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INCIDENCE OF CARDIOVASCULAR DEATH ASSOCIATION TO ADVANCED AGE (ABOVE 35 YEARS) PREGNANT CASES AS MEASURED THROUGH ELECTROCARDIOGRAPH

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Abstract:

Objective: *Arrhythmia and elder age pregnancies are prone to cardiovascular (CVD) deaths; which is also graded as 3rd commonly repeated cause of death in females. We aimed for the determination of increase in arrhythmia as a risk in elder age pregnant cases.*

Methods: *We included advance aged and under thirty-five years' females respectively 98 and 182 (total 280) in this research. Evaluation of arrhythmia risk can be measured through electrocardiographic duration of P-wave, interval of "T peak-to-end", "QT" interval & "T p-e" / "QT" proportions.*

Results: *Though no difference was observed in "T p-e" / "QTc" & "T p-e" interval ratio; minimum and maximum "QTc" and values of "QTc" dispersion higher significantly when compared advanced age pregnant cases with controls. While analyzing the correlation, increased QTc dispersion and P had positive association to maternal age factor. It was observed through "multiple linear regression analysis" that maternal age had independent link with QTc dispersion.*

Conclusion: *We can find increase in the repolarization parameters during advanced age pregnant cases even their range remains within the normal limits. This also leads to probe that if it is a state of pathology.*

Keywords: *Arrhythmia, Advanced age, Pregnancy, Electrocardiogram and Ventricular Repolarization.*

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INTRODUCTION:

Many factors have changed the reproductive behavior of females which includes social, economic, prolonged education and being a job holder. Pregnancy at a later stage of life is caused because of one of the above-mentioned reasons [1]. Advanced age child birth can be seen in the population of advanced nations. Live birth in the age of thirty to thirty-nine years in Canada has increased from 23.6% to 45.9% in the year 1982 to 2005 [2]. Decreased fertility rate and still birth risks are also linked with the older age pregnancies including many other complexities such as still birth, low-birth weight, preterm live birth and adverse pregnancy results [3 – 5]. Numerous authors have reported that favorable pregnancy related outcomes can be obtained from thirty-five years old women which is also a cut-off age in their consideration [1 – 5].

A research studies course of pregnancy till 1-year post-partum and associated maternal deaths (22.2%) to CVD risk factor and CVD deaths in older age as they died in the course of post-partum. Cardiomyopathy was most repeated etiology; whereas, 3rd most repeated cause was arrhythmic deaths [6].

Though, it is week known that an advanced maternal age can be accounted for increased morbidity and mortality in the course of pregnancy, miscarriage issues, neonatal death, still-birth and arrhythmia risk that is considered as one of the primary cause of CVD disease. Arrhythmia and elder age pregnancies are prone to cardiovascular (CVD) deaths; which is also graded as 3rd commonly repeated cause of death in females. We aimed for the determination of increase in arrhythmia as a risk in elder age pregnant cases.

METHODS:

Our cross-sectional research was carried out on every consecutive old age (above and under 35 years) in last trimester on 280 cases at Services Hospital, Lahore (Gynecology & Obstetrics Department) from March, 2016 to April, 2017. Under thirty-five years' age group was considered as controls. Our population had advanced age and under thirty-five years old cases respectively 98 and 182 in number.

We did not include all the pregnant cases like multiple pregnancies, diabetes mellitus, hypertension, preeclampsia, gestational diabetes, pregnancy-induced hypertension history, eclampsia, coronary heart presence, family history or significant disease of valvular heart, any immunologic-rheumatologic disease, heart failure (decompensated), renal abnormality, thyroid or hepatic function tests, partial or impartial bundle branch block, atrial fibrillation, QT interval & Tp-e affecting drug intake, ST–T abnormalities, negative T-waves or U-waves on ECG and imbalance of electrolyte.

We acquired ECG outcomes on a paper in the third trimester in spine position with the help of twelve-lead ECG at (50 mm/s) standardization was (1 mV/cm). To improve the overall accuracy magnifying glass and calipers was used. The P-wave onset was considered as 1st atrial deflection from isoelectric line; whereas, an offset was atrial signal return to baseline. P depression was also defined with the measurement of min and max (P wave) duration. From start of QRS, QT interval was calculated. T-wave peak and end interval was taken as ("T p-e" interval) and we also calculated the ratio of ("T p-e" / "QTc").

Statistical analysis was made through SPSS software. Various variables were assessed through various tests such as student's T-test, Chi-square and Mann–Whitney U test. Significant two-tailed value of P was taken as (≤ 0.05).

RESULTS:

Though no difference was observed in "T p-e" / "QTc" and "T p-e" interval ratio; minimum and maximum QTc and values of QTc dispersion higher significantly when compared advanced age pregnant cases with controls. While analyzing the correlation, increased QTc dispersion and P had positive association to maternal age factor. It was observed through "multiple linear regression analysis" that maternal age had independent link with QTc dispersion.

All included pregnant cases were in 3rd trimester (28–40 gestational weeks) and nulliparous. Demographic and obstetric features have been reflected in Table – I (both groups). Group-I participants were expecting and older in age. Group-I was observed in naturally increased BMI because of furthered gestational week. Advanced age pregnant cases were observed with normal blood pressure (BP). Table – II shows the clinical and laboratory outcomes of controls.

Table – I: Characteristics of the study population

Characteristics	Group - I (≥ 35 years)		Group - II (< 35 years)		P-Value
	Mean	± SD	Mean	± SD	
Maternal age, years	38.5	2.57	23.5	4.16	<0.001
Gestational week	34.7	3.5	33.4	3.4	0.008
BMI, kg/m²	30.4	4.9	28.2	4.3	<0.001
Heart rate, bpm	90.7	14.8	89.9	15.5	0.68
Systolic BP, mmHg	117.4	9.6	112.4	10.2	<0.001
Diastolic BP, mmHg	70.8	8.6	64.6	8.6	<0.001

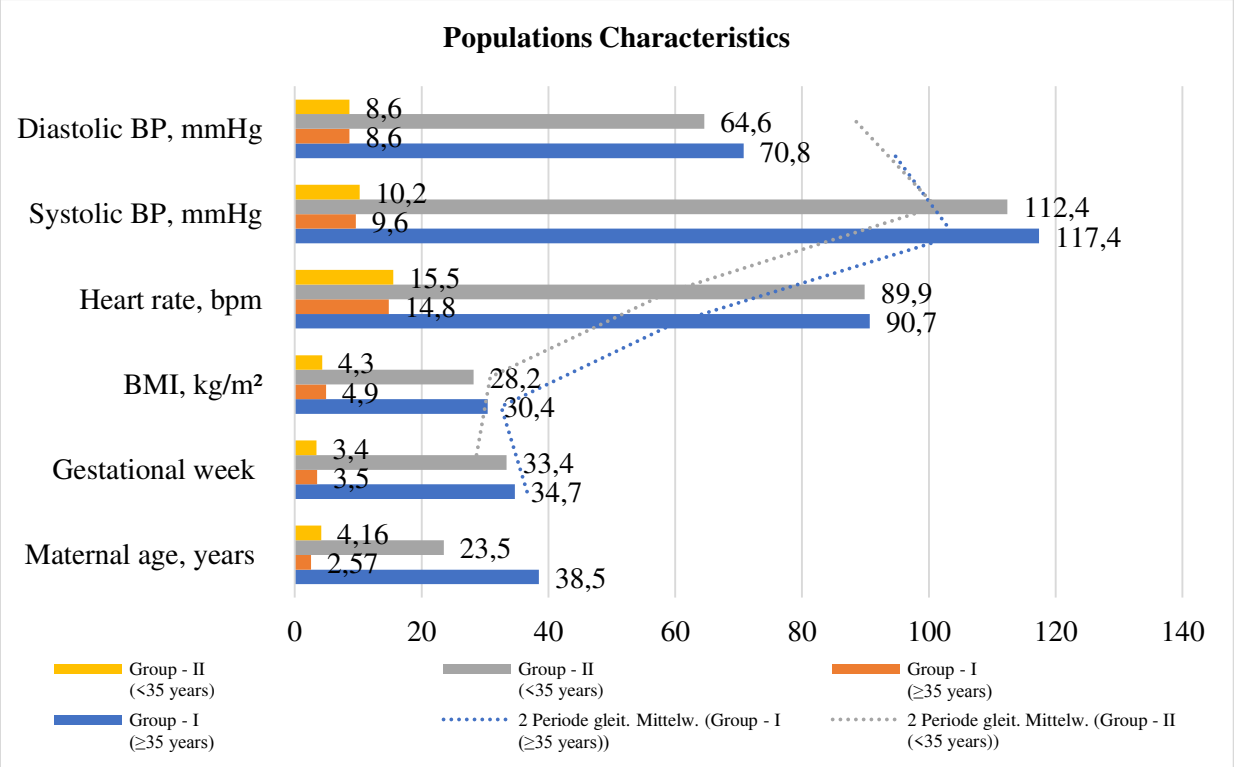


Table – II: Laboratory tests results of the study population at assessment

Characteristics	Group - I (≥35 years)		Group - II (<35 years)		P-Value
	Mean	± SD	Mean	± SD	
Hemoglobin (g/dl)	11.8	1.3	11.8	1.2	0.84
Platelet (×103) – /µL	242.6	59.4	229.1	65	0.08
WBC	11508	2422	12036	2135	0.1
BUN (mg/dl)	16.3	3.9	16.6	4.7	0.53
Creatinine (mg/dl)	0.48	0.08	0.46	0.07	0.06
Sodium (mEq/L)	137.4	1.9	137.8	1.8	0.42
Potassium (mEq/L)	4.1	0.3	4.1	0.2	0.93

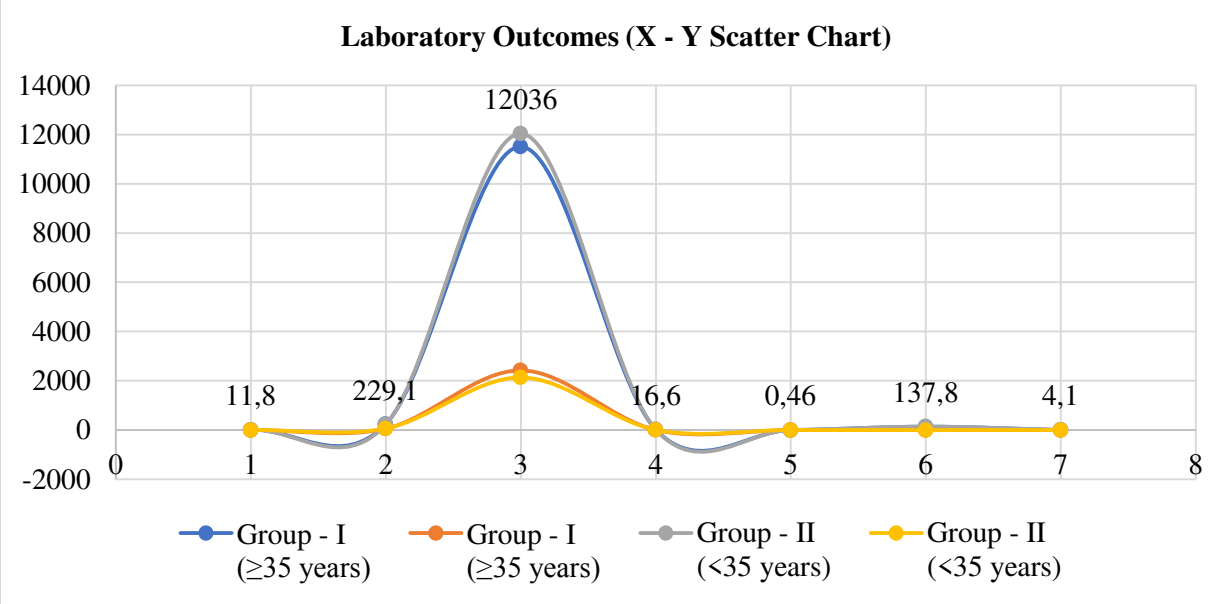


Table – III: The electrocardiographic findings of the study population

Characteristics	Group - I (≥35 years)		Group - II (<35 years)		P-Value
	Mean	± SD	Mean	± SD	
Maximum QTc interval (ms)	403.7	27.8	393.3	14.6	< 0.001
Minimum QTc interval (ms)	381.8	23.7	373.8	13.2	0.002
QTc dispersion (ms)	21.8	8.7	19.5	7.2	0.01
Tp-e interval (ms)	76.3	13	74.2	13	0.19
Tp-e/QTc ratio	0.18	0.03	0.18	0.03	0.86
P dispersion (ms)	19.5	7.5	17.8	7.2	0.05

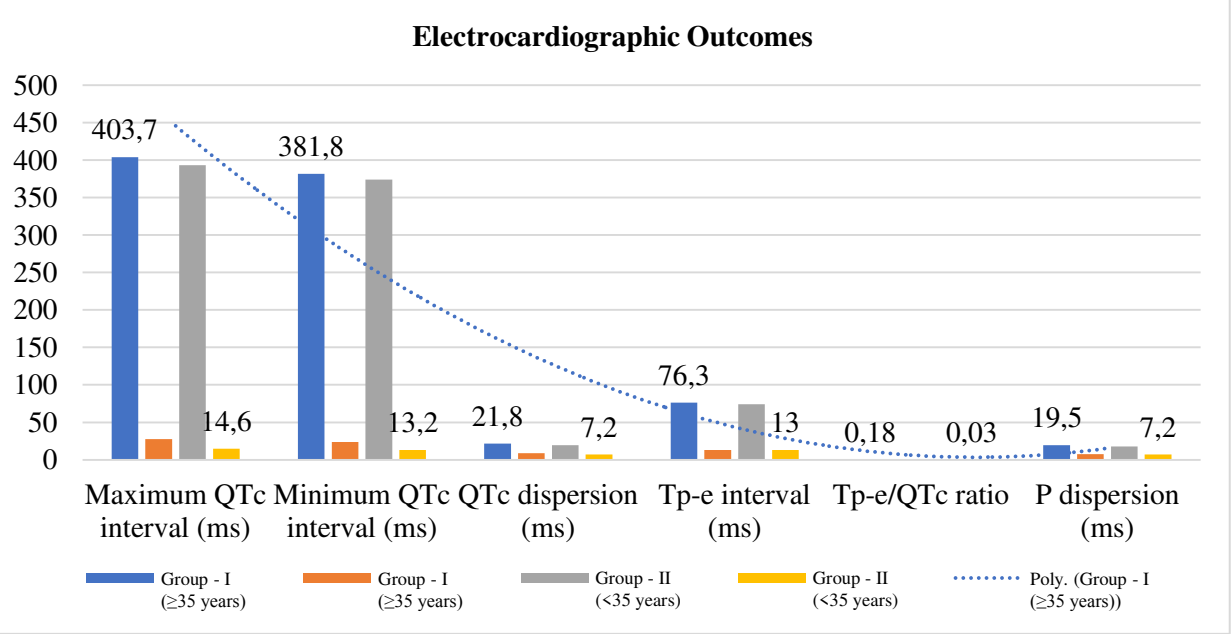
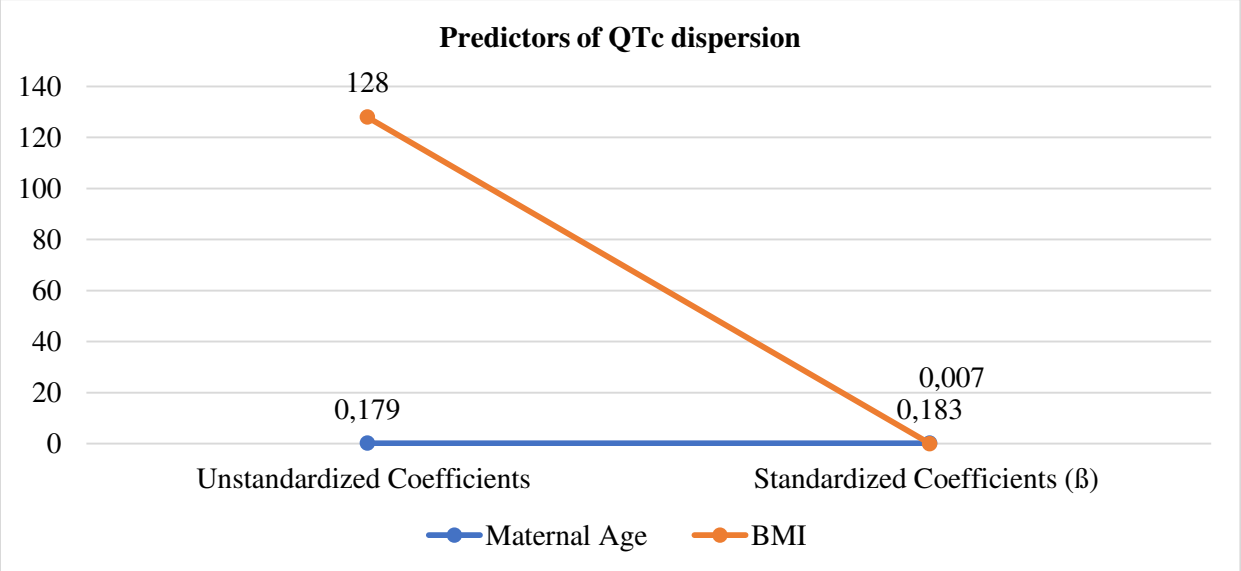


Table – IV: Correlation analysis between electrocardiographic findings and clinical characteristics in pregnant

Clinical Features	Maternal age	BMI
Maximum QTc	r: 0,241	r: 0,115
	p:<0,001	p:0,06
Minimum QTc	r:0 ,192	r: 0,113
	p:0,001	p:0,06
QTc dispersion	r: 0,199	r:0,014
	p:0,001	p:0,06
Mean QTc	r: 0,225	r:0,111
	p:<0,001	p:0,07
Tp-e interval	r: 0,123	r: -0,072
	p:0,08	p:0,23
Tp-e/QTc ratio	r: 0,056	r: -0,110
	p:0,33	p:0,07
P dispersion	r: 0, ,132	r: 0,08
	p: 0,02	p:0,16

Table – V: Results of multivariable analysis of independent predictors of QTc dispersion

Markers	Unstandardized Coefficients	Standardized Coefficients (ß)	P-value
Maternal Age	0.179	0.183	0.003
BMI	128	0.007	0.21



Though no difference was observed in "T p-e" / "QTc" and "T p–e" interval ratio in both groups, min & max QTc and values of QTc dispersion were high in Group "I" than controls as shown in Table – III. Advanced age cases were observed with greater (P dispersion) than controls.
Table IV and V respectively discuss the bivariate correlation analysis and multiple linear regression analysis.

DISCUSSION:

The outcomes of our research were ventricular and arterial repolarization characteristics observed as high very significantly in the pregnant cases of advanced age than young age cases. Additionally, the determination about the atrial and ventricular

polarization parameters was that there is an increase with increasing age; whereas, maternal age can determine the incidence of QTc depression.

As a result of the socio-economic betterment and prolonged timeframe of education, late cases of pregnancy have been increased. It is therefore; CVD issues including obstetrics and gynecological issues are at increase in women. Specified etiology about the maternal death was probed by an author Briller as above 20 % because of the CVD issues which include 25 % cases of arrhythmia or cardiomyopathy that can be prevented [6]. Another research was carried out to study the arrhythmias frequency as it increased, mostly in the shape of an activity "ventricular ectopic" especially healthy young pregnant cases with palpitations complaints [7]. There is an important role of reproductive hormones in the arrhythmia progression onset including an acquired QT long syndrome and supraventricular tachycardia [8, 9].

In the practice of laboratory, the arrhythmogenic risk can better be predicted through an instrument called "electrocardiogram". The interval of QT and its associated heart rate correction (QTc), "QT" interval dispersion and other associated published markers including markers like "T p-e" interval and "T p-e" / "QTc" proportion are proposed predicators of malign "cardiac arrhythmia". They are also used as sudden cardiac death risk stratification alternatives in pregnant cases having numerous medical conditions [10 – 12].

Another author studies the cardiac arrhythmia risk in the group of preeclampsia (PE), maximum QT, T p-e interval, QTc dispersion and T p-e / QTc proportion values were high significantly in the group of PE in comparison to healthy group of pregnant women [13]. Ventricular and atrial repolarization markers in the course of pregnancy were studies in another research and it was observed that max "QTc" interval, P dispersion, "T p-e" interval and "T p-e" / "QT" proportions increased in the late pregnant cases even than in an acceptable rage [14]. Recently, ventricular repolarization increase was demonstrated by Braschi with the incidence of increasing age [15]. In this particular research, there was an increase in the values of minimum "QTc", maximum "QTc" and "QTc" dispersion with the advancement in maternal age. In addition to that QT dispersion was determined as sole predictor of maternal age.

CONCLUSION:

We can find increase in the repolarization parameters during advanced age pregnant cases even their range remains within the normal limits. This also leads to probe that if it is a state of pathology. In case of pathological, the scoring of the risk of arrhythmia is to be made for the reduction of morbidity and mortality in advanced age cases that is (≥ 35) years in the last pregnancy trimester.

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