

Cardiovascular Failure. Pathophysiological Bases and Management

Edited by Edmundo IC Fischer, Alejandra Inés Christen, and Jorge Carlos Trainini. Argentina: Fundación Universitaria Dr. René G. Favaloro, 2001; 362 pgs., 82 figs.; 60 tables; ISBN: 987-95993-1-4.

This is an excellent book edited by Argentinean authors with the participation of numerous foreign collaborators, including colleagues from Spain. The book is dedicated to Dr. René Favaloro, who wrote the preface which is incomplete, interrupted by his tragic death.

The first chapter, from Argentinean Max. E. Valentinuzzi, is a splendid chapter on «The function of the left ventricle», with an admirable review of the heart as a pump in which he discusses in depth the Frank-Starling law and the Laplace law, analyzing volume-pressure curves, arterial impedance, contractility, and the inotropic state.

The hemodynamics of the left ventricle are much better known than those of the right ventricle, but thanks to the studies of Fernando Ginés and Juan C. Grignola, who wrote the second chapter on «The function of the right ventricle», we know many characteristics of the hemodynamics of the right ventricle. These Uruguayan authors, who begin the chapter with figures from Torrent Guasp, have shown that the right ventricle does not have contraction phases, and the isovolumetric relaxation phase, probably due to the low level of pressure between the systemic and pulmonary veins, is sufficient to maintain pulmonary circulation, without the need for ventricle adjustments, as Wiggers predicted many years ago, but which is only completed, actually, in the right ventricle. They masterfully explain that systole of the right ventricle is vermicular, peristaltic, with the inlet portion contracting first followed by contraction of the outlet portion, which makes the volume-pressure curves of the right ventricle triangular instead of rectangular, as is the case in the left ventricle. Thus, they also show that the papillary muscles of the right ventricle have a higher contraction velocity than those of the left ventricle, and that the right ventricle is «programmed» contract more rapidly with lower oxygen consumption, above all to develop preferential shortening to tension, given its reduced post-load.

The third chapter, from Argentineans Ricardo L. Armentano and Edmundo I.C. Fischer, the latter one of the editors of the book, on «Arterial function in systemic circulation» is an in-depth, complete study of the physical properties of the aorta and peripheral vessels, which begins with an experimental study on dogs of the circulatory tree like the German model of Otto Frank of Windkessel or as an arterial compression chamber with its initially elastic expandable area to explain pulsatile flow. In their model they studied the properties of the aorta and its elastin, collagen, and smooth muscle contents, as well as its inertial and viscous behavior with regard to stress/strain and its application to the hypertensive patient, although to understand it completely one must have mathematical

knowledge superior to the writer of these lines.

The fourth chapter «Genetics and heart failure», by Ronald J. Trent, of the University of Sydney, Australia, is an overview of the genome and functional genomics, with special attention to hypertrophic cardiomyopathy at present and in the future.

The excellent fifth chapter by Christine E. Lawless, from Loyola University, Illinois, USA, «Diagnosis, evaluation, and prognosis of heart failure» carefully reviews the natural history of ischemic cardiopathy, dilated cardiomyopathy, and myocarditis with clairvoyant clarity and for valvular heart failure also provides a careful analysis of the symptoms and signs of heart failure and its prognosis. This is a very useful chapter for medical students, and internal medicine and cardiology residents.

The sixth chapter, by Helen Rimington and John Chambers, of Guy's and St. Thomas's Hospitals, London, United Kingdom, on «Echocardiography for the evaluation of left ventricular function», concerns the study of systolic and diastolic function of the left ventricle, both on M-mode and 2-dimensional Doppler, also making reference to function on the long axis and tissue characterization with color Doppler.

In the seventh chapter, M. Faisal Khan and Marcelo R. Risk, from Boston, USA, perform a lucid study of «Cardiac variability and heart failure». They underline the concept that a time model is more useful than a frequency model, and that in heart failure there is a sympathetic predominance that is revealed by the decrease in frequency variability and the baroreceptor reflection, being an indicator of poor prognosis for cardiac death, but not of arrhythmias.

The eighth chapter, by Sergio Dalla Volta, from the University of Padua (Italy) on «Endothelial dysfunction in heart failure», begins with a complete description of the physiology of the endothelium, followed by endothelial dysfunction disease, and ends with a very complete view of the protagonist role of endothelial dysfunction in heart failure, considered to be a systemic syndrome that is involved with vasoconstriction, the RAAS system, the prostaglandins, endothelin, nitric oxide, growth factor, inflammatory markers, tumoral necrosis factor, free radicals and apoptosis, etc. This is a masterful chapter.

The ninth chapter, by Alejandra Inés Christen, one of the book editors, called «Medical treatment of chronic heart failure», is splendid, and is an exhaustive review of the treatment of heart failure. It is original in that it makes no reference to the treatment of diastolic failure, which I completely agree with because treatment of systolic and diastolic heart failure is the same, as they are but 2 phases of the same process.

Three professors from the University of Vienna, Austria, Brigitte Stanck, Anja Bojic, and Richard Pacher, wrote a brief tenth chapter on «Refractory heart failure. Concept of medical treatment and risk stratification». Apart from conventional treatment, they discuss their own work with prostaglandin. It appears that it gives more positive results than prostacycline and preliminary findings are promising with the intravenous form of the type B natriuretic peptide (nesiritide).

Adrian Kantrowitz, whose name curiously does not

appear on the list of authors, wrote a very interesting eleventh chapter on a theme in which he is a pioneer and an absolute authority «Introduction to left ventricular assistance», referring to the passionate history of the contrapulsation balloon he designed.

The twelfth chapter, from two of the book's editors, Edmundo I.C. Fischer and Alejandra Inés Christen, broadens the discussion on contrapulsation in the chapter called «Contrapulsation: past, present, and future perspectives». In addition to considering the physiopathology of internal and external contrapulsation, they discuss the technique developed by one of the authors of aortomyoplasty with the *latissimus dorsi* muscle, which can also be applied to the pulmonary artery, as has been shown by the Favaloro Foundation.

The thirteenth chapter, by William S. Peters and F. Payer Milson, from New Zealand, «Left ventricular assistance: physiological, technical, and clinical implications», reviews all the ventricular assistance mechanisms for which they propose the appropriate name of mechanotropic. They basically discuss the mechanotropy of left ventricular assistance that was begun as a bridge to transplant but which, in addition to its immediate benefit, has been shown to cause reverse remodeling or what the surgeons call restoration, which can be definitive. Its actual simplification may mean it will have a great future.

In chapter 14, by Argentineans Luis R. Romero and Jorge Trainini, the latter being one of the book editors, entitled «Circulatory assistance devices», the same theme is discussed, explaining the Mate, Jarvik, and DeBakey mechanical hearts, the latter miniaturized to the size of a wine bottle cork.

Chapter 15, by Eduardo de Forteza, an electrical engineer from the Universidad of Favaloro, Buenos Aires, Argentina, concerns «Novacor, a left ventricular assistance system», which is a synchronized pump placed in the abdomen and connected to the vertices of the left ventricle and the aorta.

Chapter 16, by Jorge Trainini and José de Barisani, on «Cardiac bioassistance», specifically refers to the course of 8 cases of dynamic aortomyoplasty, as does Chapter 17, by Luis Felipe Morcira, from Brazil, which is dedicated this time to «Dynamic cardiac cardiomyoplasty».

The last chapter, number 18, by Spaniards Juan Cosín Sales, Alicia M. Maceira, and Gregorio Rábago Jr., of the University of Navarra, concerns «Transmyocardial revascularization with laser». This is an interesting review in which they mention their experimental study showing that the neo-vessels produced by the laser are open for only 24 hours, and that clinical benefit can be produced by local denervation due to the necrosis from the laser itself or to the neo-vascularization due to the production of growth factor, such as VEGF or FGF, which have been found experimentally.

Overall, this is an excellent book which is missing a chapter on transplant and, perhaps, has too many chapters on cardiomyoplasty, although it must be said that the Argentinean authors have contributed to the development of many of these techniques. Otherwise, it is a book that is perfectly apt for consideration as a textbook for medical students and internal medicine and cardiology residents. Similarly, already trained internists and cardiologists can read the book with the same pleasure I did.

Pedro Zarco

Hospital Clínico San Carlos, Madrid, Spain.