



ORIGINAL RESEARCH PAPER

Physiology

EFFECT OF TIME DOMAIN ON RHEUMATOID ARTHRITIS PATIENTS

KEY WORDS: Heart rate variability, Time domain frequency, Rheumatoid arthritis.

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ABSTRACT

Rheumatoid arthritis is a chronic multisystem ,a long term ,progressive ,and disabling autoimmune disease of unknown etiology .as the immune system responds ,in inflammation occurs in the target tissue or organ .in the case of RA this can be the joints lungs eyes and heart .Heart rate variability is reliable tool for assessing the activities of autonomic nervous system.

In some studies increased heart rate and decreased HRV associated with increased mortality in patients with rheumatoid arthritis.

The present study was undertaken to determine the Heart rate variability in rheumatoid arthritis patients and to compare mean value of time domain SDNN NN50 PNN50 RMSSD Heart rate variability with study group and normal group.

MATERIALS AND METHODS: The study was conducted on 50 rheumatoid arthritis patients in the age group of 30-70years and 50 healthy age and sex matched controls. HRV was done with Medicad students Physiopac and analyzed with Kubois software Version 2.1. Data was analyzed using statistical software STATA 11.2 using ANOVA. Significance of p value was taken as 0.05.

RESULT: Data was analyzed using statistical software STATA 11.2 using ANOVA. Significance of p value was taken as 0.05.

CONCLUSION: In patients with Rheumatoid arthritis time domain frequency is altered. Our findings indicate higher sympathetic activity and higher basal heart rate compared to normal study. An involvement of humoral and cellular immune component has been suggested to play a role in severe autonomic neuropathy

INTRODUCTION

Rheumatoid arthritis is a chronic multisystem diseases of unknown etiology .It has a progressive course with exacerbation and remissions of being part of its natural history .Its onset could be at any age ,although it usually starts in the fourth decade of life .Overall there is a 3:1 female preponderance ,but this excess is greater in young people and the age related Incidence is approximately equal in elderly people .The prevalence of rheumatoid arthritis in India is about 0.75%(1,2).Rheumatoid arthritis causes premature death ,disability, and lowers the quality of life. Adults suffer from arthritis equal in approximately ,23% of the population .Multiple studies report that in the past half century ,mortality among people with diagnosed RA has increased compared with general population (3).several studies have shown an increased incidence of cardiovascular events in patients with RA(4,5,6).

HRV quantification is an accepted, non-invasive tool for cardiac autonomic regulation via sympathetic and parasympathetic nervous system. HRV analysis involve time domain parameters. low frequency (LF) reflect sympathetic and parasympathetic nervous system, (HF) reflects parasympathetic nervous system and LF/HF ratio indicates sympathovagal balance H, Dursunoglu et al showed a decreased HRV in patients with RA [7].Therefore, assessment of HRV has an important role in identifying the patients with RA who are at high risk of life-threatening cardiac events[8,9]. Thus, the utility of HRV assessment can be extended to a timely diagnosis of altered autonomic function status in RA patients there by reducing the risk of associated increased mortality due to cardiovascular events.

The aim of our study is to find frequency domain changes in rheumatoid arthritis patents to assess the autonomic nervous activity.

MATERIAL AND METHODS

The Study was performed on patients attending the Medicine & Orthopaedics OPD in a total of 50 Rheumatoid Arthritis patients were enrolled and compared with 50 controls in

tertiary care hospital, Mumbai. After clinical evaluation and laboratory investigation, those patients satisfying the Modified American Rheumatology Classification Criteria (1987) were included in the study. Age group of the subject from 30 to 70 years both male & female and the duration of disease 5-10yrs of diseases were taken for the study. Pregnant females and Patients with history of Diabetes mellitus, Renal and liver diseases, Parkinson's disease, cardiovascular diseases, Neurological diseases, were also excluded from the study. Written informed consent was taken after explaining to them about study in simple language in mother tongue or Hindi. Approval was taken by Ethics Committee

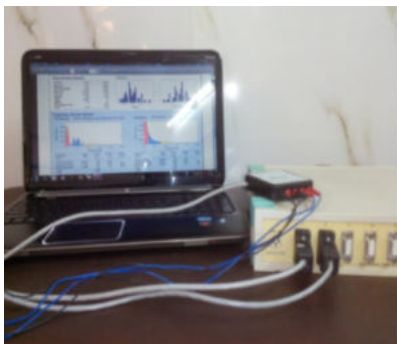
METHODS:

All patients were evaluated with detailed history including age, sex, and duration of Rheumatoid Arthritis, duration of morning stiffness, list of painful joints, other systemic disease, and history of extra-articular Manifestations and treatment. The subjects were asked to refrain from ingesting any beverages like tea or coffee and alcohol for at least 12 hours prior to the study. Details of procedures were described to each Subject before starting the evaluation so that subject did not develop any anxiety at the time of the tests. The subject was allowed to relax on a bed in supine position for 10mins and then ECG recoding was done for 5 min in supine position using physiopac" by Medicad". Data collected on physisopac was analysed by Kubois software, version 2.1. Data was recorded and analyzed by unpaired "T" test. P value <0.05 was Considered to be statistically significant.

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HRV ANALYSIS BY KUBIOS SOFTWARE



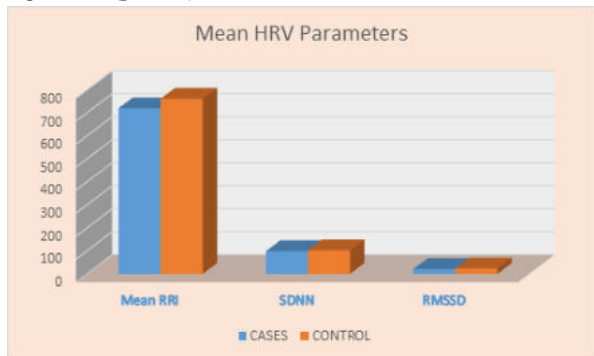
OBSERVATION AND RESULTS

Our study entitled “Effect of Rheumatoid arthritis on cardiac Autonomic Function” included 100 participants – 50 rheumatoid arthritis patients fulfilling inclusion & exclusion criteria and 50 normal subjects acting as controls. We got the following results

Table No. 1: Mean values of HRV Parameters with relation to Time Domain in study population

HRV Parameters	Cases		Control		P Value
	Mean	SD	Mean	SD	
Mean RRI	719.63	111.5	761.04	126.03	0.09(NS)
SDNN	98.53	10.83	102.26	12.06	0.11(NS)
RMSSD	21.05	6.53	23.45	6.18	0.06(NS)

There is decrease in time domain indices of HRV in study group compared to control group but it not statistically significant (p>0.05).



DISCUSSION

The present study was carried with an objective of assessing the effect of Rheumatoid arthritis patients on autonomic function. For the purpose of our study 50 rheumatoid arthritis and 50 normal subjects were taken. Patients were selected from the Medicine & Orthopaedics OPD of a tertiary care hospital. Data was collected over a period of 18 months.

The following autonomic parameters were included in this study–

Time Domains of HRV

The study and the control groups were comparable in terms of age and gender.

In our study we found reduced mean RRI and RMSSD in study group than in control which was not statistically significant. The decrease though not statistically significant may be due to poor vagal control. SDNN represents long term vagal modulation of cardiac functions. In our study SDNN was reduced in study group which was not statistically significant. Due to poor vagal control HRV is reduced with no statistical difference Lower values of SDNN and RMSSD in the present study indicate decreased overall Variability of heart rate in RA patients compared to that of healthy controls. Many studies have reported lower values of SDNN in RA patients (2, 6, 9). But with respect to RMSSD values there are conflicting reports.

Anichcov et al. (2007) observed lower value of RMSSD where as others rather found higher values (10, 11).

SUMMARY / CONCLUSIONS

The present study analyzed the Autonomic function test and the Heart Rate Variability 50 Rheumatoid Arthritis patients with 50 aged matched controls.

The findings of the present study can be summarized as follows:-

Overall HRV is reduced in time domain frequencies indicating poor vagal control but the findings were not statistically significant.

Thus the present study shows that there is autonomic dysfunction with decreased vagal tone leading to sympathetic predominance. Autonomic dysfunction is an important determinant of cardiovascular health

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