

Ocular Parasympathetic Dysfunction in Long Term Femalerheumatoid Arthritis Patients

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Abstract: Rheumatoid Arthritis (RA), a chronic inflammatory musculoskeletal disease affecting primarily the peripheral joints may also present with extra-articular manifestations like involvement of exocrine lacrimal glands. Rheumatoid arthritis patients develop ocular dryness due to inflammation of lacrimal gland tissue. Ocular dryness is also a characteristic feature of autonomic dysfunction which greatly affects the quality of life in RA patients. The study was conducted to assess the parasympathetic ocular function among RA patients using schirmer's test and to find out the correlation of parasympathetic ocular dysfunction with age, gender, disease duration and RF factor positivity. This cross sectional study was conducted in a tertiary care hospital among 200 RA patients aged 20-55 years attending Rheumatology clinic. Age matched control group included 100 persons. Ocular parasympathetic autonomic damage was strongly associated to RF, disease duration and female gender. Early detection and treatment of autonomic neuropathy will not only help to reduce the mortality but also certainly improve the quality of life and reduce the sufferings in RA patients.

Keywords : Rheumatoid arthritis, Parasympathetic ocular dysfunction, Schirmers test.

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I. Introduction

Rheumatoid Arthritis (RA), a chronic inflammatory musculoskeletal disease affecting primarily the peripheral joints is characterized by deforming symmetrical polyarthritis of varying extent and severity, associated with synovitis of joint and tendon sheath, articular cartilage loss, erosion of juxta-articular bone and presence of IgM Rheumatoid factor (RF) in blood¹. RA may also present with extra-articular manifestations like involvement of exocrine lacrimal glands². Ocular manifestations in RA include episcleritis, scleritis, choroid and retinal nodules³. Rheumatoid arthritis patients develop ocular dryness due to inflammation of lacrimal gland tissue. Ocular dryness is also a characteristic feature of autonomic dysfunction and this may also be the cause of mucosal dryness in RA patients^{4,5}. Autonomic dysfunction is due to the effect of disease process on the Sympathetic and Parasympathetic nerve fibres. Branches of parasympathetic system play a role in lacrimal function and pupil size is controlled by a balance between the innervation of the sympathetic to the iris dilator muscles and the parasympathetic to the sphincter muscles⁶. Ocular dysfunction in RA patients badly affects their quality of life. Hence this study was conducted to assess the ocular function among RA patients using schirmer's test.

II. Aims And Objectives

1. To assess the parasympathetic ocular function among RA patients.
2. To find out the correlation of parasympathetic ocular dysfunction with age, gender, disease duration and Rheumatoid factor (RF) positivity.

III. Materials And Methods

This cross sectional study was conducted among 200 RA patients aged 20-55 years attending Rheumatology clinics in a tertiary care hospital after obtaining institutional ethical committee approval. Age matched control group included 100 healthy persons. The RA patients were diagnosed based on ACR criteria⁷. Patients with other chronic illness like Diabetes, Hypertension, history of chronic drug intake, anemia (Hemoglobin below 10g/dl) and pregnancy were excluded from the study.

Test procedure

The study details were clearly explained to the subjects and informed consent was obtained. A complete clinical examination was done before doing the test. Resting pulse rate and basal blood pressure were recorded. Ocular Parasympathetic system function was assessed using the Schirmer's test

Schirmer's test-I

This test was used to measure the amount of tear production to assess parasympathetic ocular function. Standardized ophthalmic paper strips were placed in the lower eyelid of unanaesthetized eye and the degree of wetting of the strips five minutes after placement was noted. The result was considered normal if the wetting of the filter paper was 15 mm and more, borderline if the wetting of the filter paper was between 10 to 14 mm and abnormal if the wetting of the filter paper was less than 10 mm per 5 minutes^{8,9}.

Schirmer's Lignocaine test

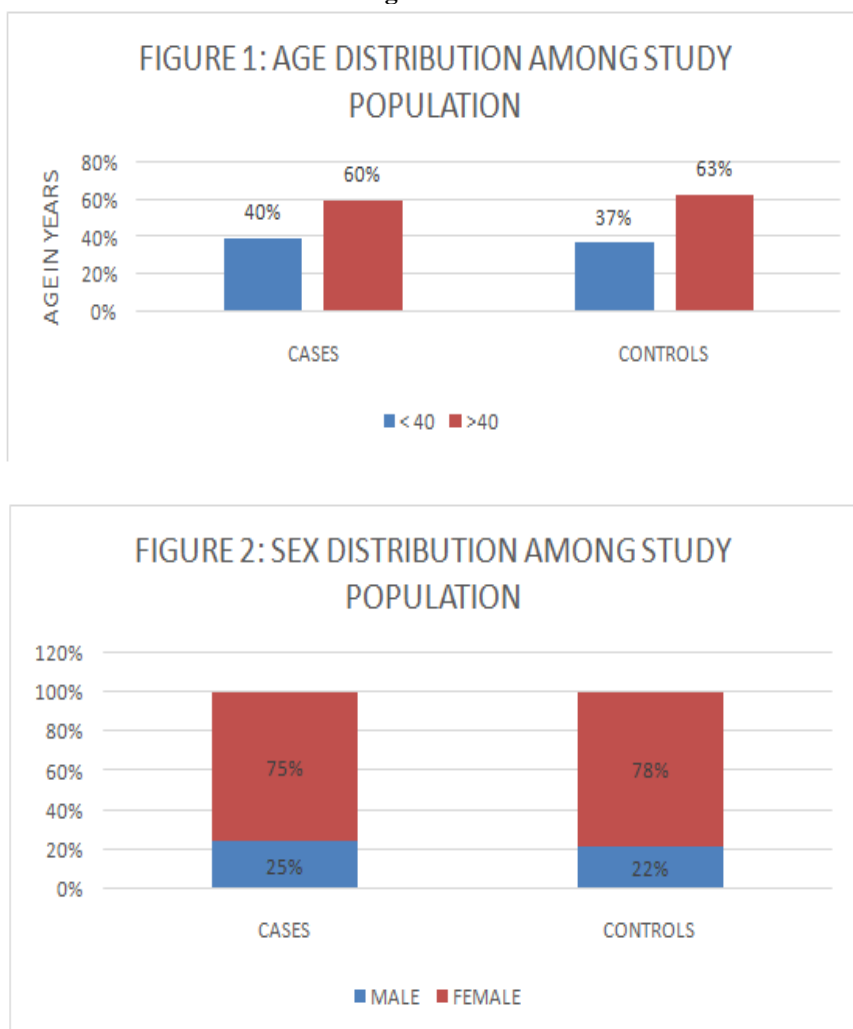
This test was used to measure the basal tear secretion. After installation of 4% lignocaine drops into the eyes the standardized filter paper strips were placed in the lower eye lid and the degree of wetting of strips in five minutes was noted. The result was considered abnormal if the wetting of the paper was below 5mm and normal if the wetting of the paper was between 5 to 10 mm.

Statistical analysis was done using Microsoft excel 2009 and SPSS version 17^{10,11}.

Results

In this study 200 Rheumatoid Arthritis patients were enrolled. The mean age of the study population was 42.60 ± 9.33 years. Among them 60% were female patients. The mean duration of disease at the time of study was 3.45 ± 2.37 . Rheumatoid Factor positivity was present among 79.86% of the cases. The mean ESR value was found to be around 42mm/hr. The demographic data of case and control group is depicted in the

Figure 1 & 2



The basal heart rate, systolic and diastolic BP was recorded among the case and control group. It was found that there was a significant increase in basal heart rate and systolic BP among RA patients. Basal diastolic BP showed no such significant increase among RA patients.(Table 1)

Table 1: Basal heart rate and Blood Pressure among study population

Variables	Groups				P Value
	Cases n =200		Controls n=100		
	Mean	SD	Mean	SD	
Basal heart rate	82.38	8.74	71.54	2.34	0.000*
Basal systolic BP	112.56	15.68	111.43	15.75	0.047*
Basal diastolic BP	74.62	7.04	75.74	5.68	0.367

*Significant SD Standard Deviation

Parasympathetic ocular function was assessed and compared among case and control group using schirmers test.

Table 2: Comparison of schirmers test result in study population

Parasympathetic Ocular Function Test	GROUPS				T Value	P Value
	CASES N=200		CONTROLS N=100			
	Mean	SD	Mean	SD		
Schirmers I Test	13.75	8.854	25.05	3.821	-15.715	<0.001*
Schirmers Lignocaine Test	5.10	1.525	7.08	1.608	-10.460	<0.001*

*Significant

Schirmers test was abnormal in 90 cases and schirmers lignocaine test was abnormal in 80 cases.

Table 3: Correlation of age,gender,diseaseduration,RF status and ocular parasympathetic damage in RA cases

Ocular parasympathetic damage	Correlation value (r)	P value
Age	-0.068	0.329*
Gender	-0.140	0.044*
Disease duration	-0.496	0.000*
RF status	0.520	0.000*

*significant

Ocular parasympathetic autonomic damage was strongly associated to RF,disease duration and female gender.

IV. Discussion

The study was done to assess the parasympathetic ocular function among RA patients using schirmers tests. Studies have shown that abnormal responses to autonomic function tests may precede symptoms for some years in diabetics with autonomic neuropathy and interestingly 14.49% of our RA patients had symptoms that could be attributed to autonomic neuropathy which is similar to the study of M.E.Edmondset al¹². 18% of RA patients presented with dry eyes which is similar to Avems H, Hall et al study¹³. This result is in contrast to the findings of Niemela et al study which showed no evidence of ocular autonomic involvement in RA patients¹⁴. Results of our study showed 46% of parasympathetic ocular autonomic damage in the form of decreased lacrimal secretion similar to Andonopoulos et al study¹⁵. Decreased lacrimal secretion is the frequent extra articular manifestation in RA patients and it is strongly related to female RA patients, rheumatoid factor positivity and duration of disease. The lacrimal gland dysfunction was assessed by measuring tear production with schirmers test. The decreased lacrimal secretion may lead to reduced ocular health in RA and probably, also sicca symptoms from other exocrine glands, as oral and ocular autoimmune exocrinopathy has been found to correlate with pathology in exocrine glands elsewhere¹⁶. Our previous study has confirmed the presence of significant subclinical cardiovascular parasympathetic nervous dysfunction in RA patients which also adds to the findings of this study that there is significant parasympathetic ocular dysfunction in Rheumatoid Arthritis patients¹⁷. Long term follow up of RA patients is essential to determine the role of risk factors in rheumatoid autonomic neuropathy.

V. Conclusion

Ocular parasympathetic damage has shown significant positive correlation to sero-positivity and significant negative correlation to disease duration and female RA patients. Early detection and treatment of autonomic neuropathy will not only help to reduce the mortality but also certainly improve the quality of life and reduce the sufferings in RA patients.

Conflicts of interest : Nil

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