

## Book review

### Mechanical Circulatory Support: Principles and Applications

**Edited by David L. Joyce and Lyle D. Joyce. Oxford University Press, United Kingdom; 2020: 440 pages, 63 tables, and 231 figures. ISBN: 9780190909291.**

This book is an updated review of the various modes of mechanical circulatory support (MCS) for patients with advanced heart failure, particularly focused on long-term left ventricular assist devices (LVADs).

The first thing that stands out is the considerable length of the book, which has 46 chapters. Each chapter is written by a different author, and most of them are from the United States. The quality and length of the chapters varies, but in general they are well written and are clinically oriented to serve as a guide for physicians dedicated to the care of patients requiring MCS.

In the chapters, a pathophysiology and literature review alternates with tables summarizing the available evidence. Thereafter, the authors propose specific protocols for managing each clinical situation discussed. For readers initiating MCS treatment, these can be of help to design their own adapted protocols for patients. The clinical perspective of the book is also reflected by the addition of clinical cases in some chapters to provide a practical summary of the key concepts transmitted. Nonetheless, some of the cases reflect a type of treatment provided in the United States, such as surgical revascularization in the acute phase of myocardial infarction, which may be far from the usual treatment in our setting. Another drawback is that the figures are not visualized well when the chapters are downloaded in PDF, although they look fine on the website.

The book is structured into several parts:

1. It begins with an engaging historical perspective on the development of MCS, imparted by a pioneer in the field, Dr. O.H. Frazier, and goes on to define the indications for LVADs and the evaluation of candidates for this treatment, with particular emphasis on the patient's degree of frailty, psychosocial aspects, and toxic habits. Unfortunately, the indications provided in the chapter lack clarity and there is no specific protocol for right ventricle assessment, which is essential for selecting these patients. Nor is the role of ventricular assist clearly defined in the general context of patients with advanced heart failure, whether as a bridge to heart transplantation or as a destination treatment. The preoperative workup chapter does not adequately address how to prevent right heart failure, and it would be helpful to have a summary table and cut-offs for guidance. The pulmonary hypertension chapter is overly general and does not discuss in detail a left ventricular assist strategy as a bridge to candidacy in patients with type 2 pulmonary arterial hypertension.
2. Next, there are several specific chapters for each MCS device, including well-known ones such as Heartmate II, Heartmate 3, HVAD, EXCOR, and total artificial hearts, as well as others in the

stage of experimentation or evaluation in clinical trials, such as iVAS, MVAD, aVAD, and EVAHEART. These chapters describe the characteristics of the devices and the clinical trials supporting them, which is useful for comparing different devices. However, it would have been helpful to include practical recommendations for programming each device, and a description of any differential features regarding handling of the controller and monitor, interpretation of the recordings, etc. Although the book mainly focusses on LVADs, there are also chapters devoted to intra-aortic counterpulsation devices, extracorporeal membrane oxygenators, and the CentriMag. Nonetheless, if the reader is mainly interested in short-term mechanical assist methods, these chapters provide rather basic information. The book is not a proper reference work for those who wish to delve deeply into the use of the venoarterial or venovenous extracorporeal membrane oxygenator.

3. The following chapters focus on implant procedures via sternotomy or thoracotomy, additional surgical procedures performed during implantation, and anesthetic treatment in the operating room. These are extensive, well documented chapters with useful information for readers interested in these aspects
4. The next chapters deal with the postimplantation period: the immediate postprocedure treatment, the type of anticoagulation to use depending on the device, and the treatment of acquired von Willebrand factor deficiency. Perhaps the best feature of the book is the practical manner in which the authors address all the complications that can develop in patients with an LVAD. Each chapter explains the pathophysiology leading to these events, the event rates reported in the literature, and how to avoid and treat these complications, which range from thrombosis and neurological or infectious complications to the development of right heart failure or aortic insufficiency following implantation. The chapters describing methods for optimal management of LVADs with the use of echocardiography and right heart catheterization are of special interest for the clinician, as they additionally enable an understanding of the hemodynamics of LVADs, a key factor for programming these devices and avoiding complications.
5. There are a few interesting chapters devoted to specific or novel aspects, such as MCS for ventricular arrhythmia ablation and the use of systems for pulmonary arterial pressure monitoring, such as CardioMEMS.
6. Finally, there is an essential chapter on the role of the specialized coordinating nurse in the prior assessment and follow-up patients with LVADs. Here it would have been very helpful to have a specific protocol for management of the LVAD lead, a key point in the treatment of these patients.

In conclusion, this is an extensive, well-documented, easy-to-read, and eminently practical book that can be a reference for those who wish to begin working with long-term MCS and a good complementary book for specialists experienced in this field.

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<https://doi.org/10.1016/j.rec.2020.01.011>

## CONFLICTS OF INTEREST

J. González-Costello has received fees for training courses from Abbott Laboratories.

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