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Neonatal Arrhythmias

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Abstract

Neonatal arrhythmia can be a life threatening emergency. Diagnosis of arrhythmias in newborns need high index of suspicion as signs and symptoms are non specific mimicking common neonatal problems like sepsis. Arrhythmias in neonates also need echocardiographic evaluation to exclude underlying structural heart disease. The review describes diagnosis and management of common neonatal rhythm disturbances.

Abbreviations: ECG-Electrocardogram, SVT-Supraventricular tachycardia, AV node-Atrioventricular node, EAT-Ectopic atrial tachycardia, MAT-Multifocal atrial tachycardia, AVRT-Atrioventricular reciprocating tachycardia, WPW-Wolff Parkinson White Syndrome, AVNRT-Atrio ventricular nodal re-entry tachycardia, AF Atrial fibrillation, VT- Ventricular tachycardia, VF- Ventricular fibrillation, PJRT-Permanent junctional reciprocating tachycardia, LQTS-Long QT Syndrome.

Introduction

Arrhythmias in newborns are relatively common, occurring in up to 1-5% of the cases. (1) Arrhythmias are classified into benign and life threatening. Benign arrhythmias include sinus arrhythmia, nodal or junctional rhythm, wandering atrial rhythm, premature atrial contractions, and premature ventricular contractions. Benign arrhythmia do not pose serious threats and no additional treatment is immediately required. They do not need follow-up because prognosis is good. Life threatening symptomatic arrhythmias includes supraventricular tachycardia (SVT), sinoatrial node dysfunction, disorders of the atrioventricular conduction system, ventricular tachyacardia (VT), long QT syndrome (LQTS), ventricular fibrillation, as well as arrhythmias due to electrolyte disturbances. These types of arrhythmia can develop suddenly and need to be immediately recognized for optimal management of the patient. Diagnosis of arrhythmias is challenging in the neonatal period. Normal heart rate may vary markedly depending on the level of activity. Clinical features often overlap with sepsis. Diagnosing rhythm disturbances in the neonatal period begins with knowledge of normal newborn electrocardiogram (ECG). (2)

Normal neonatal ECG parameters and classification of rhythm disorders

In a normal infant, sino atrial node (SA node) acts as pacemaker of the heart as it has highest spontaneous depolarization rate. Thus in normal sinus rhythm every beat originates in the sinus node. The wave of depolarization spreads to the atrial fibres represented by “P” waves in ECG. The electrical activity conducts slowly in atrioventricular node (AV node) resulting in AV delay seen as isoelectric PR segment in ECG. This delay enables ventricles to be in a relaxed state when atria are propelling blood into the ventricles. Electrical activity spreads quickly across the ventricles via His Purkinje system allowing near simultaneous contraction of both the ventricles producing QRS complex. Repolarization of ventricles is characterized by T