



COMPARATIVE STUDY OF BASAL HEART RATE & RR INTERVAL AMONG MALE AND FEMALE GENERALISED ANXIETY DISORDER (GAD) PATIENTS

Physiology

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ABSTRACT

Introduction: Generalised anxiety disorder (GAD) is known to affect autonomic nervous system though the studies showing gender based effect are conflicting. We conducted this study to compare the effect of GAD on the basis of gender.

Material and Method: 60 GAD patients were divided into 2 groups of 30 each. Group I comprised of 30 male patients and group II of 30 female patients. Basal heart rate and RR intervals were compared among the two groups.

Conclusion: Significant increase in heart rate and highly significant decrease in RR interval among female GAD patients compared to male GAD patients.

KEYWORDS

Generalised anxiety disorder (GAD), Heart rate, RR interval, Autonomic Function test

INTRODUCTION:

Anxiety disorder is an umbrella term covering different forms of pathological fear and stress. Currently psychiatric diagnostic criteria classifies a wide variety of anxiety disorders. These are often debilitating chronic conditions which waxes and wanes, and very sensitive to flare up during stress or a triggering event. These events are associated with physical symptoms like headache, sweating, muscle spasms, palpitations and hypertension, and in some cases leading to fatigue. Generalised Anxiety Disorder (GAD) is an anxiety disorder that is characterized by excessive, uncontrollable and often irrational worry about everyday things that is disproportionate to the actual source of worry. It often interferes with daily functioning¹. Episodic acute anxiety is characterised by an increase in heart rate paired to a decrease in total heart rate variability and respiratory sinus arrhythmia. Lower RR intervals and cardiac vagal control are also found in subjects reporting chronic levels of anxiety, as assessed by trait anxiety inventories and in patients with clinical anxiety disorder². Heart rate and rhythm is mainly under the control of autonomic nervous system. During resting conditions, vagal tone is the main regulator of variations in heart rate³. Various chronic disorders also have their effects on autonomic nervous system. Several studies have documented increased incidence of morbidity and mortality in patients suffering from various chronic disorders with autonomic irregularity^{4,5}. Eaker et al found a positive association between tension and anxiety and incident CHD in women, particularly women who self-identified as housewives⁶. Winters and Schneiderman in a study have stated that unequivocal support for a causal role for anxiety in the pathogenesis of congestive heart disease has not been established⁷. Some studies have found no associations between measures of anxiety and incident ischemic heart disease in men and women after adjustment for potential confounding variables⁸⁻¹⁰. Other studies have found a strong positive association between phobic anxiety and sudden death or fatal ischemic heart disease in men^{11,12}. The literature on effect of anxiety on cardiovascular system is unclear and very controversial. Keeping these various studies in mind our study was planned to assess the gender based comparative effect of generalised anxiety disorder on basal heart rate and RR interval.

MATERIAL AND METHODS:

The present study was conducted in Department of Physiology in collaboration with Department of Psychiatry, Pt. B. D. Sharma University of Health Sciences, Rohtak. The study was carried out on

60 patients of Generalised Anxiety Disorder (GAD), diagnosed as per ICD-10 guidelines with Hamilton Anxiety Scale score of 28 (i.e. moderate anxiety), of 18-45 years of age of either sex. The subjects were divided into the following two groups:

GROUP I included 30 male GAD patients.

GROUP II included 30 female GAD patients

History of any other major illness (like diabetes, hypertension, myocardial infarction and hyperthyroidism) in the previous one year and history of drug intake for any other ailments in last one month were excluded from the study.

Tests Conducted- In each individual basal heart rate and RR intervals were recorded for 10 minutes. Recording was done by digitalised polygraph (POLYRITE D system, supplied by RMS India PVT. Ltd. Chandigarh). Individual customization of data was done after acquiring. Consent was taken from every individual to undergo the whole procedure. All the recordings were done in a particular time period (from 10 AM to 1 PM) to avoid the diurnal variations. Since the short term recording gets affected by movement of the subject, noise and ectopic beats, so a particular duration of recording was selected carefully.

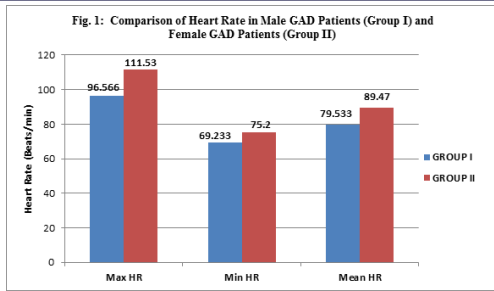
Procedure: All the subjects and patients were tested under similar laboratory conditions. From ECG recording, different components of heart rate & RR intervals were calculated by machine itself. For interpretation of the results the data set of each group was analysed statistically by applying unpaired student t test. Significance of result was predicted based on the p value.

RESULTS:

Following results shown in tables and figures were obtained.

Table I: Comparison of Basal Heart Rate of Male GAD Patients (Group I) and Female GAD Patients (Group II)

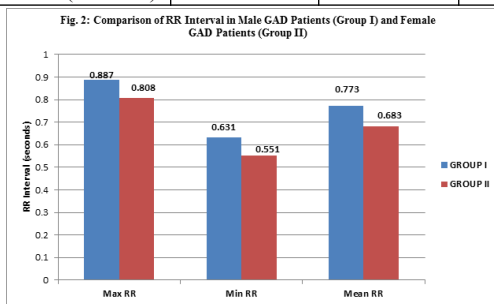
Parameter	GROUP I (MEAN ± SD)	GROUP II (MEAN ± SD)	P Value
MAX HR (Beats/min)	96.566 ± 13.286	111.533 ± 17.123	0.0003
MIN HR (Beats/min)	69.233 ± 11.711	75.2 ± 8.470	0.027
MEAN HR (Beats/min)	79.533 ± 13.164	89.466 ± 12.136	0.003



Basal recording of heart rate was compared among male GAD patients (Group I) and female GAD patients (Group II) as shown in table I & figure 1. The table I & fig. 1 show very high significant (p value <0.001) difference in maximum heart rate (increase) among Group II (111.533 ± 17.123) as compared to Group I (96.566 ± 13.286), highly significant (p value <0.01) difference in mean heart rate (increase) among Group II (89.466 ± 12.136) as compared to Group I (79.533 ± 13.164) and significant (p value <0.05) difference among minimum heart rate (increase) among Group II (75.2 ± 8.470) as compared to Group I (69.233 ± 11.711).

Table II: Comparison of RR Intervals among Male GAD Patients (Group I) and Female GAD Patients (Group II)

Parameter	GROUP I (MEAN ± SD)	GROUP II (MEAN ± SD)	P Value
MAX RR (Seconds)	0.887 ± 0.139	0.808 ± 0.098	0.013
MIN RR (Seconds)	0.631 ± 0.081	0.551 ± 0.092	0.0007
MEAN RR (Seconds)	0.773 ± 0.119	0.683 ± 0.100	0.002



Basal recording of RR interval was compared among male GAD patients (Group I) and female GAD patients (Group II) as shown in table II & figure 2. The table II & fig. 2 show very high significant (p value <0.001) difference in minimum RR interval (decrease) among Group II (0.551 ± 0.092) as compared to Group I (0.631 ± 0.081), highly significant (p value <0.01) difference in mean RR interval (decrease) among Group II (0.683 ± 0.100 respectively) as compared to Group I (0.773 ± 0.119) and significant (p value <0.05) difference in maximum RR interval (decrease) among Group II (0.808 ± 0.098) as compared to Group I (0.887 ± 0.139).

DISCUSSION:

Autonomic Nervous System plays major role in determining heart rate, stroke volume and peripheral vascular resistance to meet the appropriate requirement of body. Numerous studies have demonstrated the increased sympathetic and decreased parasympathetic nervous system activity hikes the risk of ventricular tachycardia, ventricular fibrillation and sudden cardiac death⁸⁷.

Present study was carried out to assess the autonomic disturbance in GAD patients and to detect its relationship to cardiovascular morbidity. Assessment and clinical evaluation of autonomic functions in present study was carried out by recording of basal heart rate and RR interval, HRV. We conducted the study on 60 patients of GAD. They were divided into two groups. Group I comprised of 30 male GAD patients & Group II comprised of 30 female GAD patients.

The mean basal heart rate in male as well as female GAD patients (Group I & II) was within the normal range. On comparing the basal heart rate among Group I and II, it was observed that maximum heart rate in female GAD patients (Group II) shows very highly significant, mean heart rate highly significant and minimum heart rate significant increase (though within normal range) than male GAD patients

(Group I). Similarly minimum RR interval shows very high significant, mean RR interval highly significant & maximum RR interval significant decrease among female (Group II) compared to male GAD patients (Group I) as shown in table I & II and figures 1 & 2. These increase in heart rate and decrease in RR interval are suggestive of reduced vagal tone and increased sympathetic activity in female GAD patients as compared to male GAD patients. This observation supports the two studies carried out by Thayer JF et al^{88,89}.

CONCLUSION:

In GAD patients, the heart rate and RR interval findings represent reduction of parasympathetic activity and relative increase in sympathetic activity. The result among female GAD patients comparative to male GAD patients suggests either the more reduced basal vagal tone or pronounced effect of GAD on autonomic nervous system among females. Further studies are required to find out the reason for this result.

Ethical Clearance: Taken from PGIMS, Rohtak Institute Ethical Committee (IEC)

Source of Funding: Self

Conflict of Interest: Nil

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