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**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1489541>Available online at: <http://www.iajps.com>**Research Article****TO DETERMINE THE FREQUENCY OF QTC  
PROLONGATION IN PATIENTS WITH HAEMORRHAGIC  
STROKE****Dr Hafsa Faiz, Dr Rameesha Tanvir, Dr Ruqaiya**  
Punjab Medical College (FMU)**Abstract:**

*Acute cerebral events play an important role in generating autonomic imbalance especially cardiac rhythm disturbances. This forms the basis of significant lethal abnormalities of heart rate and rhythm like QTc prolongation, ventricular fibrillation, asystole, and ultimately death. This study was conducted to determine the frequency of QTc prolongation in patients presenting with acute haemorrhagic stroke at a tertiary care hospital.*

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**INTRODUCTION:**

There are 15 million people worldwide who suffer a stroke each year. According to the World Health Organization (WHO), stroke is the second leading cause of death after coronary artery disease [1]. Contrary to decline in the incidence of the disease in the Western population, the burden of the disease in South Asian countries has inclined. No large scale epidemiological studies are available to determine the true incidence of stroke in Pakistan. Estimated annual incidence is 250/100,000, translating to 350,000 new cases every year [2]. The most common cause of death in patients with stroke is cardiac. The reported frequency of new onset cardiac arrhythmias in patients, both with ischemic and hemorrhagic stroke without underlying cardiac disease is 25-40% [3]. The central nervous system (CNS) has an important role in regulation of cardiac activity and vasomotor tones. The lesions of the CNS frequently lead to disturbance of cardiovascular system (CVS) and other autonomic functions. The manifestations of such type of autonomic dysregulation are loss of heart rate variability and various electrocardiogram (ECG) changes [4]. Prolonged QTc interval has been reported in 38–71% of patients during acute stroke [5]. QT interval is closely related to ventricular action potential and is a good non-invasive measure of ventricular repolarization and myocardial homogeneity [6].

Prolonged QTc interval has been found to be an independent indicator of arrhythmias and mortality in conditions such as the long-QT syndrome, cardiomyopathy and chronic heart failure.<sup>7</sup> Poor prognostic markers of hemorrhagic stroke include low Glasgow coma scale (GCS), brain stem involvement and prolonged QTc interval. A recent study which includes 95 patients of acute hemorrhagic stroke QTc interval was prolonged in 50.5% patients in lead III and in 49.47% patients in lead VI.<sup>8</sup> The rationale of this study is to determine the frequency of QTc prolongation in patients (without previous history of cardiac disease) of hemorrhagic stroke which will provide an opportunity for early intervention to prevent cardiac arrhythmias and death.

**OBJECTIVE**

Objective of the study is to determine the frequency of QTc prolongation in patients with hemorrhagic stroke.

**OPERATIONAL DEFINITIONS****Hemorrhagic stroke:**

It will include cases of stroke having clinical neurological loss due to haemorrhage diagnosed on

plain CT brain by the presence of hyper dense area.

**QT interval:**

The QT interval represents electrical depolarization and repolarization of the ventricles. QT interval is a measure of the time between the start of the Q wave and the end of the T wave in the heart's electrical cycle. QT interval varies with heart rate so corrected QT interval for heart rate can be calculated by using **Bazett's formula**:  $QT_c = QT / \sqrt{RR}$

RR is interval from the onset of one QRS complex to the onset of next QRS complex on ECG

In this study QTc interval

For men >450 milliseconds & for women >470 milliseconds will be taken as prolonged.<sup>9</sup>

**MATERIAL AND METHODS:**

**Study Design:** Cross-sectional study

**Setting:** Medical Department, DHQ Hospital (PMC), Faisalabad

**Duration:** Study will be conducted for six months after approval of synopsis.

**Sample size:** By using WHO sample size calculator  $P=49.47\%$ <sup>8</sup>

Absolute precision required = 10%

Confidence level = 95%

Sample size = 100

**Sampling Technique:** non probability consecutive sampling

**Inclusion Criteria:** Patients of both genders, aged 18-70 years are having:

1. First time presentation of stroke
2. Admitted within 48 hrs after the development of stroke symptoms
3. Diagnosis of stroke is confirmed by non-enhancing CT scan brain

**Exclusion Criteria:** following patients were excluded from study

1. Infarctive stroke
2. Transient ischemic attack.
3. Patients with Ischemic or valvular heart disease, heart failure, arrhythmias or cardiomyopathy proven on echocardiography
4. ECG reveals a bundle branch block, AV block, left ventricular hypertrophy, atrial fibrillation, atrial flutter or bigeminy
5. Patient taking these medications: digoxin, ant arrhythmic drugs, phenothiazine, tricyclic antidepressant drugs and macrolides antibiotics.
6. Abnormal serum potassium or calcium concentration

**DATA COLLECTION PROCEDURE:**

After approval by the Ethical Committee, all the

patients (presented in medical emergency DHQ Hospital Faisalabad) fulfilling the inclusion criteria will be enrolled. A written informed consent will be obtained from the patients or their legally authorized representatives. After complete history and neurological examination by investigator himself, the baseline investigations including serum electrolytes will be carried out and reported upon by Pathology Department, DHQ Hospital Faisalabad. Hemorrhagic stroke will be diagnosed by the presence of hyper dense area on non enhancing CT scan Brain. A 12 leads ECGs will be recorded to the patients at the time of admission to hospital by qualified ECG technician under the supervision of the principal investigator at a speed of 25 mm/s and amplitude of 10 mm/mV. The QT interval will be measured from the onset of QRS deflection to the end of the T wave, the point of the return of T wave to the isoelectrical line, or the nadir between T and U waves in limb lead II & chest lead V6. QT interval will be measured manually in milliseconds (ms). Three successive QT intervals will be measured in lead II & V6 and the mean will be accepted as the measurement for that lead. This QT interval will be corrected (QTc) for heart rate by using Bazett's formula QTc manual. Data will be collected on a Performa.

#### DATA ANALYSIS

The data will be entered and analysed by SPSS Version 20. Mean and standard deviation will be calculated for quantitative variables like age and Frequency. Percentages will be calculated for qualitative variables like gender and frequency of QTc prolongation. Effect modifiers like age, gender, hypertension, alcohol use will be controlled by stratification and post stratification. Chi square test will be applied. A *p* value of  $\leq 0.05$  will be considered significant.

#### RESULTS:

Among 95 patients of acute haemorrhagic stroke, 48 (50.5%) had prolonged QTc in lead III, 47 (49.5%) had prolonged QTc in lead VI. The average QTc interval in lead III was 440.4 +/- 45.2 (Range = 364-571). Proportion of prolonged QTc in lead III was higher in males than females. Frequency of QTc III prolongation was higher in comparatively younger age groups than older age groups.

#### CONCLUSION:

The frequency of prolonged QTc interval among patients of acute hemorrhagic stroke is alarmingly higher in our setup. Prolonged QTc is a useful predictor of impending clinical deterioration and provide an opportunity for early intervention to reduce severe loss like mortality.

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