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Morten Smerup
Copenhagen University Hospital, Denmark

Structure-function relationship in myocardial sub-structures

From an anatomical point of view the individual myocytes making up left ventricular walls are organized as an anisotropic three-dimensional mesh. This can be characterized in terms of the myocyte angulation relative to the overall geometry of the heart, i.e. helical angles, transmural angles and transverse angles, but also in terms of the organization of the myocytes and the connective tissue of the heart into superstructures, the myocyte aggregates (also called myocardial sheets or –lamellae), which can be further characterized according to their relation to the overall geometry. From a functional point of view, the deformation of the cardiac walls has been extensively described using strain theory on local cuboids of myocardium, characterizing the so-called principal and shear strains. However only lately there has been a satisfactory synthesis of the anatomical and the functional aspects of the myocardium. In this talk I will attempt to describe the fundamentals with an emphasis on the clinical impact for practicing cardiologists, based upon experimental data on the diastolic and systolic architecture in normal, hypertrophic and dilated porcine hearts. Furthermore, novel theories on potential mechanisms in heart development that govern the final arrangement of the myocardium are presented.

Biography

Morten Smerup is from the Department of Cardiothoracic Surgery, Copenhagen University Hospital, Denmark. He has surgical experience of +50 general surgical cases, incl. appendectomies, herniotomies and gall-bladder surgery, +50 CABG cases, Thirteen aortic valve replacements and one tricuspid valvuloplasty, fifteen ASD cases, three partial AVSD cases, four VSD cases, two pulmonary valve replacements (both re-dos), two BT-shunts, three coarctation repairs, two RVOTO, one pulmonary artery banding, one subaortic membrane and more than 50 standard pediatric cannulation procedures.

Morten.holdgaard.smerup@regionh.dk