

## THE STUDY OF THYROID FUNCTION IN RHEUMATOID ARTHRITIS IN EASTERN INDIA

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### Abstract

**Background:** The aim of the study was to evaluate the prevalence of thyroid dysfunction and the incidence of autoimmune thyroiditis in rheumatoid arthritis. **Materials and Methods:** The study was a cross sectional observational study involving 50 rheumatoid arthritis patients (8 male and 32 female). The conditions which can alter thyroid profile were excluded from the study population at the time of selection. 40 age and sex matched healthy subjects were taken as controls. Thyroid function test were done in all patients and controls. In patients who were found to have thyroid dysfunction TPO antibodies were done. **Result:** Prevalence of thyroid dysfunction is 14% in patients with rheumatoid arthritis. Prevalence of thyroid dysfunction in control population was 5%. Among patients who had thyroid dysfunction there was no statistically significant difference in gender. Abnormal thyroid function is mainly in the form of both overt and subclinical hypothyroidism. Prevalence of autoimmune hypothyroidism is 22% in our case population. **Conclusion:** Our study confirms that the prevalence of thyroid dysfunction in rheumatoid arthritis is high and is associated with thyroid autoimmunity and suggest that all rheumatoid arthritis patients should undergo thyroid function testing and those with elevated TSH should go for autoimmune screening with TPO.

## INTRODUCTION

Rheumatoid arthritis (RA) is the most common inflammatory arthritis affecting about 0.5-1% of general population.<sup>[1]</sup> RA is a systemic autoimmune disorder characterised by symmetrical, inflammatory, deforming polyarthritis affecting small and large peripheral joints with associated systemic disturbance such as vasculitis and nodules. Being an autoimmune disease it can be associated with other autoantibody mediated diseases like autoimmune thyroiditis.<sup>[1]</sup> The prevalence of thyroid dysfunction in rheumatoid arthritis is 10-15% which is high in previous studies.<sup>[2,3]</sup> Autoimmune thyroiditis, specifically Hashimoto's thyroiditis, is more prevalent in persons with autoimmune disorders including rheumatoid arthritis. Boelaert et al,<sup>[4]</sup> investigated the prevalence of and relative risks for coexisting autoimmune diseases in patients with Graves disease (2791 patients) or Hashimoto thyroiditis (495 patients). The authors found coexisting disorders in 9.7% of patients with Graves disease and in 14.3% of those with Hashimoto thyroiditis, with rheumatoid arthritis being the most common of these (prevalence = 3.15% and 4.24% in Graves disease and Hashimoto thyroiditis, respectively).

The term autoimmune hypothyroidism identifies situations with insufficient thyroid function caused by autoimmune thyroid diseases due to autoimmune destruction of the thyroid gland. In its initial stage, chronic autoimmune thyroiditis is characterized by the presence of hallmarks of thyroid autoimmunity and normal thyroid function. As a consequence of the autoimmune attack to the gland, hypothyroidism may develop, usually slowly and insidiously, through a subclinical phase levels and an eventual phase of overt insufficiency. Etiology and pathogenesis of chronic autoimmune thyroiditis and mechanisms leading to the hypothyroid phase remain elusive. However, some predisposing genetic factors and some triggering environmental factors have been identified. The role of antigen presenting cells, of T and B-cell response, and of effectors mechanisms in the immuno pathogenesis of chronic autoimmune hypothyroidism has been extensively investigated. Circulating thyroid auto antibodies are the hallmarks of AITD and thyroid peroxidase antibodies is more sensitive than other antibodies in identifying thyroid autoimmunity.<sup>[5]</sup> Hypothyroidism is associated with fatigue, anemia, arthritis, and myalgia, and also induces destructive arthropathy, mainly of the proximal interphalangeal joints which would normally be attributed to the inflammatory state of a patient with RA. Since autoimmune thyroiditis in rheumatoid arthritis is

usually asymptomatic, any patient who is not responding to conventional treatment of RA or having high levels of TSH should be evaluated for autoimmune thyroiditis. There are studies evidence that RA patient having autoimmune thyroiditis improved symptomatically with thyroid supplementation.<sup>[6]</sup>

#### Aims and Objectives

To study the prevalence of thyroid dysfunction in Rheumatoid arthritis.

## MATERIALS AND METHODS

A Cross sectional observational study to analyse the prevalence of thyroid dysfunction and thyroid autoimmunity in rheumatoid Arthritis. Medicine OPD, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar. The study was approved by the Institutional ethical committee. Sixty patients of Rheumatoid arthritis and forty age and sex matched healthy controls, between the age of 17 to 60 years were selected for the study from Rheumatology clinic and outpatient department of Internal Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, between (January 2021 to December 2021) after thorough history taking and clinical examination and by exclusion criteria.

#### Inclusion Criteria:

Diagnosed cases of rheumatoid arthritis according to 1987 Revised American Rheumatism Association Criteria for classification of rheumatoid arthritis.

#### Exclusion Criteria:

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

1. Nephrotic syndrome
2. Diabetes mellitus
3. Thyroid disorders
4. Liver disorders
5. Drugs like
  - a. Diuretics
  - b. Oral contraceptives

Patients suffering from inflammatory diseases, diabetes mellitus, renal disorders, thyroid disorders and diseases known to affect the hormonal status were excluded from the study. Patients on medications known to alter the hormonal levels, pregnant, postpartum and post menopausal patients were excluded from the study. Patients were informed about the details of the test performed and obtained consent before collecting blood samples. Any patient not willing to cooperate after initially signing the informed consent was allowed to withdraw from the study

#### Method of testing:

T3, T4, TSH -- Chemiluminescence.

Thyroid peroxidase -- Enzyme Linked Immuno Sorbent Assay.

#### Statistical analysis:

Statistical analysis was carried out for 90 participants (50 RA patients, 40 controls) after

categorizing each variable. Base line data was collected from patients. RF, T3, T4, TSH and TPO in patients with thyroid dysfunction were analyzed. The significance of difference in mean between two groups was analyzed by student t test. Statistical significance was taken when p value < 0.05. Statistical analysis was carried out using standard formulae. Microsoft excels 2007 and SPSS (statistical package for social sciences) version 13 software was used for data entry and analysis.

## RESULTS

Out of 50 patients the female was 42 and male was 8. The average age of the patient was 17-60 yrs. The mean age of the patient was 41.82 yrs. The total number of hypothyroid was 7 (14%), in which male was one and the female was 6. Subclinical hypothyroidism was found in 3 (6%) cases and overt hypothyroidism in 4 cases. On comparing the female: male 5.2:1 ratio by chi square test, the p value is 1.0 and 0.457.

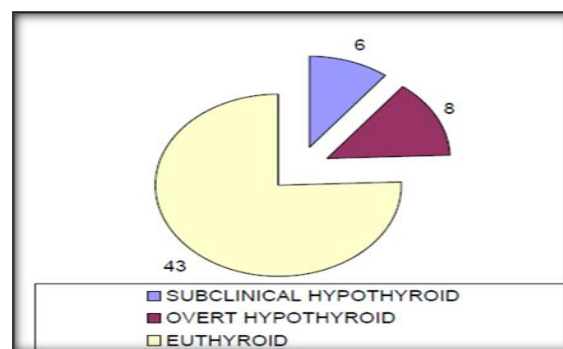


Figure 1: Prevalence of Thyroid Dysfunction in Rheumatoid Arthritis

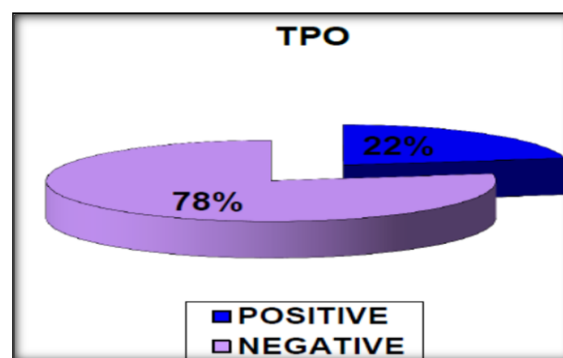


Figure 2: Prevalence of Autoimmune Hypothyroidism

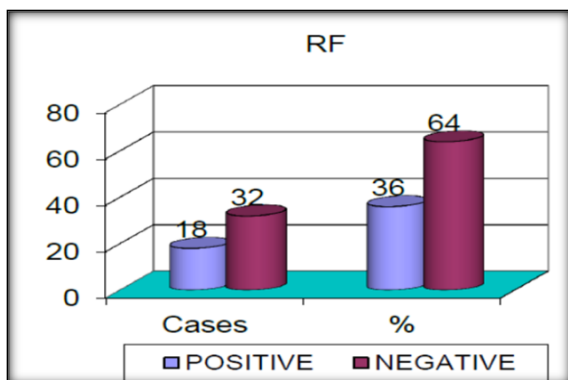


Figure 3: Rheumatoid Factor

Which is  $> 0.05$ ? So, the association between gender and hypothyroidism is not significant indicating that there is no significant gender difference among hypothyroid and Euthyroid rheumatoid arthritis as per this study. On comparing the T3 by chi square test, the p value is 0.001 which is  $< 0.05$ . So, there is significant abnormality in T3 levels in rheumatoid arthritis. On comparing the T4 by chi square test, the p value is 0.002 which is  $< 0.05$ . So, there is significant abnormality in T4 levels in rheumatoid arthritis. On comparing the TSH by chi square test, the p value is 0.04 which is  $< 0.05$ . So, there is significant abnormality in TSH levels in rheumatoid arthritis.

Table 1: Age Wise Distribution of Thyroid Dysfunction

Age	Total No	Euthyroid	Hypothyroid	Subclinical Hypothyroid	Subclinical Hyper Thyroidism
20-29	3	1	2	0	0
30-39	16	15	0	1	0
40-49	21	19	2	0	0
50-50	7	6	0	1	0
60-69	3	2	0	1	0

## DISCUSSION

The reported prevalence of thyroid dysfunction in rheumatoid arthritis populations varies widely between studies. But, thyroid dysfunction is found to be associated with organ specific antibody. In a study by Fabiola Atzeni,<sup>[13]</sup> to assess thyroid function as well as the prevalence and clinical value of anti-thyroid antibodies in patients with rheumatoid arthritis (RA) done in 70 RA patients, 9 males and 61 females, mean age 47 years (range 15–77) were analyzed. : Twenty-six patients (37%) with RA were positive for TPO Ab and 16 (23%) for TgAb. In 5 (7.1%) patients TSH level was slightly elevated. The increase of TSH levels was associated with normal FT4 in 3 cases (4.2%) and with reduced FT4 in 2 cases (2.8%). One patient (1.5%) had low TSH serum value along with normal FT4. Another study by.<sup>[14]</sup> Caron P, Lassoued S, Dromer C, Oksman F, Fournie A to find the prevalence of thyroid abnormalities in patients with rheumatoid arthritis. Prevalence of hypothyroidism and autoimmune thyroiditis and was 19.1% and 16.2% respectively. In study by,<sup>[2]</sup> Przygodzka M, Filipowicz-Sosnowska regarding prevalence of thyroid diseases and antithyroid antibodies in women with rheumatoid arthritis done among 100 patients with RA thyroid function and antithyroid antibodies were assessed. ATD was more prevalent (16%) in patients with RA than in the control group (9%). The difference was no statistically significant. Antithyroglobulin (anti-TG) and antithyroid peroxidase (anti-TPO) antibodies were (12% and 15%, respectively) in patients with RA and (9% and 18%, respectively) in the control group. The most common thyroid dysfunction observed in both groups was subclinical hypothyroidism. A study by,<sup>[3]</sup> El-Sherif WT El Gendi SS, Ashmawy MM, Ahmed HM Salama MM thyroid disorders and

autoantibodies in systemic lupus erythematosus and rheumatoid arthritis done among 20 patients with SLE and 20 with RA were studied. The results were compared with 20 healthy age and sex matched controls. This study revealed that thyroid disorders in RA, 10% had hypothyroidism (subclinical) and 5% had subclinical hyperthyroidism. TPO Ab was found in 5% of RA patients and 10% of controls. A study by Gonçalves, Fabrícia Torres MD et al,<sup>[25]</sup> autoimmune thyroiditis and rheumatoid arthritis :is there really an association? Done in 189 patients and 117 with no autoimmune rheumatic diseases. Thyroid dysfunction was found in 11, and thyroid autoantibodies in 15 RA patients, compared with 18 and 13 of the control group, respectively. The conclusion was there is no association between thyroid disease and RA. On the whole, in agreement with many similar reports, we observed a higher prevalence of thyroid dysfunction in our study and hypothyroidism was the thyroid dysfunction found, none of the patients had hyperthyroidism.

In study by,<sup>[2]</sup> Przygodzka M, Filipowicz-Sosnowska A regarding prevalence of thyroid diseases and antithyroid antibodies in women with rheumatoid arthritis done among 100 patients with RA thyroid function and antithyroid antibodies were assessed. ATD was more prevalent (16%) in patients with RA than in the control group (9%). The difference was no statistically significant. Antithyroglobulin (anti-TG) and antithyroid peroxidase (anti-TPO) antibodies were present in similar percentage of patients with RA (12% and 15%, respectively) and in the control group (9% and 18%, respectively).<sup>[3]</sup> El-Sherif WT El Gendi SS, Ashmawy MM, Ahmed HM Salama MM Thyroid disorders and autoantibodies in systemic lupus erythematosus and rheumatoid arthritis done among 20 patients with SLE and 20 with RA were studied. The results were compared with 20 healthy age- and

sex- matched controls. TPO Ab was found in 5% of RA patients and 10% of controls, and ATG Ab 30% of RA patients and 10% of controls. In a study by,<sup>[13]</sup> Fabiola Atzeni to assess thyroid function as well as the prevalence and clinical value of anti-thyroid antibodies in patients with rheumatoid arthritis (RA) done in 70 RA patients , 9 males and 61 females, mean age 47 years (range 15–77) were analyzed. : Twenty-six patients (37%) with RA were positive for TPO Ab and 16 (23%) for Tg Ab. In 5 (7.1%) patients TSH level was slightly elevated; this study shows an increased prevalence of anti-thyroid antibodies in RA patients with a low prevalence of hormonal alterations on analysing TPO antibodies in those with thyroid dysfunction prevalence was 22 % which was also comparable with the previous studies.

## CONCLUSION

Prevalence of hypothyroidism in RA is more than that seen among general population. Some patients develop subclinical form of the disease thus reducing the possibility of clinical suspicion. There is an association of thyroid autoimmunity and thyroid dysfunction in RA. In summary, our study confirms that the prevalence of thyroid dysfunction in rheumatoid arthritis is high and is associated with thyroid autoimmunity and suggest that all rheumatoid arthritis patients should undergo thyroid function testing and those with elevated TSH should go for autoimmune screening with TPO.

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