Circadian rhythm of QT interval: Is there a genuine circadian rhythm or is it due to changes in heart rate?

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Background: There is a diurnal variation in heart rate. As QT interval varies inversely with heart rate (HR), it is corrected to derive an estimated QT interval for a HR of 60 bpm. The corrected QT interval (QTc) obtained using Bazett's (QTcB) or Fridericia's (QTcF) formulae is not perfect. Consequently, previous studies evaluating circadian variation in QTc interval have shown conflicting depending on the correction formula used. We, therefore, studied the diurnal changes in QT interval by measuring it in only ECGSs with a stable HR of 60 bpm during the 24 h period to eliminate the confounding effect of QT correction formulae.
Methods: From 12-lead digital Holters recorded in 32 healthy subjects (22 males, 10 females) in a Phase I clinical trial, all ECGs at a stable HR of 60 bpm were identified for each hour of the 24 h. In addition, 6 replicate ECGs in a window period of ±5 min were extracted at 24 time-points 1 h apart, regardless of the prevailing HR and QTcB and QTcF were calculated. Circadian pattern for QT interval at a heart rate of 60 bpm (QT_{60}), QTcB and QTcF were compared at hourly intervals.
Results: Circadian pattern of QT_{60} and QTcF were comparable (Figure). QTcB showed greater variation especially at timepoints with increased HR. QT_{60} was shortest (383–393 ms) between 1 pm and 9 pm and longest between 4 AM to 7 AM (403–407 ms). Mean HR was lowest between 1 AM to 12 noon (range 60–66 bpm) and remained high between 2 PM to 11 PM (range 70–80 bpm).
Conclusions: A diurnal variation in QT_{60} was observed with an increase after 8 PM. Although mean HR varied from 60 to 80 bpm over 24 h, QTcF closely matched QT_{60}. QTcB varied with changes in HR and masked diurnal changes in QT_{60}. Absence of diurnal variation in some previous studies could be because HR changes blunt the circadian pattern when QTcB is used.

Experience with atrial fibrillation at a tertiary care centre

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Introduction: The global burden of atrial fibrillation (AF) is rising owing to the better longevity and increasing risk factors among the population. It is the most common arrhythmia and is associated with recurrent hospital admissions, poor quality of life and increased mortality. It has been associated with five times increased risk of stroke and three times increased risk of heart failure. In this study we are evaluating one thousand patients who presented with AF at our tertiary care hospital.
Materials and methods: One thousand patients with manifestation of AF were evaluated for the study. A detailed history regarding various risk factors and clinical examination was done. CHA2DS2-VASc score was calculated for all the patients to determine the need for anticoagulation.
Results: Data of first five hundred patients reveal that 52.4% patients were more than 75 years of age. Females constituted 49.2% of the study cohort. Around one third patients presented with first episode of AF. The most common risk factor associated with AF was hypertension, seen in 67.6% patients. Rheumatic heart disease accounted for 10.8% of AF patients. Left ventricular systolic dysfunction was present in 44.8% of the cohort. Thyroid disorder was observed in 16.4% patients. Mean CHA2DS2VASc score was 3.9. Around 16.4% patients had TIA, stroke and thromboembolism. Of all the patients on anti-coagulation, 6.8% presented with a major or minor bleed; the most common site being intracranial and gastrointestinal tract (29.4% each).
Conclusions: In this ongoing study half of the patients were more than seventy five years of age with equal sex distribution. The mean CHA2DS2VASc score of the population was 3.9 indicating the need for adequate anticoagulation. The implications of this analysis are obvious. Complete data would be presented.

Remote monitoring of cardiac implantable electronic devices – A single center experience

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Background: Follow up of patients with implantable cardiac electronic devices (ICED) – pacemaker, CRT and AICD is mandatory. The device interrogation is usually performed in the clinic periodically. The cost and the inconvenience of such an exercise have been shown to be significant. The newer technology of remote monitoring enables the patients to transmit the data from their devices constantly from a remote location. The data on the acceptability, feasibility, safety, cost effectiveness, benefits and technical difficulties with remote monitoring technology in India is not available. We present our data of 2 year follow up of non-randomized patients with ICED enabled with remote monitoring technology.
Methods: During the period from April 2013 to April 2015, the data of patients with remote monitoring enabled ICED were analyzed. The technical data obtained from automatic and patient triggered transmissions were analyzed. The outcome of remote monitoring technology in terms of rescheduling of clinical visits and interventions carried out were noted.
Results: 52 patients underwent remote monitoring enabled ICED. 47 patients were available for analysis with a mean follow up of 16 months. 40% ($n = 19$) had CRT-P, 11% ($n = 5$) had CRT-D, 30% ($n = 14$) had pacemakers and 19% ($n = 9$) had AICD. On the basis of transmitted device parameters, 92% ($n = 43$) patients could avoid their annual/biannual device interrogation in the clinic. 8% ($n = 4$) patients were advised to adjust their medications (diuretics/betablockers/anticoagulation/antiarrhythmics). 4% ($n = 2$) patients were called for device optimization. 13% ($n = 6$) patients encountered difficulty in data transmission due either to faulty transmitter or cellular network unavailability.
Conclusion: The program of remote monitoring of ICED in Indian patient population is feasible. The benefits are in accordance with published data from the west. The affordability of the patient and availability of cellular network influence the acceptability of the technology.