CARDIAC MECHANICS

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1 Introduction

A long way has been passed since the Galenic viewpoint (2nd century), that the blood ebbs to and from the veins to provide nutrition to the rest of the body, that the arteries carry air, that the lungs cool the heart and that the heart contains pores to allow gaseous exchange across the septum. An important milestone was William Harvey's discovery (17th century) of the pumping function of the heart "Excerciatio anatomica de motu cordis et sanguinis in animalibus" (*Anatomical disputation on the motion of the heart and blood in living creatures*). Nonetheless, now nearly 400 years later, an accurate quantitative description of cardiac function is still a challenge.

In this chapter, the anatomy and physiology of the normal heart are introduced, next to some control mechanisms of cardiac function. Also, the mechanisms, prevalence and diagnosis of congestive heart failure in general and diastolic heart failure in particular are explained. Attention is paid to the interaction between cardiac mechanics on muscular level (lengthening, shortening, tension), global myocardial properties (compliance, relaxation, contractility) and hemodynamic indices of ventricular function (pressure, flow, stroke volume, ejection fraction, power).