Assessment of Different Approaches to Model and Simulate Supraventricular Tachycardias

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Supraventricular tachycardias are arrhythmias arising at or above the AV node in the heart. Since they are considered to be not as dangerous as many other cardiovascular diseases, there are only few studies focussing on this group of abnormal electrical activity. This study aims at examining mathematical tools to model these arrhythmias. Furthermore, we bring together different approaches in a comperative way while presenting also simulation results. A set of partial differential equations called the bidomain model dominates the attempts to model electrophysiologically accurate. Based on the bidomain model is the multifunctional open-source framework Chaste [1]. Nonetheless, more approximative ways comprise advantages in computational speed. Cellular automaton models such as the Virtual Heart Model [2] suit in this respect.

The approaches share the giving opportunity to demonstrate mechanisms of the cardiac excitation propagation. For instance, the understanding how abnormal activity correlates with electrocardiogram changes can be improved.

References

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