Mechanical Circulatory Support for Advanced Heart Failure

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Editors

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A Texas Heart Institute/Baylor College of Medicine Approach

Springer

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We would like to dedicate our book Mechanical Circulatory Support for Advanced Heart Failure: A Texas Heart Institute/Baylor College of Medicine Approach *to Dr. Denton A. Cooley.*

Dr. Cooley is considered to be the world's greatest heart surgeon. His accomplishments include expanding therapeutic potential for patients with congenital heart conditions, pioneering the artificial heart and heart transplantation, developing prosthetic heart valves, and establishing new methods for aortic aneurysm repair. In the words of Dr. Walt Lillehei, "Dr. Cooley was the first to demonstrate the safety of heart surgery with the heart-lung machine. He performed more heart surgery than any heart surgeon in the world every year from 1956 to 1994." Dr. Cooley also developed the first bundled services plan for cardiac surgery, called the CardioVascular Care Providers, which was influential in the structuring of cardiac services for Medicare.

Dr. Cooley founded the Texas Heart Institute (THI) in 1962 and was instrumental in THI rising to become one of the premier institutions for cardiac surgery in the world. Over 120,000 cardiac surgeries using the cardiopulmonary bypass circuit were performed at THI during Dr. Cooley's lifetime. Dr. Cooley published over 1400 scientific articles and was a member in more than 30 professional medical societies. He founded the Cullen Cardiovascular Surgical Research Laboratory, which under Dr. O.H. Frazier's leadership, a trainee and devotee of Dr. Cooley, was instrumental in developing nearly all of the left ventricular assist devices used in clinical practice today. Among his numerous honors and awards, Dr. Cooley received the Presidential Medal of Freedom from President Reagan in 1984 and the National Medal of Technology and Innovation from President Clinton in 1998, as well as the Lifetime Achievement Award in 2016 from the American Association for Thoracic Surgery.

It is our belief that every cardiologist, cardiac surgeon, and cardiac patient owes a great degree of gratitude to Dr. Cooley for his enormous contribution to the field. We are greatly honored to have been given the opportunity to dedicate our book to the memory of the late Dr. Cooley.

Respectfully,
Jeffrey A. Morgan, M.D.; Andrew B. Civitello, M.D.; and O.H. Frazier, M.D.

Foreword

I am proud and honored to have been asked to write this foreword. It seems only fitting that a book about mechanical circulatory support (MCS) should be published by experts from Baylor College of Medicine and the Texas Heart Institute (THI). Since the 1960s, these two institutions, at first separately and now jointly, have been involved in almost every major advance in this field.

Not so long ago, a book written in collaboration between THI and Baylor physicians would have been unimaginable. In 1969, professional rivalry between myself and Dr. Michael E. DeBakey, chairman of Baylor's Department of Surgery, caused me to resign my long-standing professorship at Baylor and devote my full attention to THI, which I had founded in 1962. Baylor and THI each continued to make outstanding contributions to cardiovascular medicine, but they lacked the advantage of a mutually beneficial collaboration. Not until 2007 was a cordial relationship reestablished. Instrumental in that reconciliation were Dr. George P. Noon of Baylor, Dr. O.H. Frazier of THI, and several other physicians at both institutions. In late 2007, Dr. DeBakey joined me in the THI research laboratory to watch Dr. Frazier implant a total artificial heart into a calf. The heart comprised dual MicroMed DeBakey left ventricular assist devices. This occasion marked a breakthrough in both MCS research and Baylor-THI relations. By the time of Dr. DeBakey's death, at age 99 in July 2008, the new rapport was firmly established.

In a modest way, this rapprochement might be compared to the ending of the twentieth-century "space race" between the US astronauts and the Soviet cosmonauts. Elsewhere, I have related how the space race influenced my response to the unique scientific challenge posed by the first TAH implantation [1]. With the end of the Cold War, former rivalries were laid aside, and old boundary lines were dissolved. Since then, unprecedented spaceflight cooperation between the USA and Russia has led to progress in education, research, and technology. Today, unprecedented cooperation between Baylor and THI is leading to advances in education, research, and patient care. The current book is a result—and a symbol—of that cooperation.

I congratulate Drs. Morgan, Civitello, and Frazier and all the other contributors to this superb volume, which covers every aspect of clinical cardiac support. The experience related here is based on the largest single-center MCS series in the USA. As a clear, comprehensive, and authoritative guide to device therapy, this book will be an indispensable resource for physicians,

other medical personnel, and anyone else interested in support of the failing heart.

Houston, TX, USA Denton A. Cooley, M.D.

Reference

1. Cooley DA. Some thoughts about the historic events that led to the first clinical implantation of a total artificial heart. Tex Heart Inst J. 2013;40(2):117–119.

Preface

The first successful LVAD was implanted by Dr. DeBakey at Baylor College of Medicine/Methodist Hospital in 1966. In 1968, Dr. Denton Cooley performed the first successful human heart transplant in the USA at Texas Heart Institute, St. Luke's Hospital. Dr. Cooley subsequently performed the first successful artificial heart implantation in 1969 at the Texas Heart Institute. The first LVAD as a bridge to transplant and the first combined heart/kidney transplant were also performed by Dr. Cooley in 1978 at the Texas Heart Institute. In 1988, Dr. Frazier implanted the first successful continuous-flow LVAD and has subsequently been instrumental in the development of nearly all continuous-flow devices used clinically, including the Jarvik, HeartMate 2, HeartMate 3, and HeartWare HVAD.

With the popularization of continuous-flow LVADs, mechanical circulatory support has evolved into the standard of care for patients with refractory, end-stage heart failure. Advancements in patient selection, device design, surgical techniques, and postoperative management have led to significant improvements in survival and a reduction in device-related complications, such as bleeding, infection, stroke, device malfunction, and device thrombosis.

Each chapter in our text *Mechanical Circulatory Support for Advanced Heart Failure: A Texas Heart Institute/Baylor College of Medicine Approach* was authored by staff members from the Texas Heart Institute, Baylor College of Medicine. Our LVAD program has grown significantly over the years with greater than 1300 LVADs implanted to date, including over 850 continuous-flow LVADs. Our goal in writing this text was to provide a framework for physicians evaluating patients for LVADs, caring for patients perioperatively, and/or managing patients with LVADs long-term by sharing the cumulative experience of the Texas Heart Institute, Baylor College of Medicine LVAD program.

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