

A Brief note and Future Perspectives of Neonatal Bradycardia

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DESCRIPTION

Neonatal bradycardia is defined as a decrease in heart rate from baseline which is typically mentioned as lower limit of normal for age. The children of 0-3 years having heart rate less than 100 beats per minute is referred as bradycardia.

Heart impulses work through Electrical signals which are termed as action potentials. These action potentials travel through all the 4 chambers of heart. The above two chambers are called auricles and below two chambers are referred as ventricles. These signals create a gentle rhythm. If the rhythm of the heart changes then that condition is referred as arrhythmias, or abnormal heartbeats. The electrical problem slows down the time in between heartbeats.

These electrical impulses travel across the atria, causing them to contract and pump blood into the ventricles. Then these impulses reach a cluster of cells called the atrioventricular (AV) node. The AV node transmits the signal to a set of cells called the bundle of His. These cells transmit the signal down a left branch serving the ventricle and a right branch serving left ventricle, which causes the ventricles to contract and pump blood to right ventricle sending oxygen-poor blood to the lungs and the left ventricle sending oxygen-rich blood to the body.

Since the primary permanent pacemaker implantation in 1958, there are great improvements in pacemaker and diagnostic technology. In terms of monitoring, the proliferation of wearable devices with rhythm detection capabilities is probably going to continue. The Apple Heart Study, with its study size of 400,000 subjects and its ability to detect fibrillation by employing a photoplethysmographic signal, demonstrated the facility of wearable devices to detect rhythm abnormalities during a large group of patients. Newer devices like the Apple Watch can collect one lead ECG.

CAUSES FOR NEONATAL BRADYCARDIA

The primary reason for neonatal bradycardia is hypoxia. Other causes of bradycardia include hypothermia, hypovolemia, and pneumothorax, head injury, and medications.

Hypoxia

Hypoxia is defined as a condition where the supply of oxygen to the tissues is lowered to perform bodies versatile functions.

Drug induced

Drug induced Neonatal Bradycardia results due to excessive usage of beta blockers for the patients with hypertension during pregnancy. Neonates born to mothers who required beta-adrenergic blocker therapy during pregnancy are at an increased risk of developing neonatal bradycardia.

SYMPTOMS

- Symptoms of this condition include
- Dizziness or lightheadedness
- Fatigue
- Shortness of breath
- Fainting

Advances also still be made in bradycardia management. Studies in His bundle pacing show restoration of a narrow QRS and improvement in RV pacing induced cardiomyopathy. As experience has grown, successful permanent His bundle implant rate has improved, and even correction of left bundle branch block in select patients has been seen. The utilization of His bundle pacing as a first-line therapy, as compared with traditional CRT, in patients with EF but 35% and guideline indications for CRT is a neighborhood of accelerating interest.

The His-Sync trial was the primary randomized study comparing these strategies, but didn't show a big difference in ejection fraction, coronary artery failure or cardiovascular death. Larger studies are going to be needed to assess His bundle pacing as a way of providing CRT. Additionally, newer work with direct left bundle pacing shows low capture thresholds, stable lead position, and correction of baseline bundle branch block. This novel technique may provide another tool within the armamentarium of physiologic pacing for patients where the His bundle location is challenging, features a high capture threshold, or fails to correct baseline bundle branch block.

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