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abstract

QTc-Prolongation in Pediatric Patients Treated for Acute Leukemia: Prevalence and Causes

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QTc-Prolongation in Pediatric Patients Treated for Acute Leukemia: Prevalence and Causes

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Introduction: Acquired QT-prolongation in children undergoing treatment for acute lymphoblastic leukemia (ALL) is potentially fatal. To date, specific recommendations for ECG monitoring during ALL therapy are lacking. We aimed to assess the prevalence of QT prolongation and explore possible causes in ALL patients undergoing therapy.

Methodology: A retrospective review of the records of all pediatric ALL patients treated between 2018 and 2021 at the American University of Beirut was conducted. Patients lacking complete ECG records, baseline ECGs, or those with structural or functional heart disease were excluded from the study. QT interval was measured manually, and the longest measurement was chosen. Bazett's formula was used to correct for heart rate. All medications the patient was on at the time of the ECG recording were documented. In addition, the level of electrolytes measured within the preceding 24 hrs of the ECG was analyzed.

Results: 28 out of 257 ECGs met prolonged QTcB criteria (≥ 450 ms or ≥ 60 ms increase from baseline). Using multivariate analysis, age, Cyclophosphamide, Fluconazole, and Voriconazole maintained their significant association with QTcB prolongation. Hypomagnesemia and hypocalcemia showed association with QTc prolongation by bivariate analysis; however, this association could not be confirmed using Multivariate analysis due to the small sample size. The association between Ondansetron and Trimethoprim/sulfamethoxazole (TMP-SMX) could not be determined as all patients were receiving those two medications. Importantly, life-threatening Ventricular arrhythmias, Torsade de pointes, did not occur in any of our patients.

Conclusion: Our study provides insights into factors contributing to QTcB prolongation, including specific medications, chemotherapeutic agents, and possibly hypomagnesemia and hypocalcemia. To better understand these associations, larger prospective studies are necessary. In the interim, it is essential to conduct frequent follow-ups with ECGs when using these medications.