

Demographic Characteristics of Patients with Rheumatoid Arthritis at a Tertiary Care Centre in North India

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Abstract

Introduction: Rheumatoid arthritis is one of the most prevalent autoimmune diseases responsible for causing persistent synovitis, pain, joint destruction, and functional disability. This study was undertaken to understand the demographic characteristics of patients with rheumatoid arthritis in North-Indian population.

Methods: This study involved retrospective analysis of rheumatoid factor estimation done in 3724 serum samples using SPECTRUM RF Test Kit (Spectrum Medical Industries, Delhi, India) & SPECTRUM Automatic Analyzer at Serology & Immunology laboratory between June 2021 to May 2022.

Results: Immunoturbidimetry is a simple and sensitive technique for rheumatoid factor determination. Quantification of rheumatoid factor by immunoturbidimetry appears to be well suited for the routine diagnostic laboratory. Out of 3724 samples, 290 samples were positive for rheumatoid factor with slight male predominance as compared to females. A

statistically significant relation (P value < 0.05) with rheumatoid arthritis was found in 3 age group categories 0-10 years, 21- 30 yrs & 51- 60 yrs. Maximum number of positive cases in our study were from Department of Medicine followed by Medicine, Surgery & Obstetrics gynaecology.

Conclusion: Our study will help in understanding the demographic features associated with patients of rheumatoid arthritis in and around North India, especially Delhi region. It also emphasizes the need for continuous surveillance of new cases at local and national level that may, further, help in determining environmental and geological triggers which are responsible for such changes.

Keywords: RA Factor, Rheumatoid Arthritis, Autoimmune disease

Introduction

Rheumatoid arthritis is one of the most prevalent autoimmune diseases, affecting up to 1% of world population.¹ It causes persistent synovitis, pain, joint

destruction, and functional disability. Because irreversible joint destruction can be prevented by intervention during the first months of disease, early diagnosis of rheumatoid arthritis is important.²⁻⁴ Rheumatoid factor is an antibody directed against the Fc region of IgG and is used as a diagnostic marker for rheumatoid arthritis. However, it is non-specific and may be present in healthy elderly persons or in patients with other autoimmune and infectious diseases.⁵

Early diagnosis of rheumatoid arthritis is important because aggressive therapy can prevent the development of articular erosions and deformities.^{1,6} High titer of rheumatoid factor, as measured by conventional agglutination tests, have been associated with poor prognosis in rheumatoid arthritis including extra-articular manifestations like vasculitis, rheumatoid nodules.^{7,8}

The worldwide prevalence of rheumatoid arthritis has been estimated as 0.24 percent based upon the Global Burden of Disease 2010 Study.⁹ Estimates of rheumatoid arthritis prevalence in the United States and Northern European countries are typically higher, usually between 0.5 to 1 percent.^{10,11} The annual incidence of rheumatoid arthritis in the United States and Northern European countries is estimated to be approximately 40 per 100,000 persons.^{10,12} Whereas prevalence of rheumatoid arthritis studied in the adult Indian population was found to be 0.75%.¹³

There are different ways available at present to measure rheumatoid factor. Method like latex agglutination test is only semi quantitative and requires a subjective interpretation of the end point. In addition, this method suffers from the limitation that the rheumatoid factor level must change by over 50% before there is a change in titer. Recently, Elisa methods have become available to measure rheumatoid factor in absolute terms. They are

very sensitive but are relatively expensive and time consuming.

Immunoturbidimetry is another simple and sensitive technique for rheumatoid factor determination. It is based on principle of measuring the degree of light scatter caused by the interaction of rheumatoid factor with latex particles.¹⁴

In our study, we have studied demographic characteristics of patients with rheumatoid arthritis in North-Indian population.

Material and methods

This study involved retrospective analysis of rheumatoid factor estimation in 3724 serum samples received at Serology & Immunology laboratory, Department of Microbiology, University College of Medical Sciences and GTB hospital, Delhi between June 2021 to May 2022.

Serum Separation: 3-5ml of blood received in a plain vacutainer was centrifuged at 2000 rpm for 10 minutes for separation of serum.

Rheumatoid factor estimation was done using SPECTRUM RF Test Kit (Spectrum Medical Industries, Delhi, India) by SPECTRUM Automatic Analyzer (Spectrum Medical Industries, Delhi, India) as per manufacturer's instructions.

Statistical Analysis

Data collected was entered into Microsoft EXCEL spreadsheet and data analysis was done using 'Statistical Package for Social Sciences (SPSS) software', IBM manufacturer, Chicago, USA, version 21.0.

Results

During the study period, 3724 samples were tested for rheumatoid factor estimation. Out of 3724 samples, 290 samples were positive for rheumatoid factor and 3434 samples were negative as shown in table 1.

Table 1: Total number of samples tested

Total Samples tested	3724
Positive for Rheumatoid factor	290
Negative for Rheumatoid factor	3434

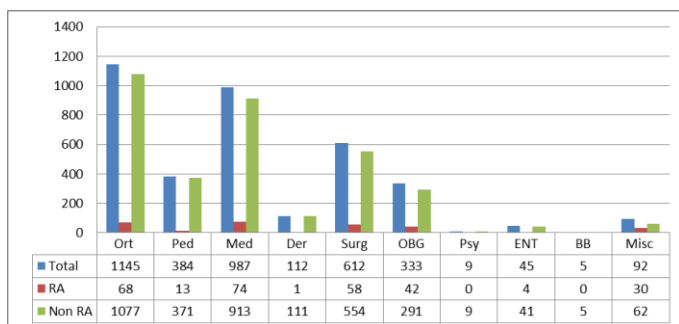
Table 2: Gender distribution (n=3724)

Sex	Total (%) n=3724	Rheumatoid factor Positive n=290(%)	Rheumatoid factor Negative n=3434(%)
Male	1326 (35.60)	114(8.59%)	1212(91.40%)
Female	2398(64.39%)	176(7.33%)	2222(92.66%)

Table 3: Age wise distribution of cases

Age Group	Total n=3724 (%)	Rheumatoid factor Positive n=290 (%)	Rheumatoid factor Negative n=3434 (%)	P value
0-10 yr	223(5.98%)	8(3.58%)	215(96.41%)	0.0137
11-20 yr	261(7%)	17(6.51%)	244(93.48%)	0.4742
21-30 yr	522(14.01%)	58(11.11%)	464(88.88%)	0.0035
31-40 yr	744(19.97%)	69(9.27%)	675(90.72%)	0.0928
41-50 yr	932(25.02%)	86(9.22%)	846(90.77%)	0.0662
51-60 yr	856(22.98%)	42(4.90%)	814(95.09%)	0.0003
>60 yr	186(4.99%)	10(5.37%)	176(94.62%)	0.2603

Fig. 1: Department-wise distribution of total, positive & negative cases



RA-Rheumatoid arthritis, Non-RA- Non rheumatoid arthritis, ort-orthopedics, Ped- pediatrics, Med-medicine, Der- dermatology, Surg- Surgery, OBG- Obstetrics and gynaecology, Psy- psychiatry, ENT – ear ,nose and throat, BB- blood bank , Misc. – miscellaneous

Table 2 shows positivity rate in males as compared to females. The positivity rate was slightly higher in males as compared to females, the M:F ratio being slightly higher in males.

Table 3 shows age wise distribution of total number of cases tested for rheumatoid factor estimation. It shows 8 cases positive for rheumatoid factor out of 223 cases in 0-10 years age category. Similarly in age group 21- 30 yrs, 58 cases positive for rheumatoid factor out of 522 cases and in age group 51- 60 yrs, 42 cases were positive out of 856 cases. A statistically significant relation (P value < 0.05) was found in all the 3 age group categories.

In fig. 1, 74 cases out of 987 were positive for rheumatoid factor in Department of Medicine followed by 68 cases out of 1145 in Orthopedics Department. There were 58 cases positive for rheumatoid factor in Department of Surgery & 42 positive cases in Department of Obstetrics & gynecology. Similarly in Pediatrics Department 13 cases were positive, in Dermatology Department 1 case was positive and in other departments like ART clinic, Unani 30 cases were positive out of 92 cases.

Discussion

Rheumatoid factor is a protein produced by immune system that can attack healthy tissues in the body. Abnormally raised levels of rheumatoid factor in the blood are most often associated with various autoimmune diseases, like rheumatoid arthritis and Sjogren's syndrome. Rheumatoid factor can also be detected in some healthy people, and in some people with autoimmune diseases, sometimes normal levels of

rheumatoid factor have also been detected. The presence, absence & high titers of rheumatoid factor have important implications for the diagnosis and prognosis of rheumatoid arthritis. The seropositive patients (rheumatoid factor positive) with rheumatoid arthritis may experience more aggressive and erosive joint disease along with extra-articular manifestations such as rheumatoid nodules and vasculitis than those who are seronegative (rheumatoid factor negative).¹⁵ Quantification of rheumatoid factor by immunoturbidimetry appears to be well suited for the routine diagnostic laboratory and has several advantages compared with the more traditional agglutination tests. The immunoturbidimetry test is simple, gives rapid results, has good precision and has the ability to measure rheumatoid factor in absolute terms.

Between June 2021 to May 2022, 3724 samples were tested for rheumatoid factor estimation. Out of 3724 samples, 290 samples were positive and 3434 samples were negative for rheumatoid factor (Table 1). The positivity rate of rheumatoid factor during this period was 7.78%. In similar studies done by Wolfe F and Visser H et al the positivity rate was 16.4% (8287 samples tested) & 12% (1988 samples tested) which was higher as compared to our study.^{16,17} This wide variation in positivity rate may be due to large number of samples received in our laboratory for testing.

In our study, the positivity rate was slightly higher in males as compared to females (M v/s F = 8.59% v/s 7.33%; Table 2). On the basis of this, a conclusion can be drawn that there is male preponderance in rheumatoid arthritis. However, this could also be an anomaly as the total number of males tested in our study were less in comparison to females. Some other studies done by Wallenius et al, Sokka et al, Hallert et al and Forslind et

al shows higher prevalence of rheumatoid arthritis amongst female as compared to males.¹⁸⁻²¹

Rheumatoid arthritis most commonly affect adult population but prevalence of rheumatoid arthritis in pediatric population especially 0-10 yrs is increasing as seen in our study where a statistically significant (P=0.0137; Table 3) finding is observed. Age related changes in incidence reflects environmental and geological triggers which causes such changes. Continued surveillance of new cases in younger age is thus needed to help determine the possible triggering agents. Our finding is supported by similar findings by Al Mayouf et al which also shows increased prevalence of rheumatoid arthritis in children below 16 years of age.²²

Maximum number of positive cases in our study were from Department of Medicine followed by Medicine, Surgery & Obstetrics gynae (74 v/s 68 v/s 58 v/s 42). Since rheumatoid arthritis is an autoimmune condition, it's management includes a multidisciplinary approach involving a regular team of rheumatologist & orthopedician along with physical therapist and dietician. The treatment approach for rheumatoid arthritis, includes the use of biological agents if required and treatment of various connective tissue disorders with specific treatment modalities.

Conclusion

Rheumatoid arthritis is one of the most prevalent autoimmune diseases and causes persistent synovitis, pain, joint destruction, and functional disability. Our study will help in understanding the demographic features associated with rheumatoid arthritis in and around North India, especially Delhi region. It also emphasizes the need for continuous surveillance of new cases at local and national level that may, further, help in determining environmental and geological triggers which

are responsible for such changes. There was a limitation to this study as the sample size was relatively small to arrive at a more definitive conclusion. A study involving more number of positive cases of rheumatoid arthritis would yield more conclusive results.

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