Cardiovascular safety of immediate-release methylphenidate in children and adolescents with attention deficit hyperactivity disorder: evaluation of cardiovascular parameters after dose administration

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Introduction: Attention-Deficit Hyperactivity Disorder (ADHD) is a frequent condition in children and often extends into adulthood. Immediate release methylphenidate (IR-MPH) has raised concerns about potential cardiovascular adverse effects within a few hours after administration. This study was carried out to investigate acute effects of IR-MPH on ECG in a pediatric population. **Methods:** A total of 54 consecutive patients with ADHD (51 males and 3 females; mean age 12.14+2.6 years, range 6-19 years), receiving a new prescription of methylphenidate (MPH) at the Unit of Child Neurology and Psychiatry of the University Policlinic of Messina, underwent a standard ECG 2 hours before and after the administration of IR-MPH 10 mg per os. Basal and post-treatment ECG parameters, including mean QT (QTc), QT dispersion (QTd) interval duration, T peak – T end (TpTe) intervals and TpTe/QT ratio were compared.
Results: Significant modifications of both QTc and QTd values were not found after drug administration. QTd fluctuated slightly from 25.7 +9.3 ms to 25.1 +8.4 ms; QTc moved from 407.6 + 12.4 ms to 409.8 + 12.7 ms. A significant variation in blood pressure (BP) (Systolic BP 105.4 +10.3 vs 109.6 +11.5; $p<0.05$. Diastolic BP 59.2+7.1 vs 63.1 +7.9; $p<0.05$) was observed, but all the data were within normal range. Heart rate (HR) moved from 80.5 + 15.5 bpm to 87.7+ 18.8 bpm. No change in TpTe values was found but a statistically significant increase in TpTe/QTc intervals was found with respect to basal values (0.207 +0.02 ms vs 0.214 +0.02 ms; $p<0.01$).
Conclusions: The findings of this study show no significant changes in ECG parameters. Our data suggest a relative cardiovascular safety of IR-MPH in childhood, even if stimulants may exert a cardiovascular effect on BP and HR. TpTe values can be an additional parameter to evaluate borderline cases.