Difficult Problems in Adult Cardiac Surgery

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FOREWORD

THE IMPROVEMENT AND REFINEMENT of cardiac surgical techniques and cardiopulmonary bypass have been truly remarkable in the 30 years since the inception of open heart surgery for acquired and congenital heart disease. Operations that formerly had high mortality and morbidity, such as aortic valve replacement, coronary bypass, and mitral valve replacement, are now done routinely throughout the world with a risk of less than 5 percent. Operative therapy is now extended to anatomic areas of the heart never before thought possible. "Physiologic" cardiac surgery is now commonplace, for even pathology cardiac surgeons cannot "see" as well as electrophysiologic pathology. *Difficult Problems in Adult Cardiac Surgery* by Arthur J. Roberts, M.D., summarizes the current major technical and judgmental advances of the 1980s related to the most difficult and controversial problems surgeons face in treating patients with adult cardiac disease. Dr. Roberts has assembled a stellar cast of surgeons who are internationally known for their work in the areas they have written about. This book is not a collection of routine cases with low morbidity and mortality; instead, it concentrates on the unusual, the controversial, and the difficult. Controversial items such as coronary bypass surgery for evolving myocardial infarction, ventricular rupture related to mitral valve replacement, arrhythmia surgery, combined coronary valvular heart surgery, and combined coronary and peripheral vascular surgery are presented along with current controversial judgmental areas such as reconstruction of cardiac valves, operating on patients with coronary disease and poor left ventricular function, or as emphasized by the editor, the clinical evaluation of the best forms of myocardial protection.

Dr. Roberts' collection of essays on today's most challenging aspects of cardiac surgery represents the state of the art in both technique and philosophic approach toward congenital, coronary and valvular heart disease in the adult. It will be an important reference source for the difficult and increasingly complex operations that cardiac surgeons are called upon to perform in this expanding area of improved myocardial protection, safer and simpler perfusion equipment, and better devices for replacement and/or repair of the heart.

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PREFACE

THE FIELD OF ADULT cardiac surgery has expanded greatly over the past 10 years. This growth is dramatically depicted in the exponential increase in the frequency of coronary artery bypass graft (CABG) operations. Simultaneously, there has been progress related to certain refinements in patient selection, anesthetic management, perfusion technology, surgical technique, myocardial protection, and postoperative patient management. These advances have been associated with decreased operative mortality and improved long-term survival. While the need for valvular heart surgery, thoracic aortic reconstruction, and pacemaker insertions has remained relatively constant during the recent past, the surgical techniques and perioperative management policies have improved. Operative intervention for the treatment of cardiac dysrhythmias has also become more disciplined and precise, even though the number of patients requiring such surgery remains relatively small. Finally, there has been renewed support for cardiac transplantation and, most dramatically, artificial heart implantation is now a reality.

The editor's purpose in organizing this book was to integrate the experience of several experienced surgical teams within the framework of a single volume related to clinical cardiac surgery. By design, several of the chapters identify exceptional experience outside of the University Medical Center and within the auspices of the community hospital. At present, most adult cardiac surgery in the United States is performed in the community hospitals. Furthermore, increasingly accurate documentation of innovative and meaningful cardiac trials is developing in this environment. The particular relationship among the university cardiac surgical groups, the private practice teams, and their respective institutions should probably evolve into a closer partnership to ensure optimal patient care, cost-effectiveness, and adequate residency training. The scope of this book is also broadened by including work in valvular replacement and reconstructive heart surgery achieved by our European associates.

We have tried to identify some of the more difficult problems in adult cardiac surgery. In this process, many of the uncomplicated situations have been excluded. This list of topics cited in this book is not all-inclusive; we hope it is representative of common problems facing the practicing cardiac surgeon. The first portion of this book considers surgery for coronary artery disease and includes discussions of reoperative CABG surgery, special techniques in CABG procedures, urgent operations following therapeutic coronary artery catheterization, and CABG surgery during naturally evolving acute myocardial infarction. In addition, CABG surgery for the mechanical complications of acute myocardial infarction, coronary spasm, and the poorly functioning left ventricle are described. Finally, CABG operations for unstable angina, left ventricular aneurysms, combined valve and coronary

disease, combined carotid and coronary atherosclerosis, and angina pectoris in renal failure are illustrated.

Part Two covers surgery for valvular heart disease. This section includes expositions on valvular reconstruction, left ventricular apical–aortic conduits for severe left ventricular outflow tract obstruction, reoperative valvular surgery, surgery for infective endocarditis, and surgical enlargement of the small aortic annulus. In addition, a presentation of the most appropriate artificial heart valve for different kinds of patients is discussed.

In Part Three, surgery for thoracic aortic disease is outlined. Operations for aortic arch aneurysms and acute aortic dissection are discussed. In addition, the management of chronic ascending aortic aneurysms and iatrogenic ascending aortic injury are detailed. Part Four discusses current techniques used in the correction or palliation of atrial and ventricular dysrhythmias. Part Five covers surgical management in pericardial disease, including diagnosis and treatment for constrictive pericarditis. In Part Six, operations involving mechanical cardiac support and cardiac replacement are detailed. The use of intra-aortic balloon pumping and left heart assist devices is described. In addition, current results with cardiac transplantation and artificial heart replacement are detailed. Part Seven outlines surgery for congenital heart disease in the adult; Part Eight, the surgical application of myocardial protection.

I hope that the collective efforts presented in this book will help other cardiac surgeons to further develop treatment plans that might improve the care of their patients. This publication may also serve as a reference book for the practicing cardiac surgeon. In addition, the information provided in these pages will hopefully stimulate residents in cardiothoracic surgery, as well as provide current surgical considerations and results for clinical cardiologists. I am indebted to the individual authors who have contributed their time and effort to the art and practice of cardiac surgery. Their leadership in the objective documentation of their surgical experience is recognized as much as their excellence in clinical practice. Nevertheless, their individual reports summarize the active contribution of many health care professionals who have collectively made cardiac surgery successful at the various institutions represented in this book. To fail to acknowledge these contributions would be an oversight. In some small way, if this work stimulates further probing and analysis of the complicated problems facing cardiac surgery, the time spent in producing this book will be worthwhile. In the process of continuing re-evaluation and investigation, advances in adult cardiac surgery are most likely to occur.

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PART ONE

Surgery for Coronary Artery Disease

1

CORONARY ARTERY REOPERATION

Floyd D. Loop, M.D.
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AFTER THE FIRST POSTOPERATIVE YEAR, the linearized rate of angina recurrence is estimated to be 4% to 5% annually. Virtually all recurring angina is explained by graft closure, progressive atherosclerosis in the native coronary artery, or both. Overall, more coronary artery reoperations are performed annually because (1) there is a continuing high volume of primary operations throughout the world, and (2) atherosclerosis is a biologically progressive disease. In other words, the clinical symptoms reflect the anatomic developments. The prospect of reoperation is probably less today than it was 10 or 15 years ago because of more complete initial revascularization and a lower incidence of early graft failure. Among the authors' 1967 to 1970 surgical patients, 17% subsequently underwent reoperation during the next 10 years. This number fell to approximately 10% in the early and mid-1970s and is probably closer to 7% today (Fig 1–1). The authors estimate that if primary myocardial revascularization procedures reach 200,000 by 1990, there will be 14,000 reoperations.[1]

Coronary artery reoperations involve twice the mortality and morbidity of primary procedures. Although results are improving, indications for reoperation should be strict, and at this point in time, only patients with severely compromised life styles should be considered for another coronary procedure.

This chapter deals with trends in selection, performance, and results of coronary artery reoperations. It also includes a section on operative technique and discusses intermediate-term results.