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## CARDIAC ARRHYTHMIAS

The American Heart Association defines cardiac arrhythmias as any change from the normal sequence of electrical impulses. Cardiac arrhythmias can be the result of either an abnormality of impulse formation [which can lead to impulses that are too fast, too slow or irregular] or else an abnormality in impulse conduction [which can lead to heart block].

During a normal cardiac cycle the electric impulse originates in the sino-atrial node (SA node), it then passes through the atria where it reaches the atrio-ventricular node (AV node) and is then conducted through the ventricles.

When there is a change in the formation of the electrical impulse, impulses may be formed in the SA node at a very fast or slow rate (sinus tachycardia and sinus bradycardia, respectively). Sometimes the electrical impulses start to originate from areas in the heart outside the SA node. This may either occur occasionally (such as in supraventricular ectopic or ventricular ectopic) or else, all electrical impulses start to originate from outside the SA node (atrial fibrillation or ventricular fibrillation). The former type usually results in impulses which follow the baseline sinus rhythm but which are



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too fast or too slow. On the other hand, the latter usually result in electrical impulses which arise in a very fast and irregular manner. The exceptions to this are junctional rhythm, which involves electrical impulses arising from the AV node at a very slow and regular rate, and supraventricular tachycardia, which involves electrical impulses arising from a site in the atria outside the SA node at a fast but regular rate.

When there is a change in electrical impulse conduction the result is heart block. Heart block can be classified as 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup> degree. In 1<sup>st</sup> degree heart block there is a delay in the conduction of electrical impulse at the AV node. In 2<sup>nd</sup> degree heart block there is intermittent non-conduction of the electrical impulses at the AV node. In 3<sup>rd</sup> degree heart block none of the electrical impulses arising in the SA node are conducted through the AV node to the ventricles. Cardiac arrhythmias can usually be successfully managed with medication, discontinuing any causative drugs or else by inserting a pacemaker in the case of heart block. ❌