IMRT ∙ IGRT ∙ SBRT
Advances in the Treatment Planning and Delivery of Radiotherapy
2nd, revised and extended edition

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Frequently Used Abbreviations

3DCRT Three-dimensional conformal radiotherapy
CTV Clinical target volume
DVH Dose-volume histogram
EPID Electronic portal imaging device
GTV Gross tumor volume
IGRT Image-guided radiotherapy
IMRT Intensity-modulated radiotherapy
kV Kilovoltage
MV Megavoltage
PTV Planning target volume
RTOG Radiation Therapy Oncology Group
SBRT Stereotactic body radiotherapy
Preface

This volume offers a guide to the techniques and technologies that can bring new, advanced radiotherapy capabilities into daily patient care. It is intended to be a readable and practical resource, presenting useful radiotherapy programs for clinical application, guidance on their efficient use and specific evidence for their selection from recent reports on clinical outcomes.

The volume is divided into four sections. The first offers explanations and discussions of the technologies themselves and technical methods for their implementation. The second section brings these technologies into the radiation clinic with presentations by noted physicians at major centers who have broad experience with these new treatment approaches. In each chapter, the authors give specific guidelines for current clinical practice. The third section explores the use of these high-precision technologies in the rapidly expanding field of stereotactic body radiotherapy. The final section discusses the important advances in proton therapy, which is adding a new dimension to the range of available treatment technologies.

This second edition takes a broad new vantage on the substantial changes that have recently occurred in the field of radiation oncology. For many cancer conditions, intensity-modulated, image-guided and stereotactic body treatment programs have become expected services of the modern, comprehensive radiotherapy clinic, and clear understanding of their use is now basic to practice. Despite their rapid adoption, many fundamental issues regarding their roles are still being defined at every step from tumor imaging and therapy planning to treatment delivery. Measures of clinical outcomes and their value based on cost/benefit analyses are just now being reported. Many new insights into their clinical indications, integration and efficient utilization are coming into focus, and their roles are redefining practice in new hypofractionated treatment programs. Further, the growing contributions of proton therapy add a new level of decision and treatment se-
lection for clinicians. Central to all of these issues are the current economics and practical allocations of our medical resources, which may increasingly define the utilization of these technologies. These developments, and their relative merits, are the focus of this volume.

I have planned and developed the text based on presentations given at the 2009 San Francisco Radiation Oncology Conference, which was jointly sponsored by the Departments of Radiation Oncology of Stanford University, University of California at San Francisco, Saint Francis Memorial Hospital San Francisco and University of California at Davis. Drs. Richard Hoppe, Mack Roach III, James Purdy, Paul Keall and Jean Poulion supported me in organizing the conference. I wish to thank each of them. Presentations have been expanded, updated, referenced and integrated for this volume, and several additional chapters were contributed to complete the scope of the text.

Advances in radiologic imaging are the foundation of much of the current work explored in this text. Throughout the volume, examples of this are often presented in more than one format. In addition to the printed illustrations, a website (www.karger.com/FRATO43_suppl) allows the reader to view a number of the important figures in time-elapse videos. This is especially useful in understanding the work on tumor motion and image guidance. Other illustrations are also posted on this website for greater clarity and dynamic visualization, and the website is an essential part of these presentations overall.

I wish to thank all of the authors for working with me on this text, especially Drs. James Purdy, Laura Dawson, Brian Kavanagh and Robert Timmerman for their excellent contributions and guidance. I wish to thank Dr. Catherine Burns for her expert assistance in the editing of the volume, and Mr. Josue Castellano for his expertise in organizing its illustrations and website materials. Finally I wish to thank Dr. Thomas Karger and the many associates of his fine publishing house.

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