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Impact of lethal arrhythmias on medical castration in patients with prostate cancer

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Background: Prostate cancer is the most common non-cutaneous malignancy in men and has been steadily rising in an aging society. Medical castration had been widely applied as a treatment for prostate cancer. Sex steroid hormones regulate cardiac ion channels. However, the proarrhythmic properties of medical castration have not been reported.

Methods: This prospective observational study consisted of 149 patients (75±6 years) who underwent hormonal therapy using gonadotropin-releasing hormone with or without anti-androgen for prostate cancer. The changes of electrocardiogram (ECG) findings during the therapy and the associations of ECG findings with lethal arrhythmias were studied.

Results: QT (394±32 to 406±39 ms, p<0.001) and QTc intervals (416±27 to 439±31 ms, p<0.001) significantly prolonged during the therapy as compared to baseline. Heart rate significantly increased during the therapy as compared to baseline (68±11 to 71±14 /min, p=0.006). PQ interval and QRS duration were similar before and during the therapy. During the hormonal therapy, 2 patients (1.3%) presented with torsades de pointes and ventricular fibrillation. The first patient was 71 year-old and the second patient was 70 year-old. The period of the therapy was 6 and 45 months, respectively. Both patients had no structural heart disease. The magnitude of QTc interval change during the therapy as compared to baseline (Δ QTc interval) was significantly greater in patients with VF than those without (p<0.001), however the magnitude of Δ heart rate, Δ PQ interval, and Δ QRS duration were similar between the 2 groups.

Conclusions: Medical castration significantly prolonged QT/QTc interval and could be a trigger of lethal arrhythmias in patients with prostate cancer.