



## THYROID PROFILE IN FEMALE PATIENTS WITH RHEUMATOID ARTHRITIS

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### ABSTRACT

The present study was carried out to assess the levels of thyroid hormones in female patients with rheumatoid arthritis(RA)(n=50). Serum T3,T4, TSH levels were measured in the early follicular phase of menstrual cycle. The levels were not significant in the patients when compared to the patients with RA. 6 patients (12%) had TSH increased and T3 and T4 levels decreased and responded to thyroxin treatment suggesting that hypothyroidism must be considered as a biochemical investigation in patients presenting with arthritis.

**KEY WORDS:** Rheumatoid arthritis, thyroid profile

### INTRODUCTION

Rheumatoid arthritis (RA) is the most common inflammatory arthritis affecting about 0.75% of general population [1]. The extra-articular manifestations in patients of RA include haematologic abnormalities, vasculitis, pulmonary disease and cardiac complications. Little is known regarding the development of these extra-articular manifestations. An abnormal autoimmune response, genetic susceptibility, some environmental or biologic factors, such as a viral infection or hormonal changes are known to trigger RA [2]. The disease usually involves the serosae, vessels, lungs, viscera and both the exocrine and endocrine glands namely the thyroid. The coexistence of thyroiditis and RA has been the subject of debate for years and some workers [3] have suggested that thyroid dysfunction might exacerbate rheumatoid disease and a destructive arthropathy, mainly of the proximal interphalangeal joints.

Though numerous studies [4, 5] have focused on the functional and immune thyroid gland abnormalities in patients with previous history of RA and the joint changes in patients with previous autoimmune thyroid diseases, the precise relationship between RA and thyroid disorders as a function of the disease duration and disease activity has yet not been established.

Women are significantly more likely to develop RA than men and hormones are known to affect the disease status in patients of RA [6]. Hence, it

was thought worthwhile to evaluate the thyroid profile in females with recent onset RA in the early follicular stage of menstrual cycle.

### MATERIALS AND METHODS

A case control study was carried out in the Department of Biochemistry, NKPSIMS, Nagpur for a period of one and half year. The study protocol was cleared by the ethics committee of the Institute.

50 samples of freshly diagnosed female patients suffering from rheumatoid arthritis were age-matched (30-50) years with 50 normal healthy controls. As per the detailed clinical examination, the patients fulfilled the Criteria of the American Rheumatism Association for the diagnosis RA. The Criterias are 1) morning stiffness in and around the joints for at least one hour, 2) Swelling or inflammation [Arthritis] of 2 or more joints simultaneously, 3) Involvement of at least one area at wrist, hand, or finger joints 4) Symmetrical Arthritis 5) Presence of Rheumatoid Nodules 6) Positive Rheumatoid Factor ,6) Radiological changes in the hands and wrists with destruction of bone around the involved joints. The first 4 factors must have been present for at least 6 weeks for the diagnosis of RA. All the cases were screened for rheumatoid factor, C-reactive proteins, ESR, X-ray of the joint involved. 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.

An informed written consent was obtained from each subject participating in the study. Any patient not willing to cooperate after initially signing the informed consent was allowed to withdraw from the study.

All blood samples were collected in dry tubes, centrifuged at 3000 rpm for 5 minutes and serum was stored in deep freeze at -20 °C until analysis. T3, T4 and TSH concentrations from females who were in the early follicular phase of menstrual cycle were measured under basal conditions by kit method using by Lumax analyzer. Data was analyzed using students t test

## RESULTS AND DISCUSSION

Rheumatoid arthritis is a chronic multi system disease of unknown cause with multiple systemic manifestations. There are many mysteries attached to role of thyroid hormones in RA. The pathogenesis of thyroid disease in patients with RA seems to be linked to a common pathway. Antithyroid activity of one of the antibodies produced in RA result in alterations in the thyroid volume and function irrespective of the disease activity. [7 ]

Our study demonstrates that of the 50 patients diagnosed for RA on the basis of clinical features, 37 (74%) patients were CRP & RA positive and had normal thyroid profile. 7 (14%) patients were CRP and RA negative with normal T3, T4, TSH levels but were diagnosed as suffering from RA on the basis of the Criteria of the American Rheumatism Association. Only 6 (12%) showed altered thyroid profile with decreased T3&T4 and increased TSH values with CRP and RA negative suggesting that patients with arthritis showed an altered thyroid profile.

Similar observations by [Wellby](#) [8] and [Delamere JP](#)[3] suggested that the activity of recent onset rheumatoid arthritis did not affect thyroid function in any way. However [B. Singh](#) [9] [Cevik R](#) [10] and [Bianchi G](#)[7] found statistically significant higher values of T3&T4 and lower TSH in women with RA which correlated with the disease duration and not with the disease activity .

[Jeffrey B Shiroky](#) [11] evaluated that thyroid dysfunction occurs in patients with RA at a much higher frequency than comparable controls. The presence of thyroid dysfunction is unrelated to increasing age, duration of RA, rheumatoid factor status, or antinuclear antibody status. The excess thyroid dysfunction is due to hypothyroidism. Moreover, most probably rheumatoid arthritis and thyroid abnormalities are due to HLA type that is genetic predisposition in nature. [12]

**Table 1**

Parameters	Controls (n=50)	RA patients (n=50)
T3 (ng/ml)	1.06±0.36	0.98±0.30 NS
T4 (µg/ml)	7.90 ±2.99	7.26 ±2.01 NS
TSH (µIU/ml)	1.37 ±1.25	1.54 ±1.17 NS

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. Rheumatic complaints start simultaneously with the first symptoms of hypothyroidism and joint pain and swelling usually disappear with thyroxine substitution. In our study, in the six cases that showed clinical features of RA and biochemical changes of hypothyroidism treatment with thyroxine led to improvement in their symptoms. This is in accordance with the study of [Gerster Jean C](#) [13].

Hence, 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. Moreover, high risk patients i.e. females with lowered TSH should be evaluated for thyroid profile follow up and be given appropriate treatment.

## REFERENCES

1. [T. Gram](#), [T. Riise](#) and [Y. Honda](#). Rheumatoid arthritis: A commonly misused diagnosis by the general

- population *Clinical Rheumatology*, 1997, Volume 16, Number 3: 264-266.
2. Maurizio Cutolo, Barbara Villaggio, Chiara Craviotto, Carmen Pizzorni, Bruno Serio and Alberto Sulli. Sex hormones and rheumatoid arthritis. *Autoimmunity Reviews* Volume 1, Issue (5), October 2002, 284-289.
  3. Delamere JP, Scott DL, Felix-Davies DD. Thyroid dysfunctions and rheumatic disease. *J R Soc Med* 75:102-106, 1982.
  4. T. Y. Chan, Z. Al-Saffar and R. C. Bucknall. Thyroid disease in systemic lupus erythematosus and rheumatoid arthritis *Rheumatology* 2001; 40: 353-354.
  5. R. Porkodi, S. Ramesh, A. Mahesh, P. Kanakarani, S. Rukmangathrajan Panchapakesa, C. Rajendran Thyroid dysfunction in systemic Lupus Erythematosus and Rheumatoid Arthritis. *Indian Rheumatol Assoc* 2004 : 12 : 88-90.
  6. Masi Alfonse T. Aldag Jean C. Chatterson Robert T. Sex hormones and risks of rheumatoid arthritis and developmental or environmental influences. *Annals of the New York Academy of Sciences* 2006, vol. 1069, pp. 223-235.
  7. Bianchi G, Marchesini G, Zoli M, Falasconi MC, IERVESE T, VECCHI F, MAGALOTTI D, FERRI S; Thyroid involvement in chronic inflammatory rheumatological disorders. *Clinical rheumatology* 1994, 13;1:479-484.
  8. M.L. Wellby, J.A. Kennedy, K. Pile, B.S. True, P. Barreau Serum interleukin-6 and thyroid hormones in rheumatoid arthritis. *Metabolism Clinical and Experimental Journal* 2001 Volume 50, Issue 4, Pages 463-467.
  9. B. Singh, B.R. Mittal, A. Bhattacharya, S.D. Deodhar A Cross Sectional Evaluation of Circulating Thyroid Hormonal Profile in Patients with Rheumatoid Arthritis *2002IJNM*, 17(2 & 3): 68-72.
  10. Cevik R, Em S, Gur A, Nas K, Sarac A.J, Çolpan L. Sex and thyroid hormone status in women with rheumatoid arthritis: are there any effects of menopausal state and disease activity on these hormones? *International Journal of Clinical Practice*, Volume 58, Number 4, April 2004, 6:327-332.
  11. Jeffrey B Shiroky, Martin Cohen, Marie-Louise Ballachey, Carolyn Neville. Thyroid dysfunction in rheumatoid arthritis: a controlled prospective survey. *Annals of the Rheumatic Diseases* 1993; 52: 454-456
  12. Staykova ND. Rheumatoid arthritis and thyroid abnormalities. *Folia Med (Plovdiv)*. 2007;49(3-4):5-12.
  13. Gerster Jean C, Pierre Quadri and Yves Saudan. Hypothyroidism presenting as a destructive arthropathy of the fingers, *Postgraduate Medical Journal* 1985; 61,157-159.