T-wave Alternans and Long QT Syndrome

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T-wave alternans is an uncommonly observed electrocardiographic (ECG) finding of beat-to-beat alternation in T-wave shape or amplitude (A, operating room monitor; B, ECG rhythm strip). “Macroscopic” T-wave alternans, visible to the naked eye, is associated with a prolonged QT interval and long QT syndrome (LQTS). T-wave alternans may portend a rapidly developing and life-threatening scenario, and its recognition is crucial to prevent progression to lethal arrhythmias.

T-wave alternans developed in a 2-yr-old, 15-kg boy without known cardiac history who was undergoing general anesthesia with sevoflurane for syndactyly surgery. When T-wave alternans is suspected, intraoperative cardiology consultation is appropriate to assist with this often-unfamiliar ECG abnormality that may degenerate quickly to torsades de pointes. Immediate treatment should begin with 20 to 30 mg/kg of intravenous magnesium and preparation for defibrillation.

Diagnostic evaluation of patients with T-wave alternans often reveals a prolonged QTc interval (greater than 450 ms). Genetic characterization may reveal one of the 13 known genotypes of LQTS that have an overall incidence of 1 in 2,500. LQTS8 (Timothy syndrome) is associated specifically with arrhythmias during anesthesia, as well as with syndactyly and craniofacial and cognitive abnormalities. Anesthetic management of a patient with LQTS requires both avoidance of QT-prolonging medications, such as sevoflurane, ondansetron, ephedrine, phenylephrine, and albuterol, as well as premedication and pain control to minimize sympathetic stimulation. Anesthesiologists should have a heightened level of awareness for LQTS when such ECG abnormalities are seen, especially when coupled with physical findings associated with these syndromes.

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Competing Interests
The authors declare no competing interests.

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