Cardiac Resynchronization Therapy in Heart Failure

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Cardiac Resynchronization Therapy in Heart Failure is a compilation of state-of-the-art reviews about various aspects of the use of cardiac resynchronization therapy (CRT) in heart failure. The editors, Dr Abraham and Dr Baliga, collected and combined contributions from some of the best experts in the field. As mentioned in their preface, large randomized trials have unequivocally demonstrated that CRT improves clinical status, functional capacity, and survival in patients with heart failure and dyssynchrony. Yet, and even despite a class I indication since 2005, there is a reluctance by many cardiologists to apply this therapy. The editors refer to a study by Piccini et al,1 which indicates that the therapy currently has a penetration of only 40% in the indicated population. Because this was a study in the United States, where device implantations occur more frequently than in most other countries worldwide, the CRT penetration may be even lower. Possible explanations are the relative youth of CRT as well as the fact that CRT is an unusual kind of therapy for personnel treating heart failure, in the sense that it uses electric stimulation to improve cardiac pump function.

Cardiac Resynchronization Therapy in Heart Failure is a book that is attractive and understandable for many medical professionals involved in the treatment of heart failure, whether or not they are already involved in treating patients with CRT. It provides exactly what is promised in the title: a comprehensive state-of-the-art overview of how CRT should be used in heart failure, on the basis of present insights and evidence-based medicine. The book consists of 16 chapters, written by separate teams of experts. The chapters are well written and contain in-depth scientific reviews, with critical appraisal of the various topics. The boxes containing practical points at the end of each chapter, which provide the reader with excellent, concise conclusions of the sometimes extensive discussions, are very helpful. It is of great importance that all authors provide us with honest practical points, even if they have to be negative. The recommendations provided are conservative and based on extensive evidence, avoiding suggestions for too speculative a use of the therapy. The conservative approach, promulgated by the book, may foster confidence building, and may serve the useful purpose of encouraging a prudent, gradual increase in the utilization of CRT.

The book starts with an excellent review on the pathophysiology of dyssynchrony and mechanisms of resynchronization by Dr Kass’ group. These investigators clearly indicate that the dyssynchronous heart is not only abnormal in its timing of electric activation, but also in contractile, structural, and molecular aspects, thus providing a very strong argument for the efficacy of resynchronization on the short and long term. Good understanding of these aspects is the key to proper appreciation of the benefits of CRT. Although this first chapter also shows some mechanisms of resynchronization, further insight on the electrophysiological mechanism of CRT is provided by the last chapter in the book. There, Dr Rudy’s group shares data with us, derived from their novel ECG-imaging technique, which shows estimated epicardial activation maps during various modes of CRT. The appearance of electrophysiology in the last chapter is striking, and indicates that this book has been developed by, and is mainly devoted to, specialists with a background in heart failure. However, even those healthcare professionals should understand that not every wide QRS complex reflects a left bundle-branch block, the conduction disturbance where CRT affords its best effects. The book seems to have missed a chance to provide the heart failure specialist with some more basic insight in electrophysiology, such as the recognition of left bundle-branch block on the surface ECG.

Chapters 2 to 6 discuss how echocardiographic measurements can be used to predict the response to CRT as well as to optimize the therapy. Chapter 3 discusses, elegantly and in detail, how diastolic function can be improved and optimized using Doppler-derived left ventricular filling measurements. Chapter 5 gives an up-to-date view on the optimization of atrioventricular and interventricular delays using the various echocardiographic approaches. Figure 5.9 is very useful here, which explains the confusing difference in the definition of interventricular stimulation delay by the different pacemaker companies.

A current major area of discussion is the use of echocardiographic parameters for the selection of CRT patients. The authors of chapter 4 (Hawkins, Petrie, and McMurray) conclude that “CRT selection should not be guided by echocardiographic parameters of dyssynchrony,” a conclusion in line with the consensus statement of the American Society for Echocardiography in 2008. Similarly, some small single-center studies found positive effects of CRT in patients with narrow QRS complex. In the book, the use of CRT in patients with narrow QRS complex is clearly discouraged, especially on the basis of the negative results in the randomized multicenter RethinQ study. It is very possible that novel echocardiographic indices will turn out to be helpful, indeed, and that certain groups of patients with narrow QRS complex are helped by CRT. However, sufficient positive information from large trials is currently lacking.

Chapters 7, 9, and 10 elaborate on the large number of beneficial effects of CRT in adult patients with intrinsic and pacing-induced dyssynchrony, and in pediatric patients. Other important topics that are discussed are heart failure management in CRT, discussing the interaction of CRT with drug therapy and the use of special device features to better monitor patient status. The spectrum of contributions is completed by chapters on safety, cost effectiveness, and regulatory aspects of CRT.

The selected combination of contributions in the book results in a concise and up-to-date piece of information about when and how CRT should be used in heart failure. The book seems especially suited to healthcare professionals who are interested in heart failure treatment and who want to know more about this still fairly novel nonpharmacological therapy. By not including information on more exotic imaging (computerized tomography, single-photon emission computed tomography) and invasive hemodynamic and electrophysiological techniques, nor about how and where to implant the pacing leads, the book achieves a maximal learning effect and acceptance in a large population of healthcare specialists that are leaning toward application of CRT.

Timing is everything. This clearly holds for CRT. It holds also for the time of finalizing the manuscripts for the book. In chapter...
11, on clinical trials with CRT, Dr Hasan was unfortunately unable to mention the final outcome of the Resynchronization Reverses Remodeling in Systolic Left Ventricular Dysfunction (REVERSE) trial. In the preface, presumably the part of the book that was written last, the editors could briefly mention the positive outcome of this trial on the effect of CRT in New York Heart Association class I and II patients, and a similarly positive finding in the Multicenter Automatic Defibrillator Implantation Trial with Cardiac Resynchronization Therapy (MADIT-CRT) trial. Therefore, in the near future, the number of patients treated with CRT may further increase by the use of CRT for prevention of (worsening) heart failure, a development that further necessitates many healthcare specialists to read Cardiac Resynchronization Therapy in Heart Failure.

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