ABSTRACT

Background: Mobile phone is a low power single channel, 2-way radio transmitter whose technology relies on radiofrequency electromagnetic field. There is increasing public concern about the possible health risks associated with this electromagnetic field emitted by mobile phones. No scientific data support definitive answer to question about the existence or nonexistence of health risk related to mobile phone electromagnetic field. More researches to produce more reliable information are needed before any conclusion can be made.

Increased QT interval and dispersion on the surface ECG reflect different aspect of the ventricular repolarization. Prolonged QT interval and / or increased dispersion have been associated with increased cardiovascular risk and mortality in health and diseased state even among the hypertensives.

Aim: This study is aimed at investigating the effects of electromagnetic field emitted from mobile phone on QT interval and dispersion among hypertensives.

Subjects and Methods: This is an experimental study involving 100 hypertensive volunteers with age and sex matched controls. Five sets of 12 lead resting ECGs were obtained from each participant with the first ECG (baseline) obtained without mobile phone and the other four ECGs obtained during the 4 experimental settings: mobile phone over the praecordium in turn ON mode not ringing, mobile phone over the praecordium in RINGING mode, mobile phone at the hip level in turn ON mode not ringing and mobile phone at the hip level in RINGING mode.

QT interval and dispersion were manually measured from each of the ECG and were corrected for heart rate using Bazett’s formula. The statistical analysis in the first step was performed using
one way ANOVA for repeated measures with Bonferroni post hoc analysis done through the baseline QT variables to the four experimental settings. The second step analysis was done using the paired t test which compared the difference between the QT parameters when the mobile phone was ringing at the praecordium and at the hip level.

**Results:** There was no statistically significant difference in the QT parameters through baseline values to the four experimental setting when the two groups (hypertensives and controls) were analysed separately. Although the longest QT intervals were measured when the mobile phone was ringing on the praecordium of the hypertensives, these did not reach statistical significant level as the p values were generally > 0.999 in this first step of analysis. However, when the hypertensives were compared with the controls, the baseline QT intervals (QTc, QTcmax and QTcmin) were significantly longer than the controls. These significant differences persisted throughout the four experimental settings.

In the second step there was a significant prolongation of the corrected QT intervals among the hypertensive when the phone was ringing on the praecordium as compared with phone ringing at the hip level: QTc (432.84 ± 24.38 vs 430.72 ± 26.40, p = 0.038); QTcmax (455.04±27.78 vs 450.28±27.77 p = 0.002); QTcmin (410.59±28.97 vs 406.97±28.33 p = 0.016). Gender differences were noted in some QT parameters of the normotensives with the females showing statistical prolongation in QTcmax, QTd and QTcd when the phone rang on the praecordium compared with ringing at hip level: QTcmax (448.55 ± 23.09 vs. 442.40±21.94, p= 0.003), QTd (38.95 ±19.14 vs. 32.63±15.01, p = 0.006) and QTcd (44.75 ± 23.41 vs. 36.40 ± 16.02 p = 0.004).

**Conclusion:** Acute exposure to electromagnetic field emitted by mobile phone interferes with QT parameters in hypertensive patients particularly when the mobile phone is ringing on the chest in proximity to the heart.
More prolonged longitudinal studies are advocated. **Keywords:** Mobile phone, electromagnetic field, ECG, QT interval and dispersion, hypertensive.