ORIGINAL RESEARCH PAPER

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KEY WORDS: HIV, CD4 count, subclinical hypothyroidism.

PREVALENCE OF THYROID DYSFUNCTION IN HIV INFECTED PATIENTS

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ABSTRACT

OBJECTIVE: Thyroid dysfunction in HIV infected patients and correlation with CD4 counts.

METHODOLOGY: Prospective study consisting 100 symptomatic HIV seropositive patients were evaluated in our Medical College. Patients with known thyroid disorder, on drugs altering thyroid hormone metabolism, diabetics and pregnancy were excluded from the study. HIV serology was done by ELISA, CD4 count by Flow cytometry and TSH, FT3, FT4 by electrochemiluminescence method.

RESULTS: Among the 100 patients, 28 of them had thyroid dysfunction. Subclinical hypothyroidism dominated the type of thyroid dysfunction (57.14%) followed by 35.7% had hypothyroidism. Thyroid dysfunction was highest among HIV patients with CD4 count <200 (37%) followed by CD4 count 200-500 (21.1%), (P=0.045, statistically significant).

CONCLUSION: Thyroid dysfunction is frequent in HIV infection and is in direct proportion to the advancing HIV disease (lower CD4 counts). Subclinical hypothyroidism is the commonest dysfunction, with hypothyroidism being next most common.

INTRODUCTION

HIV is a global pandemic with cases reported from virtually every country with 34 million people living with AIDS/HIV in 2011. 1.7 million deaths in 2011 due to AIDS, and each day almost 7000 people get newly infected. In India, estimated incidence is around 1.16 lakh among adults and around 14,500 new infections among children (2011).[1]

HIV infection is associated with multiple organ involvement including the endocrine system. In autopsy studies, adrenal gland is most commonly involved endocrine gland in the body, but clinical adrenal dysfunction is uncommon, likewise clinical thyroid disorder rare but altered TFT results are common.[2]

Thyroid function may be altered in 10-15% of patients with HIV infection. Both hypothyroidism and hyperthyroidism may be seen. The predominant abnormality is Subclinical hypothyroidism. In the setting of cART, up to 10% of patients have been noted to have elevated TSH levels, suggesting that this may be a manifestation of immune reconstitution. In advance HIV disease, infection of thyroid gland may occur with opportunistic pathogens, including P. Jiroveci, CMV, mycobacteria, toxoplasma gondii, & Cryptococcus neoformans.[3]

Subclinical hypothyroidism refers to biochemical evidence of thyroid hormone deficiency in patients who have few or no apparent clinical feature of hypothyroidism. Subclinical hypothyroidism is defined as an elevated serum TSH level with normal free thyroid hormone values. The prevalence of subclinical hypothyroidism is 4-8% in the general population, and up to 15-18% in women who are older than 60 years.[4]

In addition, this thyroid dysfunction correlated with advancement of the infection in conjunction with lowering CD4 cell counts. Subtle alterations in thyroid function tests are more common in HIV infection and at times detectable in the early phase of disease and as well as in late phases. The changes in TFT's are HIV specific and are consistent with an abnormal response to acute illness.[5]

AIMS & OBJECTIVES OF THE STUDY

- To study of Thyroid dysfunction in HIV infected patients.
- To correlate the Thyroid dysfunction with CD4 count.

MATERIALS AND METHODS

This study was carried out in the department of medicine, ART centre & attached group of hospitals Govt. Medical College Kota.

Inclusion Criteria:

Patients who are diagnosed to have HIV infection by ELISA test according to

NACO-National AIDS Control Organization- March 2007 Guidelines.

Exclusion Criteria

- All known cases of thyroid disease
- Use of drugs known to interfere with thyroid hormone metabolism for e.g. rifampicin, steroids, ketoconazole, antiepileptics, amiodarone .
- Diabetics and Pregnancy.

METHODS:

Source of Data: Patients who was diagnosed to had HIV infection according to NACO-National AIDS Control Organization–March 2007, who fulfill inclusion and exclusion criteria who get admitted to ART center & attached group of hospitals Govt. Medical College Kota.

Method Of Collection Of Data:

- This study was done on sample of 100 patients in ART centre & attached group of hospitals Govt. medical college Kota.
- Purpose of study explained to the study subject and their relatives
- Prestructured proforma used to record the relevant information from individual case selected for study.
- A Prospective study done on symptomatic HIV seropositive patients of both sexes, categorized as per the CDC criteria based on CD4 levels.
- Patient confidentiality was maintained.

INVESTIGATION:

- HIV (by ELISA).
- CD-4 Count (Flow cytometry).
- Thyroid function tests (FT3, FT4 & TSH by

Electrochemiluminescence method).
- Other relevant investigation.

Statistical Analysis:
Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean SD (Min-Max) and results on categorical measurements are presented in Number (%). Chi-square test has been used to find the significance of study parameters between two groups.

RESULTS:
In this study 100 HIV positive patients had been included. Among 100 patients, 60 were males and 40 were females HIV patients. Mean age of study subjects was 39.48 ± 10.18 years

Sex-wise distribution of HIV+ patients in relation to thyroid dysfunction (Figure-1) and (Table-1):

Among the 100 patients studied, 28 of them had thyroid dysfunction, Out of these 28 patients, 18 were males (30%) & 10 were females (25%). However chi square test shows that this difference was not statistically significant (P=0.750) Thyroid Dysfunction was more common in males HIV patients than females patients.

Distribution of thyroid dysfunction subtype in HIV+ Patients (Figure-2) and (Table-2):

Among the 100 HIV patients studied, 28 patients had thyroid dysfunction (28%). Among them, 57.1% had subclinical hypothyroidism, 35.7% had hypothyroidism and 7.2% had subclinical Hyperthyroidism.

Distribution of CD4 count w.r.t thyroid dysfunction (Figure-3) and (Table-3):

Among 100 HIV positive patients studied among them prevalence of Thyroid dysfunction was highest with CD4 count <200 (37%) followed by CD4 count 200-500 (21.1%). Application of Chi square test shows that low CD4 count was significantly associated with Thyroid dysfunction (P=0.045).

Table 1: Sex-wise distribution of HIV+ patients in relation to thyroid dysfunction

HIV positive cases	MALE	FEMALE	TOTAL
With Thyroid Dysfunction	18 (30%)	10 (25%)	28 (28%)
Without Thyroid Dysfunction	42 (70%)	30 (75%)	72 (72%)
Total	60 (100%)	40 (100%)	100 (100%)

Chi-square = 0.101 with 1 degree of freedom; P = 0.750

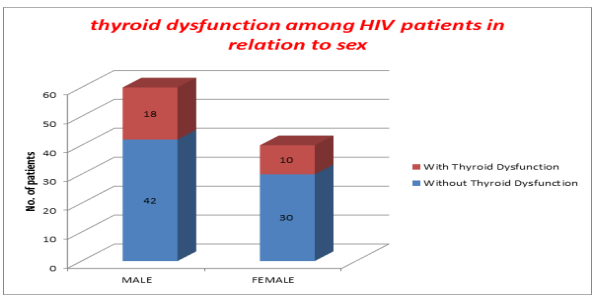

Figure 1: Sex-wise distribution of HIV+ patients in relation to Thyroid dysfunction

Table 2: Distribution of thyroid dysfunction subtype in HIV+ Patients

HIV positive cases	No.	%
With Subclinical Hypothyroidism	16	57.1
With Subclinical Hyperthyroidism	2	7.2
Hypothyroidism	10	35.7
Hyperthyroidism	0	0
Total	28	100

This table shows that among HIV patients having Thyroid dysfunction, 57.1% had Subclinical Hypothyroidism and 35.7% had Hypothyroidism, Subclinical Hyperthyroidism was much less common (7.2%) and none had clinical Hyperthyroidism.

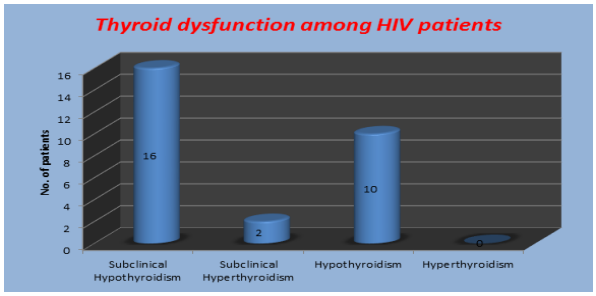

Figure 2: Distribution of thyroid dysfunction subtype in HIV+ Patients

Table3:Distribution of Cd4 count w.r.t thyroid dysfunction:

CD4 Count	With thyroid dysfunction	Without Thyroid Dysfunction	Total
<200	20 (37%)	34 (63%)	54 (100%)
200-500	8 (21.1%)	30 (78.9%)	38 (100%)
>500	0	8 (100%)	8 (100%)
Total	28 (28%)	72 (72%)	100 (100%)

Chi-square = 6.208 with 2 degrees of freedom; P = 0.045

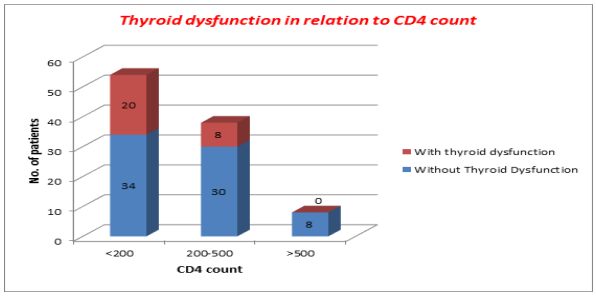

Figure 3: Distribution of CD4 count w.r.t thyroid dysfunction:

DISCUSSION
This study was conducted in ART centre & attached group of hospitals Govt. Medical college Kota. Hundred HIV symptomatic seropositive patients were taken up for the study. All patients were clinically examined and investigated as per the proforma.

Correlation With Age Group:
In our study, Mean Age was 39.48±10.18. Out of the 100 individuals 38% were of the 31-40 years age group and 24% were of 20-30 years group. Most of the case reports and studies series had in their sample set middle aged individuals.

Beltran et al[6] had mean age of 44 years, Palanisamy et al[7] had a mean age of 49 years whereas Madge et al[8] of 37 years and Sunder et al[2], series had a mean age of 35.81+/-8.85 years. There were no age correlation drawn with thyroid dysfunction in HIV patients.

Sex Distribution:
Among the 100 individuals studied, 60% of them were males and 40% females. Thus males were predominant in our study. In 2000 Grappin et al A total of 212 patients were included in

the study.The sex ratio of men to women was 2:1.[9]

In 2003 Beltran et al The case-control study included 343 case patients where sex ratio of male to female was 2:1.[6]

Madge et al studied 1565 HIV positive individuals, of which 1233 were males and 332 were females.[10] So most of these studies have a male predominance in their study groups. The higher number of male patients suffering from HIV could be attributed to their job and occupational habits, multiplicity of sexual partners and high risk behaviors, professional blood donation and higher number of reporting of cases to hospitals as compared to female patients suffering from HIV. Male patients usually dominate in their family, present to hospital more as compared to females. Females are neglected in society and probably due to social stigma they come to hospital in lesser number.

Sex-wise distribution of thyroid dysfunction in HIV positive patients :-

Among the 100 patients studied, 28 of them had thyroid dysfunction, Out of these 28 patients, 18 were males(30%) & 10 were females (25%). Thyroid Dysfunction was more common in males HIV patients than females patients. This is in contrast to the general occurrence of thyroid dysfunction commonly among females in general population.

In 2002 Calza et al Eighty-four patients were evaluated for study, subclinical hypothyroidism occurred in 3 men and 3 women, aged 31 to 49 years.[11]

Category wise distribution of thyroid dysfunction in the 100 HIV individuals studied:

Among the 100 HIV patients studied, 28 patients had thyroid dysfunction (28%). Among them, 57.1% had subclinical hypothyroidism, 35.7% had hypothyroidism and 7.2% had subclinical Hyperthyroidism. Subclinical hypothyroidism is the commonest dysfunction, with hypothyroidism being next most common in present study.

In 2003 Carter M et al The study between May & December 2001, included a cohort of 350 patients 16% of patients (n=56) had hypothyroidism, of whom 2.6% had overt hypothyroidism, 6.6% subclinical hypothyroidism, and 6.8% a low FT4 level.[12]

In 2003 Beltran et al[6] A cohort of 350 patients with HIV was screened. Overt hypothyroidism was detected in 2.6 percent of patients and Subclinical hypothyroidism was detected in 6.6 percent of patients.

In Meena LP et al[2] total 30% patients had subclinical hypothyroidism and 10.66% patients had overt hypothyroidism.

The cause of thyroid dysfunction is unclear, but hypothesizes include autoimmune disease, concurrent infection, destruction by opportunistic infection, and drug reaction.[13]

Relationship Of Absolute CD4 Counts With Thyroid Dysfunction:

In our study 100 HIV positive patients studied, among them prevalence of Thyroid dysfunction was highest with CD4 count <200 (37%) followed by CD4 count 200-500 (21.1%). Application of Chi square test shows that low CD4 count was significantly associated with Thyroid dysfunction (P=0.045).

In 2003 Beltran et al reported subclinical hypothyroidism in6.6%, overt hypothyroidism 2.6% was correlated with low CD4 counts in a Spanish population.[6] Sunder et al, studied patients in 3 groups (CD4<200cells/mm3, 200-350cells/mm3 and >350cells/mm3). Each group had 50 subjects. Percentage of high TSH was maximum amongst subjects with CD4 <200cells/mm3 (52%) and least amongst those with CD4 > 350 cells/mm3 (26%).[14]There is direct correlation between low CD_4count with thyroid dysfunction in HIV patients.

CONCLUSION

The present study shows that thyroid dysfunction is frequent in HIV infection and is in direct proportion to the advancing HIV disease. Subclinical hypothyroidism is the commonest dysfunction, with hypothyroidism being next most common. Thyroid dysfunction in HIV patients is more common with lowering CD4 counts. Thyroid function tests as part of screening in patients with advanced disease (AIDS) May be done on routine basis.

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