

CARDIAC SURGERY

SECOND EDITION



John W. Kirklin ■ Brian G. Barratt-Boyes

CARDIAC SURGERY

Volume 2

Morphology, Diagnostic Criteria,
Natural History, Techniques,
Results, and Indications

Second Edition

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FOREWORD TO THE FIRST EDITION



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FOREWORD TO THE FIRST EDITION

Perhaps you are like me in having fancied at some time or another the possibility of someday being able to encompass the entire body of essential information of a selected specialty and then “wrap it up” into a skillfully coordinated, comprehensive, concise compendium. Increasingly rare are the occasions when that fantasy can be transformed into reality. Indeed, for cardiac surgery, such an accomplishment may never again occur after this book. This is especially true if an aspiring author is also required to be a principal contributor to essentially every frontier of progress in the entire specialty. Thus, from its very inception, this book has been unique.

There was a time when I would have experienced an unwelcome sense of jealousy at encountering a remarkable volume such as this one—similar to the irrational frustration I typically experienced as a youth when listening to a virtuoso pianist. Why couldn’t I play as well? But now, in maturity, I can enjoy such a performance without feeling the pain of my own inadequacies. So also can the outstanding accomplishments of this text now be appreciated. One can absorb its facts, benefit from its teaching, marvel at the skill of its authors, and still rigorously control one’s envy. But it isn’t easy!

It would be expected that my background of clinical experience as well as service as the editor of a journal of our specialty would ensure reasonable familiarity with what is known in cardiac surgery. Nevertheless, as I have read through the various chapters of this book in a comprehensive manner, I have experienced afresh the thrill of discovering new knowledge, of setting straight some confusing and annoying misunderstandings regarding certain principles, and of filling in various lingering gaps in my knowledge. The entire expanse of cardiac surgery seems to be here, laid out in the same crisp, logical, fully documented style that we have all come to recognize and respect in

the many other reports, lectures, and publications provided by these particular authors. Furthermore, not only does the book address the needs of those experienced in the subtleties of cardiac surgery, but it should serve equally well as an introduction for those just beginning the journey.

It is no exaggeration to suggest that Drs. Kirklin and Barratt-Boyes are well known by medical professionals throughout the world and are deeply and legitimately respected and admired by all of them. Though for the bulk of their careers they have worked at nearly diametrically opposite points on our globe, earlier they were associated for a time, when Brian Barratt-Boyes was a resident in cardiothoracic surgery at Mayo and John Kirklin was just embarking on his unique pioneering experience with the world’s first continuous series of clinical cardiac operations using a pump oxygenator. Their subsequent collaboration through the years, culminating now in the production of this book, is evidence of their mutual respect. This tradition of cooperation between them has often resulted in a cross-fertilization of ideas and publication of analyses of their combined clinical experiences. It has also provided evidence of the shrunken dimensions of our modern world and strengthens the hope that one day such collaboration will be possible even among politicians, economists, ethicists, and every segment of society all over the world.

Whether a text is more valuable if each of its various chapters is written by a highly selected authority on the subject, or more valuable if written entirely by one or a handful of authors, with consequent advantages of consistency of style and integration of presentation, is debatable. But the question has become largely moot in modern times, particularly for the whole expanse of cardiac surgery, because the body of knowledge has become so vast that anything other than multiple authorship is increasingly impractical. The question is specifically irrelevant with

respect to this book since, though it has only two authors, each chapter reflects their combined outstanding authority on that subject. Thus this text retains the advantages of both approaches. One wonders if this phenomenon can ever again be possible.

We live in an age unique for the rapid revelation of complexity and intricacy in the universe about us. So marvelous is the view that one is almost overwhelmed by fascination and excitement. In its particular way this book adds to that fascination. And even apart from the factual information and the technical descriptions that pack its pages,

the book serves also as an example of artistic beauty. And I speak not only of the superb drawings of John Desley; the precise, comprehensive, compact presentation of its materials gives the work true literary status. If scientific literature can ever be regarded as subject to admiration in an artistic sense, this book can.

I come away from my reading of this book intellectually stimulated, freshly inspired, rededicated toward scientific ideals, and even newly reassured about the ultimate fulfillment of humanity's loftiest hopes. I think you will do likewise.

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PREFACE

"Writing a monograph on my own was done mainly to preserve a unity of presentation in all the chapters. This does not mean that the book is the exclusive result of my thinking and work..., " wrote Spaan.¹ This is precisely our situation. No doubt most parts of the second edition of this book could have been written authoritatively by some one of our three collaborators, or by someone else. Had this been done, unity of presentation would have required an initial detailed writing by the other person, then essentially a rewrite by us, and a final approval by the first author. The process of preparing the second edition has taken about 18 months, a process sufficiently long that chapters revised in the early months required still further updating more recently. Had we done it differently, the process would have taken twice as long. Then it would already have been the time to start preparing still another edition!

We have not been content merely to add the most recent bibliographic references and update sections such as "Indications for Operation." Instead, all chapters have been completely revised, many new operations have been incorporated and illustrated, new data and new analyses have been added, and the indications for operation (and other kinds of interventions) have been recrafted. As before, the abbreviation UAB has been used to identify data and illustrations from the University of Alabama at Birmingham; GLH identifies those from Green Lane Hospital in Auckland, New Zealand. The use of these abbreviations in conjunction with a procedure, a form of patient care, an indication, or a concept identifies it as being held by the one of us from that institution but not necessarily by the other. As in the first edition, each chapter has received the

attention of both of us. The process of preparing the manuscripts was the same for each chapter. Since the publication of the first edition, the literature has been continuously tabulated; for each chapter of the second edition, the relevant literature has been reviewed. New data, new patient follow-up, and new analyses were made for nearly all chapters. Each chapter was then revised from beginning to end, usually with a complete rewriting of about two-thirds of the chapter. The book is based primarily on our personal experiences, gathered during 75 combined man-years in cardiac surgery, during which time approximately 55,000 open heart operations and 5,500 closed heart operations were performed by our colleagues and us on cardiac surgical services that we directed. This is stressed only to indicate the extent of the experience upon which the book is based.

This edition has retained the presentation of "Indications for Operation" at the *end* of each chapter. This has been done because the indications are the derivatives of comparisons (see Ch. 6) of various outcomes (results) of alternative forms of treatment, including no treatment (natural history).

The second edition has been written with the intimate collaboration of three younger experts, Dr. E.H. Blackstone, Dr. Richard Jonas, and Dr. N.T. Kouchoukos, to ensure that each chapter reflects the most up-to-date, as well as the older, knowledge, trends, and practices. Dr. Blackstone had a major role in the preparation of all parts of the first edition, and has been even more involved with this one. Dr. Jonas has played a major role in revising each chapter on congenital heart disease, and also Chapters 2, 3, 5, and parts of Chapter 53. Dr. Kouchoukos has played a major role in revising each chapter on ischemic heart disease, acquired valvular heart disease, thoracic aortic disease, as well as Chapters 2, 3, and 5. In this process, our collaborators provided factual information from their own

¹ Spaan JAE: Coronary Blood Flow: Mechanics, Distribution, and Control. The Netherlands: Kluwer Academic Publishers, 1991.

experiences, suggested deletions and additions to the initial revisions of the chapters, and expressed their views about the subject of the chapters. All this was then reviewed by the authors and incorporated into the chapters. The chapters can therefore be considered a consensus among the authors and collaborators. When a procedure, form of care, indication, or concept was unique to a collaborator but not to the consensus, it has been identified as such either by the abbreviation BCH, for Dr. Jonas of the Boston Children's Hospital, or JHStL, for Dr. Kouchoukos of the Jewish Hospital of St. Louis.

In addition, Dr. James K. Kirklin made important suggestions and additions to Chapter 51, on cardiac transplantation; Dr. Francis Fontan did likewise for Chapters 8 and 9, on ischemic ventricular aneurysm and ischemic mitral incompetence. Dr. Gerald Buckberg reviewed and made suggestions for Chapter 3, on myocardial management. Chapter 4, on anesthesia, was revised and updated by Drs. William A. Lell of UAB, and Dr. J.G. Reves of Duke University Medical Center. Dr. Louise Calder (GLH) provided specimen photographs for Chapter 44, which help clarify the complex anomaly of double inlet ventricle.

This second edition was deprived of input from Dr. Peter Brandt (GLH), who contributed in a major way to the first edition. Dr. Brandt died of multiple myeloma on September 19, 1991, after a long illness.

The bibliographic references are again characterized by the first letter of the last name of the first author and a number (such as L4), rather than simply a number. This convention is both simple and convenient, and allows the reader to easily find a given author's paper among the alphabetically arranged references. New references within each alphabetic subheading were simply added to vacancies left by deleted references or at the end of the list.

The abbreviation CL is used throughout to denote 70% confidence limits around the point estimate. The reasons for presenting 70% confidence limits, rather than 95% or 50% confidence limits, are described in Chapter 6. The drawings of surgical procedures are, with few exceptions, oriented as the field is seen from the position of

the surgeon. In the case of open operations, this is from the patient's right side.

The second edition reflects data and outcomes from an era of largely unregulated medical care, and similar data may be impossible to gather and freely analyze when care is largely regulated. This is not intended as an opinion as to the advantages or disadvantages of regulation of health care; indeed, as regulation proceeds, the data in this book, along with other data, should be helpful in establishing priorities and guidelines. As already noted, in both the first and second editions, the last section of each chapter is on indications for operation. In the future, regulations of policy makers may need to be added to the other variables determining indications.

Our hope is that this book will be useful to cardiac surgeons caring for patients with congenital or acquired heart disease, as well as to cardiologists and interventional cardiologists working with children and adults, anesthesiologists, intensivists, pathologists, imaging experts, residents, and others.

In the first edition, we acknowledged the many individuals in our two institutions and elsewhere who contributed importantly to the data and knowledge contained in that edition. In this edition, Dr. Andrew Epstein, in the Division of Cardiovascular Medicine, UAB, provided information and advice for the chapter on cardiac rhythm disturbances and for Chapter 5. New drawings and numerous revisions of drawings were again made with skill and patience by John Desley of Rochester, Minnesota.

The manuscripts of the various chapters, and numerous tables and plots, were made in preliminary and final form largely by Ms. Debbie Nuby. Without her perseverance and skill this second edition could never have been produced. Nancy Ferguson was helpful in the early months of the work. Ann Earwood has provided overall support, help, and a shoulder to cry on throughout. The advice, help, skill, and support of Ms. Avé McCracken and Mr. David Terry, of Churchill Livingstone, the publisher, have been essential ingredients in whatever success this second edition enjoys.

John W. Kirklin, M.D.

Brian G. Barratt-Boyes, K.B.E., M.B., Ch.M.

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