Intrinsic cardiac conduction system

In the cardiac cycle, independent contraction and relaxation of heart cells are coordinated by the activity of the internal conduction system of the heart and communication between cells through fissures in the heart muscle cells themselves. The internal conduction system of the heart consists of nodal tissue, whose specialized cells have both neural and muscular properties. Nodal tissue is localized in specific regions of the heart: The introduction of an internal heart conduction system consists of several specialized subpopulations of cells that either spontaneously generate electrical activity (pacemaker cells), or preferentially carry out this excitation in the four chambers of the heart in a coordinated way. This tutorial will discuss the details of this anatomy, as well as the physiological properties of the system. The potential for heart action at the root of signaling in the heart, and various heart cells (myocytes) populations trigger characteristic waveforms. Active detection (or recording) of these potentials is important in both research and clinical trials. Although each myocyte in the heart has the ability to carry the electrical impulse of the heart (to be excitable), there are specific myocytes that generate the potential for heart action and/or preferentially lead them from the atria to the ventricles. This cellular network has become known as the conduction system [1]. Ordered contractions of the atria and ventricles are regulated by the organized transmission of electrical impulses that pass through these modified cells of the heart muscle; These specializing cells are inserted into the systolic heart muscle. More precisely, this internal conduction system is considered to consist of the following subpopulations of cells: 1) pacemaker cells, those that spontaneously generate electrical activities; and 2) conductive fibers (in chambers, Purkinje fibers) those that preferentially carry out this activity throughout the heart: that is, it consists of a cell with a larger diameter with fast conduction speeds. Normally, after initiating activation (or depolarization) in the pacemaker cell, this electrical excitation spreads throughout the heart in a fast and highly coordinated manner. This system functionally controls the operating time between vestibular and ventricular chambers, which allows for optimized haemodynamic performance. Interestingly, the common global architecture of this conduction system is present in mammals: however, there are significant interspecies differences, primarily at histological level [2,3]. History related to the identification of the conduction system Discoveries related to the existence of the internal conduction system of the heart are relatively recent in medical history and are now basic to knowledge of heart function and anatomy. In 1845 Johannes E. Purkinje first described the conduction system of the chamber, and in 1882 Gaskell, an electrophysiologist, coined the expression heart block. In addition, Gaskell also identified the presence of a slow ventrilate activation rate to benefit from atrial frequency [4]. The first description of the sinoatrial mammal node was reported by Sir Arthur Keith and Martin Flack in 1907 in the Journal of Anatomy and Physiology. Nevertheless, it should be noted that new findings on the functionality of this node are still being identified today. The explanation of the electrical connection from the vestibular node by the heart skeleton to the ventricular part of the conduction system, known as his beam, is attributed to Wilhelm Jr. [6]. Importantly, Tawara later verified the existence of this package in 1906[7]. Due to the difficulty in distinguishing atrioventricular nodal tissue from the surrounding tissue, he also defined the beginning of his bundle as the point at which these specialized vestibular nodal cells enter the central fibrous body (which designates the atria from the ventricles). Tawara is also considered the first person to clearly identify specialized conduction tissues (modified myocytes) that extend from the atrial septal to the ventricular apex, including the right and left bundles of purkinje branches and fibers. Walter Karl Koch (1880-1962) was a prominent German surgeon who identified a triangular area in the right atrium of the heart, which indicates the relative location of the ATRIOVENTRICULAR node (now known as the Koch triangle). In addition, on the basis of detailed anatomical and histological studies of animal hearts and dead human fetuses, Koch also noted that the last part of the heart that loses activity after the death of the entire organ is the area of the pacemaker (ultimum moriens). He postulated that the area of the heart near the opening of the coronary sinus wall was therefore a true pacemaker [8,9]; note that the vestibular node will trigger the escape rhythm when the sinoatrial node in the right atrium fails. 1.Ho, S.Y., Kilpatrick, L., Kanai, T., Germroth, P.G., Thompson, R.P., and Anderson, R.H. (1995) Architecture of the ATRIOVENTRICULAR conduction axis in dogs compared to man — its importance for the ablation of sublimation nodal approaches. 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