



HYPOTHYROIDISM IN RHEUMATOID ARTHRITIS -A HOSPITAL BASED CROSS-SECTIONAL STUDY IN RIMS, RANCHI, JHARKHAND

General Medicine

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ABSTRACT

BACKGROUND: Thyroid hormones are two hormones produced and released by the thyroid gland, namely triiodothyronine (T_3) and thyroxine (T_4). They are tyrosine-based hormones that are primarily responsible for regulation of metabolism. Hypothyroidism is a clinical syndrome disorder of thyroid gland or it may be secondary in which there is pituitary or hypothalamic defect. Subclinical hypothyroidism refers to biochemical evidence of thyroid hormone deficiency in patients who have few or no apparent clinical features of hypothyroidism

AIM: To study the prevalence of both clinical and subclinical hypothyroidism in patients of Rheumatoid Arthritis.

MATERIALS AND METHODS: 60 patients of Rheumatoid Arthritis both indoor and outdoor patients were included in this study and their serum T_3 , T_4 and TSH levels were evaluated.

Any T_3 / T_4 value below the lower limit of normal along with an elevated TSH $> 4.94 \mu\text{IU/ml}$ was considered as hypothyroidism.

Any TSH $> 4.94 \mu\text{IU/ml}$ along with normal range T_3 , T_4 was considered as subclinical hypothyroidism.

RESULT: Mean age of patients in this study was 40.97 ± 9.88 with mean age of males 46.92 ± 9.25 years and that of females 39.32 ± 9.49 years. Out of 60 total number of females were 47 (78.33%) and males were 13 (21.66%) with female to male ratio 3.6:1. Out of these 60 patients of Rheumatoid Arthritis, 9 patients (15%) were associated with hypothyroidism with all being females (100%) and most patients belonging to age group 25-34 years of age. Overall prevalence of clinical hypothyroidism in this study was 10% and that of subclinical hypothyroidism was 5% with autoimmunity in 13.33% of patients.

CONCLUSION: Prevalence of hypothyroidism in RA is not uncommon and there is an association between autoimmune process and hypothyroidism in patients of Rheumatoid Arthritis. Some patients develop subclinical form of the disease thus reducing the possibility of clinical suspicion of hypothyroidism in RA patients. Regular monitoring of thyroid function test is required to detect early onset of hypothyroidism in these patients.

KEYWORDS

Hypothyroidism, RA, autoimmune thyroid disease

INTRODUCTION:

Rheumatoid Arthritis (RA) is a chronic multi system inflammatory disorder disease of unknown cause, characterized by symmetrical, inflammatory, deforming polyarthritis⁽¹⁾ affecting small and large peripheral joints with associated systemic disturbance such as vasculitis and nodules. The prevalence of RA is 0.5–1% of the adult population worldwide. RA occurs more commonly in females than in males, with a ratio of 2–3:1⁽¹⁾. The onset is more frequent during the fourth and fifth decades of life, with 80% of all patients developing the disease between the ages of 35 and 50^(1,2). The initiating cause of rheumatoid arthritis remains unclear.

1. Genetic factors: Genetic studies of the distribution of RA in families and in mono & dizygotic twins show that there is a small but definite contribution of genetic factors to the disease. In twins studies, there is around 12–15% concordance of disease in identical twins and around 2–5% in non-identical twins⁽²⁾. In Indians RA is most commonly associated with HLA-DRI⁽³⁾.

2. Environmental factors: It has been suggested that RA might be a manifestation of the response to an infectious agent in a genetically susceptible host. Organism included EBV, CMV, Parovirus B1931, Rubella virus and mycoplasma. Cigarette smoking was associated with increased risk of RA⁽⁴⁾.

3. Host factors: RA is one of many autoimmune diseases that is predominant in women. Autoantibody-producing B cells exposed to estradiol are more resistant to apoptosis, suggesting that autoreactive B cell clones might escape tolerance.

The term "autoimmune thyroid disease" is used to describe all autoimmune thyroid conditions, including Graves' disease, Hashimoto's thyroiditis, and various other disorders (eg, postpartum thyroiditis, most cases of silent thyroiditis). The most common presentation is the presence of positive antithyroid antibodies in a euthyroid patient. Hypothyroidism with or without goiter is more

common than hyperthyroidism⁽⁴⁾. Rheumatic complaints start simultaneously with the first symptoms of hypothyroidism and joint pain and swelling usually disappear with thyroxine substitution. A study by Gerster Jean C⁽⁵⁾, as thyroxine replacement may reverse the rheumatic complaints, thyroid function should be performed as part of the biochemical profile in patients with RA not responding to anti-rheumatic treatment. Hypothyroidism should be considered in the differential diagnosis of destructive arthropathy⁽⁶⁾.

We aim to study prevalence of hypothyroidism in RA patients and its association with autoimmune process by evaluating Anti TPO antibody among these patients.

MATERIALS AND METHODS:

Our study was a single centre, observational study in both indoor and outdoor department of medicine, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand. The study was approved by the Institutional ethics committee, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India. Informed consent was taken from every patient included in the study.

INCLUSION CRITERIA

All the patients above 15 years of age with confirmed Rheumatoid Arthritis and those diagnosed with Rheumatoid Arthritis following evaluation between February 2020 to July 2020 were included in this study.

EXCLUSION CRITERIA

Patients with rheumatoid arthritis with the following conditions were excluded from the study:

- Nephrotic syndrome
- Diabetes mellitus
- Liver disorders
- Drugs like: Diuretics, Oral contraceptive

Normal ranges:

Serum Total T3 – 0.58-1.59 ng/ml
 Serum Total T4 – 4.87-11.72 µg/dl
 Serum TSH -0.35 - 4.94 µIU/ml
 Serum Anti TPOAb upto <5.61 IU/ml

Serum T3, T4, TSH were measured using Chemiluminescence technique and Thyroid peroxidase antibody by Enzyme Linked Immuno-Sorbent Assay.

Definition:

Serum T3 /T4 value below the lower limit of normal along with an elevated TSH >4.94 µIU/ml was considered as hypothyroidism.

Serum TSH > 4.94 µIU/ml along with normal range T3, T4 was considered as subclinical hypothyroidism.

Thyroid autoimmunity is considered to exist if TPOAb level was >5.61 IU/ml and not to exist if it is lesser.

RESULTS:

Mean age of patients in this study was 40.97±9.88 with mean age of males 46.92±9.25 years and that of females 39.32±9.49 years. Out of 60 total number of females were 47 (78.33%) and males were 13 (21.66%) with female to male ratio 3.6:1 in this study.

Out of these 60 RA patients, 9 patients (15%) were associated with hypothyroidism with all being females (100%) and most patients belonging to age group 25-34 years of age. Overall prevalence of clinical hypothyroidism in this study was 10% and that of subclinical hypothyroidism was 5% with autoimmunity in 13.33% of patients.

Table 1: Prevalence Of Hypothyroidism In Patients Of Rheumatoid Arthritis (n=60)

Total no of patients	60(100%)
Number of patients with hypothyroidism	9(15%)
Number of patients without hypothyroidism	51(85%)

Out of 60 patients of Rheumatoid Arthritis, 9(15%) patients were associated with hypothyroidism

Table 2: Distribution Of Form Of Hypothyroidism In Patients Of Rheumatoid Arthritis(n=60)

Total number of patients with clinical hypothyroidism	6(10%)
Total number of patients with subclinical hypothyroidism	3(5%)
Total number of RA patients	60(100%)

Out of 9 patients of hypothyroidism, 6 (10%) were associated with clinical hypothyroidism and 3 (5%) were associated with subclinical hypothyroidism.

Table 3: Prevalence Of Autoimmune Hypothyroidism In Patients Of Rheumatoid Arthritis(n=60)

Total number of RA patients	60(100%)
Total number of Anti TPO Antibody positive patients	8(13.33%)
Total number of Anti TPO Antibody negative patients	52(86.66%)

Out of these 9 patients showing hypothyroidism, 8 patients were Anti TPO antibody positive

TABLE 4: Total no of patients with thyroid dysfunction in different age groups (N=9)

Age group(in years)	No. of patients (%)
15-24	0
25-34	4(44.44%)
35-44	2(22.22%)
45-54	2(22.22%)
≥55	1(11.11%)
Total	9(100%)

Maximum numbers of patients of RA with hypothyroidism were present in age group of 25-44 years i.e. 44.44%.

Further, this study confirms that the prevalence of thyroid dysfunction in rheumatoid arthritis is high, especially in females and is associated with thyroid autoimmunity and suggests that all rheumatoid arthritis patients should undergo thyroid function test. Also those patients with elevated TSH should undergo screening for Anti TPO Ab.

DISCUSSION:

In this study, 18.33% patients were associated with hypothyroidism and 81.8% were anti TPO antibody positive whereas in study done by Atzeni F et al⁽⁷⁾ (2008) reported the presence of thyroid dysfunction in 8.5% patients of rheumatoid arthritis (RA) out of which 37% patients were anti TPO Antibody positive.

In this study, prevalence of clinical and subclinical hypothyroidism were 10% and 6% respectively whereas in a study done by Azeem et al⁽⁸⁾ in Egypt in 2018, thyroid abnormality was seen in 28% of patients of Rheumatoid Arthritis, out of which 21% of patients were associated with subclinical hypothyroidism, and 6% with clinical hypothyroidism

In this study, hypothyroidism was seen mostly in female patients of RA which is consistent with study done by Emamifar et al⁽⁹⁾ among Danish people in 2017 which reports the presence of thyroid dysfunction to be more in female patients than male patients of RA.

In this study, thyroid dysfunction was seen in age group from 25-44 years of age which was not consistent with study done by Hannawi et al⁽¹⁰⁾ in 2018 which shows that there was no significant difference in distribution of age for thyroid dysfunction in patients of RA.

Overall it was concluded that there was a higher prevalence of thyroid dysfunction in patients of Rheumatoid Arthritis, especially in females ranging from age group 25-44 years of age.

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