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Acute effect of estrogens stimulation -triptorelin induced on heart ECG parameters in patients with polycystic ovary syndrome

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Background: sex hormones (SH) influence cardiac rhythm (CR) controlling cardiac ion channels and the autonomic nervous system. The effects of estradiol (E2) on the cardiac cycle are not yet to be understood: E2 seems to be the main hormone responsible of QTc interval prolongation and vagal stimulation. Conversely. progesterone and testosterone determine shortening of QTc interval and sympathetic responses. Aim: to assess the effect of basal and stimulated SH by Triptarelin a GnRH-analogue (TRIP) on the CR in a group of young women with or without PCOS Materials and Methods: we enrolled 15 young female patients (18-36 years) five PCOS and ten (NoPCOS). CR was analysed using ECG Holter at early follicular phase pre and after TRIP and luteal phase (18-25 days) to evaluate heart rate (HR), HR variability (HRV), PR, QRS complex, QTc. Eleven female controls (CON) were tested by baseline biochemical exams and two ECG Holter recordings during follicular and luteal phases. Data were analysed using t test (statistically significant when $p<0.05$). Results: All ECG data were inside the normal range. Patients recordings displayed higher HR values in luteal phase compared to follicular phase with reduced HRV in luteal phase (p:0.005). During TRIP we registered a decrease of HR (p:0.006) and an increase of HRV (p:0,04). A prolongation of QTc interval from follicular phase to TRIP (p:0.001) corresponding to peak E2 secretion was also observed. HR was higher in PCOS than NoPCOS, in the luteal phase (p:0.02), and the decrease of HR was reduced in PCOS after TRIP. PCOS furtherly displayed longer QTc intervals in all three recordings compared to NoPCOS. No variation between follicular and luteal phase was reported in CON. Conclusions: our study didn't evidence any pathological variations of CR. HR was higher in luteal phase when compared to follicular phase in all subjects. PCOS showed HR higher than NoPCOS suggesting a higher sympathetic tone in PCOS. High plasma E2 TRIP-induced were able to influence cardiac parameters causing HR decrease, HRV increase and finally a QTc prolongation suggesting, for the first time in human, a rapid modulatory effect of gonadal steroid on these ECG parameters.

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