	5.71	11	10.48	17	16.19
>60	03	2.86	07	6.67	10	9.52	04	3.81	06	5.71	10	9.52
Total	**11**	**10.48**	**45**	**42.86**	**56**	**53.33**	**12**	**11.43**	**37**	**35.24**	**49**	**46.67**

Above table showing the distribution of male and female subclinical and overt hypothyroidism with TSH level.
Subclinical hypothyroidism female are the most common.

Table 3: Sign & symptoms present in hypothyroidism patient

Presenting Sign & Symptoms (Sign and symptoms)	Male (n=23)		Female (n=82)	
	No.	%	No.	%
Sign				
Oedema	16	69.56	55	67
Skin texture (dry course skin)	14	60.86	65	79.26
Bradycardia	5	21.73	20	24.39
Pallor	6	26	19	23.17
Icterus	3	13.04	16	19.51
Cyanosis	5	21.73	18	21.95
Anaemia	4	17.39	16	19.51
Symptoms				
Weight gain	10	43.47	52	63.41
Cold intolerance	11	47.82	47	57.31
Constipation	9	39.13	35	42.68
Abnormal eye drooping	2	8.69	10	12.19
Lethargy	14	60.86	35	42.68
Tiredness	16	69.56	58	70.73
Hoarseness of voice	4	17.39	20	24.39
Abdominal pain	2	8.69	25	30.48
Menstrual irregularity (in female)	0	00	35	42.68

Dry course skin was the most common sign in female and tiredness is the most common symptom in female. Oedema was the most common sign in male and tiredness was the most common symptoms in male.

Table 4: Clinical sign present in subclinical and overt hypothyroidism male/female patient

Sign	Subclinical hypothyroidism(n=56)				Overt hypothyroidism(n=49)			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
Oedema	6	10.71	28	50	10	20.40	27	55.10
Dry course skin	6	10.71	35	62.5	8	16.32	30	61.12
Bradycardia	2	3.5	9	16.07	3	6.12	11	22.44
Pallor	2	3.5	9	16.07	4	8.16	10	20.40
Icterus	1	1.7	6	10.7	2	4.08	10	20.40
Cyanosis	2	3.4	7	12.5	3	6.12	11	22.44
Anaemia	2	3.4	7	12.5	2	4.08	9	18.36

Above table showing the sign presenting in subclinical and overt hypothyroid male and female.
Oedema and dry course skin is most presenting sign in both clinical and overt hypothyroidism male. The dry course skin and oedema is most presenting symptom in both subclinical and overt hypothyroidism-female.

Table 5: Clinical symptoms present in subclinical and overt hypothyroidism male/female patient

Symptom	Subclinical hypothyroidism(n=56)				Overt hypothyroidism(n=49)			
	Male (11)		Female (45)		Male (12)		Female (37)	
	No.	%	No.	%	No.	%	No.	%
Weight gain	4	6.25	20	35.71	6	12.24	32	65.30
Cold intolerance	5	8.9	22	39.28	6	12.24	25	51.02
constipation	3	5.35	18	32.14	4	8.16	17	34.69
Abnormal eye drooping	1	1.7	4	7.14	1	2.04	6	12.24
lethargy	6	10.7	15	26.78	8	16.32	20	40.81
tiredness	7	12.5	28	50	9	18.36	30	61.22
Hoarseness of voice	1	1.7	8	14.28	3	6.12	12	24.48
Abdominal pain	2	3.5	10	17.85	0	0.00	15	30.61
Menstrual irregularities (female)	0	0.00	15	26.78	0	0.00	20	40.81

Above table showing that symptoms presenting in subclinical and overt hypothyroidism male and female patients. Tiredness was the most common presenting symptoms in both subclinical and overt hypothyroidism male patients. Tiredness was the most common presenting symptom in subclinical female and weight gain was the most common presenting symptoms in overt hypothyroidism female patients.

Table 6: Age wise distribution of dyslipidemia in total subclinical and overt hypothyroidism male/female patient

Age group (in yrs)	Total subclinical male+ female	Dysli-pidemia	%	Total overt male+ female	Dysli-pidemia	%
< 20	03	0	00	01	0	0
21- 40	25	08	32	21	08	38.09
41- 60	18	11	61.11	17	13	76.4
>60	10	09	90	10	8	80
Total	**56**	**28**	**50**	**49**	**29**	**59.18**

Above table that showing dyslipidemia in subclinical and overt hypothyroidism patients.
Dyslipidemia was more common in > 60 yrs age group in both subclinical and overt male and female hypothyroidism patient.

Table 7: Abnormalities of lipid profile in total male and female hypothyroidism patient

Lipid profile	Male(n=23)		Female(n=82)	
	No.	%	No.	%
Total cholesterol (150-250 mg%)	08	34.7	26	31.7
Triglyceride (60-150 mg%)	07	30.4	21	25.6
HDL (36-60 mg%)	04	17.3	15	18.2
LDL (Upto 130 mg%)	02	8.6	07	8.5
VLDL (12-30 mg%)	08	34.7	10	12.1

Above table showing abnormalities of lipid profile in total male and female hypothyroidism patients.
Total cholesterol was the common lipid which was increased in both male and female hypothyroidism patients.

Table 8: Abnormalities of lipid profile in total no. of subclinical and overt female hypothyroidism patient (n=82)

Lipid profile	Subclinical (45)		Overt (37)	
	No.	%	No.	%
Total cholesterol (150-250 mg%)	13	28.8	13	35.1
Triglyceride (60-150 mg%)	11	24.4	10	27
HDL (36-60 mg%)	07	15.5	08	21.6
LDL (Upto 130 mg%)	04	8.8	03	8.1
VLDL (12-30 mg%)	05	11.1	05	13.5

Above table showing dyslipidemia in total female subclinical and overt hypothyroidism patient.
Total cholesterol and triglyceride predominantly increased in subclinical and overt female hypothyroidism patient.

Table 9: Abnormalities of lipid profile in total no. of subclinial and overt male hypothyroidism patient (n==23)

Lipid profile	Subclinical (11)		Overt (12)	
	No.	%	No.	%
Total cholesterol (150-250 mg%)	05	45.45	03	25
Triglyceride (60-150 mg%)	05	45.45	02	16.6
HDL (36-60 mg%)	02	18.18	02	16.6
LDL (Upto 130 mg%)	02	18.18	00	00
VLDL (12-30 mg%)	04	36.36	04	33.33

Above table showing dyslipidemia in subclinical and overt male patients. Total cholesterol and triglyceride predominantly increased in subclinical male hypothyroidism.Total VLDL and total cholesterol was predominantly increased in overt male hypothyroidism patient.

Table 10: Total number of subclinical hypothyroidism males with hypertension, diabetics and CAD patients

Age group (in yrs)	Subclinical Hypothyridism Male(N=11)						
	TOTAL	HYPERTENSION		DIABETES		CAD	
	No.	No.	%	No.	%	No.	%
< 20	00	0	00	0	00	0	00
21-40	04	0	00	0	00	0	00
41-60	04	1	9.09	0	00	1	9.09
> 60	03	3	27.27	0	00	2	18.18
Total	**11**	**4**	**36.36**	**0**	**00**	**3**	**27.27**

Above table showing subclinical hypothyroidism male patient in which other comorbid disease present as hypertension, diabetes and coronary artery disease. In subclinical hypothyroidism in age group of > 60 yrs or more predominantly suffering from hypertension and coronary artery disease. In subclinical hypothyroidism male diabetic patients are 0%.

Table 11: Total number of overt hypothyroidism male hypertensive, diabetics and CAD patients

Age group (in yrs)	Overt Hypothyridism Male(N=12)						
	TOTAL	Hypertension		Diabetes		CAD	
	No.	No.	%	No.	%	No.	%
< 20	00	0	00	0	00	0	00
21-40	02	0	00	0	00	0	00
41-60	06	3	25	0	00	1	8.33
> 60	04	2	16.66	0	00	2	16.66
Total	**12**	**5**	**41.66**	**0**	**00**	**3**	**25**

Above table showing overt hypothyroidism male patient in which other comorbid disease present as hypertension, diabetes and coronary artery disease. In overt hypothyroidism patient in age group of 41-60 yrs and > 60 yrs are 50% suffering from hypertension while coronary artery disease is predominant in age group > 60 yrs. In overt hypothyroidism male diabetic patients were 0%.

Table 12: Total number of subclinical hypothyroidism female with hypertensive, diabetics and CAD patients

Age group (in yrs)	Subclinical Hypothyridism Female(n=45)						
	Total	Hypertension		Diabetes		CAD	
	No.	No.	%	No.	%	No.	%
< 20	03	0	0	0	00	0	00
21-40	21	0	0	0	00	0	00
41-60	14	10	22.22	4	8.88	2	4.04
> 60	07	7	15.55	1	2.02	1	2.02
Total	**45**	17	**37.77**	5	**11.11**	3	**6.06**

Above table showing subclinical hypothyroidism female patient in which other comorbid disease present as hypertension, diabetes and coronary artery disease. In subclinical hypothyroidism female in age group > 60 yrs, all patients are suffering from hypertension. In overall 45 subclinical hyperthyroid female, 17 were suffering from hypertension, 5 diabetes and 3 coronary artery disease.

Table 13: Total number of overt hypothyroidism female with hypertensive, diabetics and CAD patients

Age group (in yrs)	Overt Hypothyridism Female (n=37)						
	Total	Hypertension		Diabetes		CAD	
	No.	No.	%	No.	%	No.	%
< 20	01	0	00	0	00	0	00
21-40	19	3	8.1	1	2.7	1	2.7
41-60	11	4	10.81	1	2.7	0	00
> 60	06	4	10.81	1	2.7	0	00
Total	**37**	**11**	**29.72**	**3**	**8.10**	**1**	**2.7**

Above table showing overt hypothyroidism female patient in which other comorbid disease present as hypertension, diabetes and coronary artery disease. In overall 37 overt hypothyroidism female patients, 11 patients suffering from hypertension, 3 diabetes and 1 from coronary artery disease.

DISCUSSION-In the present study we found that there is the female preponderance in hypothyroidism. The female to male ratio was 4:1 (p value <0.05) which is similar to study done by Khurram *et al* (2003) [3]. Another study done by Akbar *et al* (2003)[4]also suggest that female to male ratio was 8:1 and Both subclinical and overt hypothyroidism was seen mainly in females when compared to male patients. Study done by Samanta B.B *et al* [5] also suggests that most cases occurs in females. The present study shows that the prevalence of hypothyroidism was maximum in age group of 20 to 60 yrs (77.23%). similar result was also found in study of Wright-Rascose RA *et al* (2010) [6] according to their study mean age of hypothyroidism was 43.3 yrs (range 12-82 year). Study done by Khurram *et al.* (2003) [3] also suggests the same. Study done by Samanta B.B *et al.* [5] also have same findings as ours. In present study most common symptom in female was tiredness followed by weight gain, cold intolerance, constipation, menstrual irregularities, lethargy and abdominal pain and hoarseness of voice. while in male patients most common symptom was tiredness followed by cold intolerance weight gain, constipation, hoarseness of voice, abnormal eye dropping and, abdominal pain. Our result was similar to study done by Lahiri *et al.* (1996) [7]. In present study most common sign in male was oedema followed by dry coarse skin, pallor, bradycardia, cyanosis, anaemia, and icterus. While in females Dry coarse skin is the most common sign followed by oedema, bradycardia, pallor, cyanosis, anaemia and then icterus. Result were similar to study done by Samanta B.B *et al.* [5]. In present study Both signs and symptoms was more in overt hypothyroidism when compared to subclinical hypothyroidism. Hypothyroidism is the most important cause of secondary dyslipidemia. Thyroid hormones influences lipid metabolism by several mechanism. In present study we found that abnormal lipid profile seen in both in subclinical and overt hypothyroidism patients but it was more deranged in overt hypothyroidism patients when compared to subclinical

hypothyroidism patients.it was 59.18% in overt hypothyroidism patients and 50% in subclinical hypothyroidism patients. our results are similar to study done by Tayal D *et al* (2008) [8] they reported that levels of cholesterol increases up to (50%) above the normal in hypothyroidism, and dyslipidemia was more in overt hypothyroidism patients compared to subclinical hypothyroidism patients. In present study we also found that deranged lipid profile was more in overt hypothyroidism female patients compared to subclinical hypothyroidism female patients. Present study shows that comorbidities were more common in female hypothyroidism patients compared to male hypothyroidism patients. Out of 82 female hypothyroidism patients 28 were hypertensive and 4 were diabetic and 4 had coronary artery disease while in out of 23 male hypothyroidism patients 9 were hypertensive, no diabetic and 6 had coronary artery disease. F. Monzani *et al* (2004) [9] in their study founds the association of Subclinical hypothyroidism with dyslipidemia and enhanced cardiovascular risk. PJD Owen *et al*. (2006) [10] in their study also found that subclinical hypothyroidism is associated with increased risk of cardiac disease. In our study we also found that co-morbidities like hypertension, diabetes and coronary artery disease was common in subclinical hypothyroidism patients compared to overt hypothyroidism. Duntas LH (2002) [11], in their study also found that subclinical hypothyroidism has been associated with endothelium dysfunction, aortic atherosclerosis, and myocardial infarction. Lipid disorders exhibit great individual variability. Nevertheless, they might be a link, although it has not been proved, between Subclinical Hypothyroidism and atherosclerosis.

Conclusion

Our study revealed that Hypothyroidism is more common in female than male and also more in the age group between 41-60 yrs. commonest symptoms of hypothyroidism found in tiredness, weight gain, constipation and abdominal pain. While commonest signs are edema, dry coarse skin, pallor, bradycardia, anemia in both males and females. Hypothyroidism is associated with dyslipidemia characterized by elevated total CH, LDL-CH, TG and low HDL and so it is an independent risk factor for atherosclerosis & coronary artery diseases. Overt hypothyroidism patient have significantly higher dyslipidemia compared to subclinical hypothyroidism. Further studies is needed to investigate to whether early treatment of hypothyroidism could prevent dyslipidemia & other comorbid illness in these patients.

Acknowledgement-None
Source of Fund – None
Conflicts of Interest-None
Ethical Approval- Yes

References-

1. Harrison's Textbook, Principles of Internal Medicine, 18th Edition, Volume 2, Page No. 2918-2919
2. Leiter LA, Genest J, Harris SB *et al* for the Canadian Diabetes Association Clinical Practice Guidelines Expert Committe. Dyslipidemia in Adults with Diabetes. Canadian Journal of Diabetes. 2006; 30(3):230-240.
3. Irfan M. Khurram, Kiran S. Choudhary, Khan Muhammad, Najmul Islam. Clinical presentation of hypothyroidism: A case control analysis. J Ayub Med Coll Abbottabad 2003; 15(1).
4. Akbar D, Mushtaq M. Clinical profile of adult hypothyroidism. Journal of the Bahrain Medical Society.
5. B.B. Samanta. Clinical profile of hypothyroidism. Physician, S.E. Railway polytclic at: Motibagh, P.O. Bezobagh, nagpur-440004, Maharashtra.
6. Rosemarie A Wright-Pascoe. Clinical features of spontaneous hypothyroidism in one physician's practice in Jamaica. Int J Gen Med. 2010 May 26; 3:137-41.
7. Lahiri, D., Dasgupta A., Kundu S. - Menstrual pattern and fertility status in hypothyroid women. Journal of Obstetrics and Gynaecology of India. Vol. 46: p-663-671, 1996.
8. D Tayal, B Goswami, VK Gupta, V Mallika. Evaluation of lipid profile in hypothyroid patients: Our experience. Thyroid Res Tract 2008;5(2):43-7
9. F Monzani, N Caraccio, M Kozakowa, A Dardano, F Vittone *et al*. Effect of levothyroxine replacement on lipid profile and intima media thickness in subclinical hypothyroidism: A double-blind, placebo-controlled study. J Clin Endocrinol Metab 2004; 89:2099-2106.
10. PJD Owen, C Rajiv, D Vinereanju, T Mathew, AG Fraser *et al*. Subclinical hypothyroidism, arterial stiffness, and myocardial reserve. J Clin Endocrinol Metab 2006;91:2126-2132
11. Duntas LH. Thyroid disease and lipids. Thyroid 2002 Apr; 12(4):287-93.