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Original Research Paper

General Medicine

THYROID PROFILE IN NEWLY DIAGNOSED HIV PATIENTS IN A TERTIARY CARE CENTRE OF NORTH BENGAL-A CROSS-SECTIONAL STUDY.

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ABSTRACT

Background: HIV infection can lead to thyroid gland endocrinopathy. There is limited data regarding prevalence, pattern and correlates associated with thyroid dysfunction in India. The study will help to assess whether universal screening of thyroid function should be enforced in HIV infected patients.

Objectives: To determine the prevalence and pattern of thyroid dysfunction and also to find out association between thyroid dysfunction with other factors like age, gender, and CD4 count in newly diagnosed HIV infected patients attending North Bengal Medical College.

Methods: A cross-sectional observational study was conducted among 95 HIV infected patients attending indoor and outdoor of North Bengal Medical College and Hospital after fulfilment of inclusion and exclusion criteria. Data were collected using predesigned pre tested schedule after having informed consent and subjected to clinical and laboratory examination. Collected data were analysed using SPSS statistical software and presented using principles of descriptive statistics.

Results: Overall 34.7% of study subjects had thyroid dysfunction. Mostly found dysfunction was subclinical hypothyroidism (23.2%). Direct correlation was observed between T3, T4, CD4 Count whereas TSH was inversely correlated with all others parameters.

Conclusion: Biochemical abnormalities in thyroid function is commoner among patients with HIV. The severity of hypothyroidism is inversely correlated with CD4 counts. The screening of thyroid function in HIV patients thus indicated to improve the quality of life.

KEYWORDS : HIV, Thyroid dysfunction, North Bengal

BACKGROUND:

The prevalence of human immunodeficiency virus (HIV) infection in India is estimated to be 2.4 million[1].Human immunodeficiency virus (HIV) infection can lead to involvement of various organs and systems including endocrine glands like function of the pituitary, adrenals, gonads, and pancreas etc and are becoming the main conditions influencing the long-term quality of life in HIV infected patients. Thyroid hormones play a fundamental role in metabolism and regulate immune system modulating humoral and cell mediated immunity[2], can also be affected by HIV infection. Numerous studies have reported that the incidence of thyroid dysfunction is much higher (about 36%-37%) in patients infected with HIV than in the general population[3,4]. Thyroid dysfunction reduces the quality of life of patients infected with HIV.

The most frequent abnormalities in thyroid function tests are subclinical hypothyroidism[2,4,5,6,7]. Some reports have indicated that HAART increases the probability of thyroid dysfunction. Madeddu et al. reported that thyroid-stimulating hormone (TSH) was negatively correlated with CD4 cell count nadir and positively correlated with HAART duration[2]. They also reported that there was no significant correlation between free tri-iodothyronine (FT3), FT4, age, duration of HIV infection, duration of HAART, CD4 cell count, and CD4 cell count nadir[2].

However, few studies in India reported the prevalence of thyroid dysfunction in HIV ranging from 24-40.66% patients[8,9]. There is a clear discrepancy in the prevalence rates of thyroid dysfunction reported from the West and India[5,8,9,10]. Hence further studies are required to confirm this. People with acute illnesses which can alter the thyroid function were also included in the Western and Indian studies. There was no report of hyperthyroidism in these publications despite reports of resurgence of autoimmunity leading on to Graves' disease in immune reconstitution inflammatory syndrome. Hence the present study was designed to answer the above limitations. The study will also help to assess whether universal screening of thyroid function should be enforced in HIV infected patients.

OBJECTIVES:

To determine the prevalence and pattern of thyroid dysfunction (hyperthyroid, hypothyroid, subclinical hypothyroid, subclinical hyperthyroid) and also to find out association between thyroid dysfunction with other factors like age, gender, and CD4 count in newly diagnosed HIV infected patients attending North Bengal Medical College.

MATERIALS AND METHODS:

An observational study with cross sectional design was conducted among the HIV patient attending OPD/IPD of North Bengal Medical College from June 2015 to May 2016. Inclusion criteria was subjects with HIV serology positive by ELISA test, Age greater than 12 years and willing to take part in study. Pregnancy, patient on HAART or taking drugs altering thyroid hormone level/function such as L thyroxine, antithyroid, amiodarone, beta blocker, lithium, steroids, ketoconazole etc, patients with chronic liver disease, chronic kidney disease, nephrotic syndrome, protein losing enteropathy where there may be some inherent alterations of serum protein status as well as protein binding, bleeding diathesis etc were excluded. Ethical clearance was obtained from Institutional Ethics Committee of North Bengal Medical College and WBSAPCS.

Sample size and sampling technique:

Data were collected from 95 patients during the study period selected by purposive sampling technique.

Data collection:

The information regarding various socio-demographic and other epidemiological correlates like age, gender, place of residence, presence of co-morbidities (diabetes, hypertension), family history of thyroid dysfunction etc were obtained by interviewing the respondents using a predesigned pretested schedule.

Sample collection:

For diagnosis and confirmation of HIV infection, The National AIDS Control Organization(NACO) recommendation for HIV testing was followed. Single sample of 10 ml ante-cubital venous blood was obtained under aseptic measures for hormonal analysis (T3, T4 and TSH). After clotting, the blood was centrifuged for 30 minutes and the supernatant(serum) was taken in a test tube. The tests for hormonal analysis are available in North Bengal Medical College. If any of the results were abnormal the patient was contacted and started on medication if necessary.

Data analysis:

Collected data of 95 study subjects were checked for consistency and completeness. Then data were entered in Excel Microsoft Software to prepare Master table and is being presented in various tables, charts and diagrams and were analysed using IBM SPSS 20. Chi-square test was applied to test the significance and p value less than 0.05 was considered as statistically significant. Pearson co relation coefficient was used to depict the relationship between CD4 count and thyroid hormone values (T3, T4 and TSH).

RESULT:

BACKGROUND CHARACTERISTICS OF THE STUDY SUBJECTS:

Table 1 shows that 66.3% of the study subjects belonged to <40 years of age group with a mean age of 36.44±10.36 years. 75.8% of the study subjects were male. 34.7% of them were from Darjeeling district. Proportion of hypertension and diabetes among the study subjects was 9.5% and 7.4% respectively. Only 3.2% of the study subjects had family history of thyroid dysfunction. Mean CD 4 count was found to be 241.74 (±151.636).

Thyroid Profile In Newly Diagnosed HIV Patients:

Fig 1 shows distribution of study subjects according to thyroid profile. 65.3% of the study subjects were Euthyroid, 23.2% of the study subjects had subclinical hypothyroidism, 9.5% had overt hypothyroidism and 2.1% had hyperthyroidism. Overall 33(34.7%) study subjects had thyroid dysfunction. Mean values of T3, T4 and TSH were .9683 (±.47799), 6.8835 (±2.32880) and 4.2944 (±3.49173) respectively.

Factors associated with thyroid dysfunction:

In bi variate analysis thyroid dysfunction was found to be significantly associated with CD 4 count ($p<.05$) but not with age, gender ($p>.05$) [Table 2]. In correlation analysis between different thyroid hormones and CD4 count, direct correlation was observed between T3, T4, and CD4 Count whereas TSH was inversely correlated [Table 3 & Fig 2].

DISCUSSION:

The present study was conducted aiming at identification of prevalence and pattern of thyroid dysfunction among the newly (within 6 months of diagnosis) diagnosed HIV patients attending OPD/IPD of North Bengal Medical College and Hospital.

In this context, the findings of the present study are discussed and interpreted.

Background characteristics:

Present study revealed that mean age was 36.44(±10.36) years. Majority of the study subjects belonged to 31-40 years of age group (37.9%) followed by 30.5% and 18.9% in 21-30 years and 41-50 years of age group respectively. In our study 75.8% of the study subjects were male and 24.2% were female. Majority of the study subjects were from Darjeeling district (34.7%) followed by Jalpaiguri district (31.6%). A cross sectional study from Thailand by **Ketsamathi et al**[11] reported 48.5% of study population were male and mean age of 36.3(±8.3) years.

Prevalence and pattern of thyroid dysfunction:

Prevalence of thyroid dysfunction in newly diagnosed HIV patients attending OPD/IPD of North Bengal Medical College was found to be substantially high. Among all the study subjects, 34.7% had thyroid dysfunction. High prevalence of thyroid dysfunction (75.5% & 40.66%) among HIV patients was also reported by **Dev et al**[12] and **Meena et al**[8] in their studies. Our study also revealed that among all the study subjects, 65.3% were euthyroid, 23.2% of the study subjects had subclinical hypothyroidism, 9.5% had overt hypothyroidism and 2.1% had hyperthyroidism. **Beltran et al**[5] reported that overall prevalence of hypothyroidism was 16% in 350 HIV-infected patients: 2.6% had overt hypothyroidism, 6.6% had subclinical hypothyroidism, and 6.8% had a low free T4 level. Before the advent of HAART, **Merenich et al**[13] reported an 8% prevalence of subclinical hypothyroidism among asymptomatic HIV-infected patients. High prevalence of subclinical hypothyroidism (12.2%, 17.4% & 53%) among HIV-infected patients receiving HAART was also reported by **Calza et al**[7], **Brockmeyer N et al** [14] and **Dev et al**[12] in their studies. In contrast, **Collazos et al.**[10] reported a lower prevalence of sub clinical hypothyroidism (3.5%), in a study conducted among of 202 patients in Spain. **Meena et al**[8] from BHU, Varanasi reported 30% sub-clinical hypothyroidism and 10.66% primary hypothyroidism among 150 study subjects. Prevalence of overt primary hypothyroidism in the general population and HIV infected individuals from different studies across the globe has been reported to be 0.3% and 0- 2.6%, respectively. Similarly, the prevalence of subclinical hypothyroidism has also reported to be higher in HIV infected individuals as compared to the general population (4.3% versus 3.5–12.2%) in different studies. In present study, 34.7% of HIV-infected patients were diagnosed with thyroid dysfunction.

Factors associated with thyroid dysfunction:

Among all the study subjects who have thyroid dysfunction, among them 30.2% were <40 years of age group and 43.8% were ≥40 years of age group. This distribution was not found to be statistically significant ($p>.05$). Among all the study subjects who have thyroid dysfunction, among them 30.6% were male and 47.8% were female. This distribution was also not found to be statistically significant ($p>.05$).

The study subjects who have thyroid dysfunction, among them 42.9% had CD4 count ≤250 and 23.1% had CD4 count >250.This distribution was found to be statistically significant ($p<.05$). However, **Afhami et al**[15] from Iran found no association between hypothyroidism in HIV-infected patients and CD4-cell count or use of HAART.

The present study also observed direct correlation between T3, T4 and CD4 count but inverse correlation between TSH and CD4 count. Similar finding was also reported in studies by **Jain G et**[9] al from Jaipur and **Dev et al**[12] from New Delhi. A case control study from Iran concluded that age, sex, HAART, mean CD4- cell count, duration of HIV infection, HCV co-infection, and opportunistic infections were not significant risk factors of hypothyroidism in HIV-infected patients[15]. The occurrence of hypothyroidism may be related to other factors or HIV infection itself.

The findings of our study broadly reflect the findings of previous authors across the globe. Moreover, the few studies from the Indian subcontinent are in consonance with our findings. Thus our study underlines the facts that thyroid dysfunction is more in HIV infected populations than the general population, the degree of hypothyroidism corroborates with the degree of immunodeficiency and hyperthyroidism is much less prevalent in HIV infected cohorts than hypothyroidism. The variations that occur despite this concordance with previous authors stems from geographic and ethnic factors as also sample size and selection methods.

However, small sample size may limit the applicability of the result in a larger population of HIV patients. Also in the present study, only total T3, Total T4, and TSH were evaluated. Free T3, T4, anti TPO antibody and TBG were not estimated in the study and these are the major limitations of the present study. HIV disease and its consequent infections can all lead to alterations in serum proteins which might affect the sensitivity of these measurements.

CONCLUSION:

We conclude from this study that biochemical abnormalities in thyroid function is commoner among patients with HIV than that in the general population. In HIV infected patients with thyroid dysfunction, subclinical hypothyroidism is commonest, followed by overt hypothyroidism, with hyperthyroidism being least common. The severity of hypothyroidism is inversely correlated with CD4 counts. The screening of thyroid function in HIV patients may be suggested to identify patients with thyroid disease and also to serve as a surrogate marker of disease progression as also an indirect parameter of quality of life.

RESULTS:

Table 1: Background characteristics of the study subjects

n=95

Background characteristics	Frequency(%)
Age group	
<40 years	63(66.3)
≥40 years	32(33.7)
Gender	
Male	72(75.8)
Female	23(24.2)
Place of residence	
Darjeeling district	33(34.7)
Other district	62(65.3)
Hypertension	
Present	9(9.5)
Absent	86(90.5)
Diabetes	
Present	7(7.4)
Absent	88(92.6)
Family h/o thyroid dysfunction	
Present	3(3.2)
Absent	92(96.8)
Total	**95(100.0)**

n=95

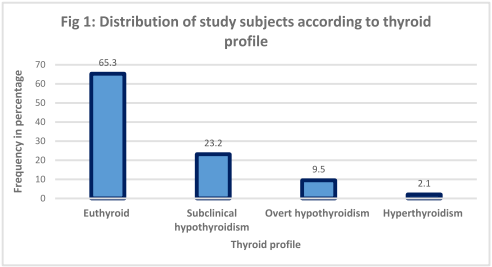


Fig 1: Thyroid profile among the newly diagnosed HIV patients.

Table 2: Bi variate analysis showing the relationship between different factors and thyroid dysfunction

n=95

Factors	Thyroid dysfunction		Total	Chi-square value	df	p value
Age group	Present (%)	Absent (%)				
<40 years	19(30.2)	44(69.8)	63(100.0)	1.729	1	.189
≥40 years	14(43.8)	18(56.2)	32(100.0)			
Gender						
Male	22(30.6)	50(69.4)	72(100.0)	2.293	1	.130
Female	11(47.8)	12(52.2)	23(100.0)			
CD4 Count						
≤250	24(42.9)	32(57.1)	56(100.0)	3.968	1	.046
>250	9(23.1)	30(76.9)	39(100.0)			
Total	33(34.7)	62(65.3)	95(100.0)			

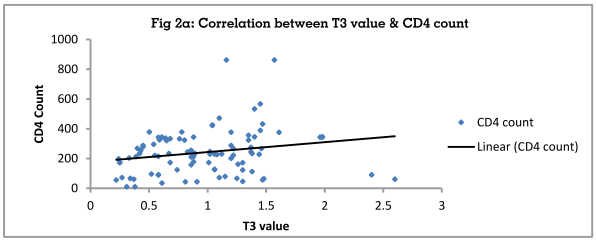
Table 3: Correlation between different thyroid hormones and CD4 count

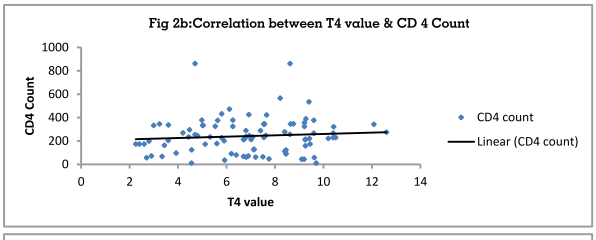
n=95

Correlations		T3	T4	TSH	Cd4 count
T3	Pearson Correlation	1	.343**	-.403**	.210*
	Sig. (2-tailed)		.001	.000	.041
T4	Pearson Correlation	.343**	1	-.350**	.086
	Sig. (2-tailed)	.001		.001	.405
TSH	Pearson Correlation	-.403**	-.350**	1	-.299**
	Sig. (2-tailed)	.000	.001		.003
Cd4 count	Pearson Correlation	.210*	.086	-.299**	1
	Sig. (2-tailed)	.041	.405	.003	

***. Correlation is significant at the 0.05 level (2-tailed)**

n=95





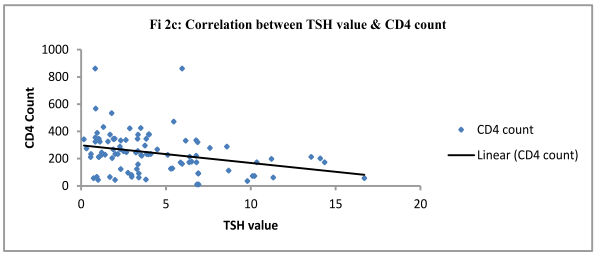


Fig 2a,2b,2c showing linear relationship between different thyroid hormones and CD4 count

REFERENCES:

1. Global report: UNAIDS report on the global AIDS epidemic 2010.annexure 1;p 187
2. G. Madeddu, A. Spanu, F. Chessa et al., "Thyroid function in human immunodeficiency virus patients treated with highly active antiretroviral therapy (HAART): a longitudinal study," Clinical Endocrinology, vol. 64, no. 4, pp. 375–383, 2006
3. G. A. Silva, M. C. Andrade, A. Sugui D et al., "Association between antiretrovirals and thyroid diseases: a cross-sectional study," Archives of Endocrinology and Metabolism, vol. 59, no. 2, pp. 116–122, 2015.

4. C. J. Hoffmann and T. T. Brown, "Thyroid function abnormalities in HIVinfected patients," Clinical Infectious Diseases, vol. 45, no. 4, pp. 488–494, 2007
5. S. Beltran, F.-X. Lescure, R. Descailloud et al., "Increased prevalence of hypothyroidism among human immunodeficiency virus-infected patients: a need for screening," Clinical Infectious Diseases, vol. 37, no. 4, pp. 579–583, 2003.
6. S. Thongam, S. Keithelakpam, T. Y. Singh, R. L. Singh, A. M. Singh, and S. Ranabir, "Thyroid dysfunction in human immunodeficiency virus-infected children and its correlation with CD4+ T lymphocyte count," Indian Journal of Endocrinology and Metabolism, vol. 19, no. 2, pp. 272–276, 2015.
7. L. Calza, R. Manfredi, and F. Chiodo, "Subclinical hypothyroidism in HIV infected patients receiving highly active antiretroviral therapy," Journal of Acquired Immune Deficiency Syndromes, vol. 31, no. 3, pp. 361–363, 2002.
8. Meena LP, Rai M, Singh SK et al. Endocrine changes in male HIV patients. JAssoc Physicians India , 2011;59:365-6.
9. Jain G, Devpura G, Gupta BS, Abnormalities in the thyroid function tests as surrogate marker of advancing HIV infection in infected adults. Jassoc Physicians India:2009:57:508-10
10. Collazos J, Ibarra S, Mayo J. Thyroid hormones in HIV infected patients in the highly active antiretroviral therapy era: evidence of an interrelationship between the thyroid axis and the immune system.AIDS,2003:17;763-65.
11. Ketsamathi C, Jongjaroenprasert W, Chailurkit LO, Udomsubpayakul U, Kiertiburanakul S. Prevalence of thyroid dysfunction in Thai HIV-infected patients. Curr HIV Res. 2006;4(4):463-7.
12. Dev N, Sahoo R, Kulshreshtha B, Gadpayle AK, Sharma SC. Prevalence of thyroid dysfunction and its correlation with CD4 count in newly-diagnosed HIV-positive adults--a cross-sectional study. Int J STD AIDS 2015;26(13):96570.
13. Merenich JA, McDermott MT, Asp AA, Harrison SM, Kidd GS. Evidence of endocrine involvement early in the course of human immunodeficiency virus infection.. J Clin Endocrinol Metab. 1990;70(3):566-71.
14. Brockmeyer NH, Kreuter A, Bader A, Seemann U, Reimann G. Prevalence of endocrine dysfunction in HIV-infected men. Horm Res. 2000;54(5-6):294
15. Afhami S, Haghpanah V, Heshmat R, Rasoulinejad M, Izadi M, Lashkari A et al. Assessment of the factors involving in the development of hypothyroidism in HIV-infected patients: a case-control study. Infection. 2007;35(5):334-8. Epub 2007 Sep 20.