Quyen D. Chu
John F. Gibbs
Gazi B. Zibari
Editors

Surgical Oncology

A Practical and Comprehensive Approach

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Editors
Quyen D. Chu, MD, MBA, FACS
Department of Surgery
LSU Health Sciences Center-Shreveport
Shreveport, LA, USA

Gazi B. Zibari, MD, FACS
John C. McDonald Regional Transplant Center
Willis Knighton Health System
Shreveport, LA, USA

John F. Gibbs, MD, FACS
Department of Surgery
Jersey Shore University Medical Center/Meridian Health
Neptune, NJ, USA

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To our wives, Trina Chu, Theresa Gibbs, Maysoon Zibari, and our children, Thuy-Tien Chu, Yen Chu, Matthew Gibbs, Zachary Gibbs, Brianna Gibbs, Susan Seepan Zibari, Renas Zibari, Rona Connie Zibari, and Lehat Zibari.

To our parents, Trinh V. Chu and Nhan T. Chu, (the late) William L. Gibbs, Sr, and Betty G. Gibbs, and (the late) Baderkhan Zibari and Khanzad Zibari.

Foreword

This is a unique surgical oncology text. It is written in a very user friendly format that is somewhat unusual for a standard text. Each chapter starts out with Learning Objectives, followed by an Abstract of the chapter. The chapter itself then follows, each chapter being comprehensive and complete, but brief. This is followed by a list of Salient Points, and a section on Questions concerning the chapter, with Answers. This is followed by a comprehensive list of references. I believe this format will be particularly effective for individuals in terms of learning and retention. This book should be appropriate for medical students, residents, fellows, faculty, and surgeons out in private practice. Each chapter is written by experts in their field. The editors, Drs. Chu, Gibbs, and Zibari, have all contributed to the text, and have done an excellent job in editing those chapters contributed by outside experts. Many surgical oncology texts are so large and cumbersome, that they are difficult to handle. They are also written in a format that does not encourage retention. I would predict that this text will be a great success, following the format of other textbooks and concentrate on being brief, but comprehensive. I believe this text will attract a large audience.

The Johns Hopkins Medical Institutions
Baltimore, MD, USA

John L. Cameron, MD

Preface

Learning the correct approach for managing solid tumors represents a large part of medical/surgical residency training. The demand for an oncology textbook that is tailored to the needs of both learners and teachers is high. One might expect to see a plethora of surgical oncology textbooks readily available to accommodate such a demand; unfortunately, this is not the case. Despite a handful of excellent surgical oncology textbooks out there, most either lack sufficient depth and/or contain information that may not be practical or germane to the learners.

This textbook, *Surgical Oncology: A Practical and Comprehensive Approach*, provides a comprehensive perspective on surgical oncologic diseases that are relevant to those who have an interest in surgical oncology. Its purpose is to distill a voluminous amount of information into one book so that readers can readily access relevant information and knowledge according to their particular needs. Medical students and residents will find this textbook useful in preparing for surgical case presentations and written/oral tests. For the surgical oncology fellows, the book not only provides the already mentioned advantages, but also serves as a guide and a beginning point to help them further explore specific topics more in-depth. For the busy general surgeons who care for cancer patients, this book serves an invaluable source to help them better manage their patients while staying abreast with the latest advances in the field. Finally, for the educators (staff members, academicians, etc.), this book can serve as a valuable teaching tool to save them from spending countless hours searching for relevant teaching materials.

Each chapter is written by experts and their colleagues in their respective field of expertise. The chapters provide concise and in-depth information on the topic at hand. Seminal articles are highlighted throughout the book to reinforce the principle that optimal management depends not only on good clinical judgment, but also on evidence-based medicine. Plenty of illustrations, diagrams, tables, and photographs are included to assist the visual learners. The unique outline of the book is that each chapter begins with key points to focus the readers on the materials covered and concludes with an appendix that summarizes the chapter with salient points. This unique set-up can be used as a tool to quickly review the topic at hand. *Surgical Oncology: A Practical and Comprehensive Approach* also includes a set of short questions and answers at the end of each chapter to reinforce key learning points.

One of the problems with currently published surgical textbooks is that the information contained therein may become outdated and obsolete by the time

they are published. However, by publishing a textbook with (eBook) capability, we can achieve our objectives – mainly to publish a practical oncology text that is geared towards the needs of the practicing surgeon, surgical oncology fellow, surgical residents, and medical students while at the same time have the flexibility to readily update the information to match current practices.

Surgical Oncology: A Practical and Comprehensive Approach is a book that includes topics that are germane to a broad range of audiences who have an interest in surgical oncology. Those interested in surgical oncology will gain an in-depth knowledge on traditional topics such as breast cancer, thyroid cancer, melanoma, gastric cancer, colorectal cancer, esophageal cancer, hepatobiliary cancers, sarcomas, and gastrointestinal stromal. In addition, topics such as local treatment of early rectal cancer, breast cancer in pregnancy, and management of colorectal metastases to the liver are examples of other topics that will be emphasized.

Although topics such as urologic cancers, neurosurgical cancers, and childhood cancers are important, they are not necessarily an important part of general surgical training in many healthcare centers in the USA. Therefore, these topics are excluded from *Surgical Oncology: A Practical and Comprehensive Approach*.

We believe that *Surgical Oncology: A Practical and Comprehensive Approach* will be an invaluable resource for any serious learners of surgical oncology and will become a must-have textbook for training programs.

Shreveport, LA, USA — Quyen D. Chu, MD, MBA, FACS
Neptune, NJ, USA — John F. Gibbs, MD, FACS
Shreveport, LA, USA — Gazi B. Zibari, MD, FACS

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Contents

Editors and Contributors

Editors

Quyen D. Chu, M.D., M.B.A., F.A.C.S. Department of Surgery, LSU Health Sciences Center-Shreveport, Shreveport, LA, USA

John F. Gibbs, M.D., F.A.C.S. Department of Surgery, Jersey Shore University Medical Center/Meridian Health, Neptune, NJ, USA

Gazi B. Zibari, M.D., F.A.C.S. John C. McDonald Regional Transplant Center, Willis Knighton Health System, Shreveport, LA, USA

Contributors

Ernest Kwame Adjepong-Tandoh, M.Bch.B. Department of Surgery, University of Ghana Medical School, Accra, Ghana

Mazin F. Al-Kasspooles, M.D. Department of General Surgery, University of Kansas Medical Center, Kansas City, KS, USA

Salim Amrani, M.D. Department of Surgery, Carlsbad Medical Center, Carlsbad, NM, USA

Tania K. Arora, M.D. Department of Surgery, Geisinger Health System, Danville, PA, USA

Rachel D. Aufforth, M.D. Division of Surgical Oncology and Endocrine Surgery, University of North Carolina, Chapel Hill, NC, USA

Justin John Baker, M.D. Department of Surgery, Maine Medical Center/ Tufts University School of Medicine, Portland, ME, USA

Joaquina C. Baranda, M.D. Internal Medicine, University of Kansas Medical Center, Westwood, KS, USA

Harry D. Bear, M.D., Ph.D. Department of Surgery, Virginia Commonwealth University, Richmond, VA, USA

Richard J. Bold, M.D. Division of Surgical Oncology, UC Davis Cancer Center, Sacramento, CA, USA

Jeffrey J. Brewer, M.D. Department of Surgery, University at Buffalo, Buffalo, NY, USA

Jocelyn F. Burke, M.D. Department of General Surgery, University of Wisconsin Hospital and Clinics, Madison, WI, USA

Michael R. Cassidy, M.D. Department of Surgery, Boston University School of Medicine, Boston Medical Center, Boston, MA, USA

Herbert Chen, M.D. Department of General Surgery, University of Wisconsin Hospital and Clinics, Madison, WI, USA

Edward Eun Cho, M.D., Sc.M. Department of Surgery, Kaleida Health/ Buffalo General Med Center, State University of New York at Buffalo, Buffalo, NY, USA

Quyen D. Chu, M.D., M.B.A., F.A.C.S. Department of Surgery, Louisiana State University Health Sciences Center – Shreveport, Shreveport, LA, USA

Linus T. Chuang, M.D., M.P.H., F.A.C.O.G. Division of Gynecologic Oncology, Department of Obstetrics, Gynecology and Reproductive Science, Icahn School of Medicine at Mount Sinai, New York, NY, USA

Mark S. Cohen, M.D. Department of General Surgery, University of Michigan Hospital and Health Systems, Ann Arbor, MI, USA

Phillip A. Cole, M.D., M.H.C.M., F.A.C.S., F.A.S.C.R.S. Department of Surgery, LSUHSC/University Health-Shreveport, Shreveport, LA, USA

Rouzbeh Daylami, M.D. Department of Surgery, Kaiser Permanente, Sacramento, CA, USA

Liane Deligdisch, M.D. Department of Pathology, Obstetrics-Gynecology and Reproductive Science, Ichan School of Medicine at Mount Sinai, New York, NY, USA

Peter J. DiPasco, M.D. Department of General Surgery, University of Kansas Medical Center, Kansas City, KS, USA

Lesly A. Dossett, M.D., M.P.H. Department of Surgery, Naval Hospital Jacksonville, Jacksonville, FL, USA

Rosemary Bernadette Duda, M.D., M.P.H. Department of Surgery, Beth Israel Deaconess Medical Center, Howard Medical School, Boston, MA, USA

John F. Gibbs, M.D. Department of Surgery, Jersey Shore University Medical Center/Meridian Health, Neptune, NJ, USA

David Gleason, M.D. Department of Surgery, Kaleida Health/Buffalo General Medical Center, State University of New York at Buffalo, Buffalo, NY, USA

Stephen R. Grobmyer, M.D. Section of Surgical Oncology, Cleveland Clinic, Cleveland, OH, USA

William R. Jarnagin, M.D. Hepatopancreatobiliary Service, Memorial Sloan-Kettering Cancer Center, New York, NY, USA

Martin S. Karpeh, Jr., M.D. Department of Surgery, Mount Sinai Beth Israel Medical Center, New York, NY, USA

Elizabeth P. Ketner, M.D. Department of Surgery, Mount Sinai Beth Israel Medical Center, New York, NY, USA

Nikhil I. Khushalani, M.D. Department of Medicine, Roswell Park Cancer Institute, Buffalo, NY, USA

Hong Jin Kim, M.D. Division of Surgical Oncology and Endocrine Surgery, University of North Carolina at Chapel Hill, Lineberger Comprehensive Cancer Center, Chapel Hill, NC, USA

Roger H. Kim, M.D. Department of Surgery, Louisiana State University Health Sciences Center – Shreveport and the Feist-Weiller Cancer Center, Shreveport, LA, USA

Bas Groot Koerkamp, M.D., Ph.D. Hepatopancreatobiliary Service, Memorial Sloan-Kettering Cancer Center, New York, NY, USA

David A. Kooby, M.D. Division of Surgical Oncology, Winship Cancer Institute, Emory University, Atlanta, GA, USA

Moshim Kukar, M.D. Surgical Oncology, Roswell Park Cancer Institute, Buffalo, NY, USA

Mahmoud N. Kulaylat, M.D. Department of Surgery, Buffalo General Medical Center, University at Buffalo-State University of New York, Buffalo, NY, USA

Edward A. Levine, M.D. Department of Surgery, Wake Forest School of Medicine, Salem, NC, USA

Parham Mafi, M.D. Department of Surgery, SUNY Buffalo, Buffalo, NY, USA

Jane E. Méndez, M.D., F.A.C.S. Department of Surgery, Surgical Oncology, Boston Medical Center/Boston University School of Medicine, Boston, MA, USA

Nipun B. Merchant, M.D., F.A.C.S. Department of Surgical Oncology and Endocrine Surgery, Vanderbilt University Medical Center, Nashville, TN, USA

Kimberly E. Miller-Hammond, M.D. Department of Surgery, Kaleida Health/Buffalo General Medical Center, State University of New York at Buffalo, Buffalo, NY, USA

Jacqueline Oxenberg, D.O. Surgical Oncology, Roswell Park Cancer Institute, Buffalo, NY, USA

John H. Park, M.D. Radiation Oncology, University of Kansas Medical Center, Kansas City, KS, USA

Elena Pereira, M.D. Department of Obstetrics, Gynecology and Reproductive Science, Mount Sinai Hospital, New York, NY, USA

Michael Polcino, M.D. Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY, USA

Reese W. Randle, M.D. Department of Surgery, Wake Forest School of Medicine, Salem, NC, USA

Luz Maria Rodriguez, M.D. Department of Surgery, Walter Reed National Military Medical Center/National Cancer Institute, Bethesda, MD, USA

Miguel Rodriguez-Bigas, M.D. Department of Surgical Oncology, UT MD Anderson Cancer Center, Houston, TX, USA

Matthew Sanders, B.A., M.D. Department of Surgery, LSUHSC-Shreveport, Shreveport, LA, USA

Guillermo Pablo Sangster, M.D. Department of Radiology, Louisiana State University Health Sciences Center – Shreveport, Shreveport, LA, USA

Christopher N. Scipio, M.D. Department of General Surgery, University of Michigan Hospital and Health Systems, Ann Arbor, MI, USA

Dhruvil Shah, M.D. Department of Surgery, UC Davis, Sacramento, CA, USA

Christiana Shaw, M.D. M.S., F.A.C.S. Surgery, University of Florida, Gainesville, FL, USA

Perry Shen, M.D. Department of Surgery, Wake Forest School of Medicine, Salem, NC, USA

Junichi Shindoh, M.D., Ph.D. Department of Surgical Oncology, Anderson Cancer Center, Houston, TX, USA

Hosein Shokouh-Amiri, M.D. John C. McDonald Regional Transplant Center, Willis Knighton Health System, Shreveport, LA, USA

Joseph Skitzki, M.D. Surgical Oncology, Roswell Park Cancer Institute, Buffalo, NY, USA

Jillian K. Smith, M.D., M.P.H. Department of Surgery, University of Massachusetts Medical School, Worcester, MA, USA

Richard R. Smith, M.D. Department of Surgery, Tripler Army Medical Center, Honolulu, HI, USA

Malcolm H. Squires III, M.D. Division of Surgical Oncology, Winship Cancer Institute, Emory University, Atlanta, GA, USA

John H. Stewart IV, M.D., M.B.A. Department of General Surgery, Wake Forest Baptist Health, Salem, NC, USA

Jennifer F. Tseng, M.D., M.P.H. Department of Surgery, Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, MA, USA

Benjamin W. Vabi, M.D. Department of General Surgery, University at Buffalo School of Medicine, Buffalo, NY, USA

Jean-Nicolas Vauthey, M.D. Department of Surgical Oncology, Anderson Cancer Center, Houston, TX, USA

Konstantinos I. Votanopoulos, M.D., Ph.D. Department of Surgery, Wake Forest School of Medicine, Salem, NC, USA

Nathalie C. Zeitouni, M.D.C.M. Dermatology, University of Arizona, Tucson, AZ, USA

Gazi B. Zibari, M.D. John C. McDonald Regional Transplant Center, Willis Knighton Health System, Shreveport, LA, USA

Giuseppe Zimmitti, M.D. Department of Surgical Oncology, Anderson Cancer Center, Houston, TX, USA

Part I

Skin

Melanoma

1

Christiana Shaw and Stephen R. Grobmyer

Learning Objectives

After reading this chapter, you should be able to:

- Recognize risk factors for melanoma.
- Understand how to evaluate and stage patients with melanoma.
- Appreciate how prospective randomized controlled trials have impacted the treatment of patients with melanoma, and apply these trials to treatment paradigms.
- Be familiar with novel target-specific therapy for advanced melanomas.
- Select options for local, regional, and systemic control of the disease.

C. Shaw, M.D., M.S., F.A.C.S.
Surgery, University of Florida, 1600 Southwest Archer Road, Box 100109, Gainesville, FL 32610, USA
e-mail: christiana.shaw@surgery.ufl.edu

S.R. Grobmyer, M.D. (✉)
Section of Surgical Oncology, Cleveland Clinic, 9500 Euclid Avenue A81, Cleveland, OH 44195, USA
e-mail: Grobmys@ccf.org; Stephen.grobmyer@gmail.com

Background and Historical Perspective

Melanoma is an important health problem. In the United States, it is estimated that 76,690 people (45,060 men and 31,630 women) will be diagnosed with melanoma in 2013 [1], and lifetime risk for development of melanoma is currently estimated at 2 % [1]. An increase in episodic exposure to intense sun of fair-skinned individuals has led to a 600 % rise in melanoma incidence from 1950 to 2000 [2]. Despite an increased incidence, survival rates improved over the same time period, although melanoma is responsible for 80 % of skin cancer deaths. Education and early diagnosis, resulting from better skin cancer screening, have resulted in this improvement in survival. One of its most important public health features is that melanoma often affects younger patients, with a median age at diagnosis of 61 and median age at death of 69. Thus, an average of 18.6 years of potential life are lost for each melanoma death, one of the highest rates for an adult onset cancer [3].

Risk Factors

When taking a history of a patient with a skin lesion, certain risk factors for melanoma are important to understand. Relative risk is one way of understanding a risk factor for development of

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a disease. Relative risk is the chance of developing a disease, when comparing an exposed group of individuals to a nonexposed group. A history of severe, episodic sunburns in early life is the most widely recognized risk factor for the development of melanoma, although with a relative risk of 2.5, a history of blistering sunburn is often not the strongest risk factor for its development. Perhaps the most important risk factor is a family history of melanoma. A weak family history accounts for a threefold increase in risk, whereas a strong family history (≥3 first degree relatives) carries a relative risk of 35–70. Heritable mutations have been identified, and a genetic modification in *CDKN2A* or *CDK4* confers a 60–90 % lifetime risk of melanoma [4]. Having multiple benign or atypical nevi confers a relative risk of 11, whereas a personal history of melanoma is responsible for an 8.5 times higher risk. Additional risks include dysplastic nevus syndrome (RR = 2.3–12) [5], xeroderma pigmentosum (1,000-fold increased risk for developing skin cancer, including cutaneous melanoma) [6, 7], a personal history of previous nonmelanoma skin cancer (RR = 2.9), immunosuppression (RR = 1.5–3), and markers of sun sensitivity such as type I skin, freckling, blue eyes, or red hair (RR = 1.6–2.5) [3].

Diagnosis

Melanoma can be recognized using the ABCDE features (Table 1.1, Fig. 1.1). Often patients may complain of a mole that has changed in characteristics and is associated with itching, bleeding, or ulceration. When thinking of any cancer patient, the first step in management is to obtain an accurate diagnosis. Biopsy of suspicious cutaneous lesions is of critical importance in making an early diagnosis of melanoma or other skin cancers. Excisional biopsies are the most accurate but are best suited for small lesions. Other types of biopsies that can be performed include punch biopsies and shave biopsies [8, 9]. Each biopsy type has benefits and drawbacks. Punch biopsies while easy to perform may misrepresent the depth of a lesion. Shave biopsies are quick and easy to perform but have been criticized traditionally for not providing accurate depth of a lesion, although a large recent study suggests that shave biopsies provide reliable information in planning surgical treatment and staging [10]. When performing a wide local excision of a melanoma on the extremity, the incision should be placed longitudinally along the long axis of the extremity (Fig. 1.2).

Useful immunohistochemical stainings include S100, HMB-45, MART-1/Melan-A, tyrosinase, and MITF [11].

Table 1.1 The ABCDEs of melanoma

A: **A**symmetry
B: **B**order (irregular)
C: **C**olor changes
D: **D**iameter > 6 mm (size of a pencil eraser)
E: **E**volving (any change in characteristics such as size, shape, color, elevation, new symptoms such as bleeding, itching, or ulcerating)

Staging and Prognosis

The next step in management of a cancer patient is to accurately stage the disease. This allows appropriate treatment decisions to be made through risk-benefit analysis, often based on prognosis. Two scales are used to determine the depth of invasion: (1) Breslow's thickness and (2) Clark's levels (Fig. 1.3).

Melanomas are staged according to the American Joint Committee on Cancer (AJCC) TNM system, where tumor depth (Breslow's thickness), ulceration, nodal status, and metastases form the basis of prognosis (Table 1.2). Tumor depth is the strongest prognostic factor, whereas ulceration is the second most important prognostic indicator (Tables 1.3 and 1.4). Tumors with a Breslow's thickness of less than 1 mm (1 mm ≈ width of a dime) are known as "thin" melanomas, whereas those between 1 and 4 mm are "intermediate thickness" and those greater than 4 mm (4 mm ≈ width of two nickels) are "thick." Tumor depth forms the basis of the margin needed for excision and is also predictive of node positivity. For tumors ≤ 1 mm, 4 % have positive regional lymph nodes; 1.01–2.00 mm,