

# **Image-Guided Diagnosis and Treatment of Cancer**

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## Preface

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Cancer detection and treatment have been greatly enhanced by advances in imaging technology during the last decade. *Image-Guided Diagnosis and Treatment of Cancer* aims to describe the past, current, and future applications of imaging in the diagnosis, staging, treatment, and outcome assessment of cancer of the prostate, central nervous system, and breast. Given the multitude of advances in image-guided biopsy and treatment, this book aims to be the first of its kind to introduce the field of minimally invasive image-guided surgery to the medical community.

Earlier detection using screening mammography has decreased breast cancer mortality (Chapter 3). Approaches to breast cancer detection using magnetic resonance imaging (MRI) are currently under study (Chapter 4). Improved visualization of the prostate gland first using transrectal ultrasound (Chapters 1 and 6) and later using MRI (Chapters 2 and 7) has provided the ability to diagnose prostate cancer and perform minimally invasive delivery of high-dose radiation to the tumor bearing region(s) of the prostate with minimal toxicity. MRI-guided resection of neoplasms and sites of functional disorders allows for minimally invasive biopsy (Chapter 5) and neurosurgery (Chapters 8 and 9) with maximum benefits.

As imaging technology has become increasingly sophisticated, the ability to assess response to chemotherapy (Chapter 10), map temperature profiles (Chapter 11), and visualize gene expression in vivo is becoming a reality (Chapter 12). *Image-Guided Diagnosis and Treatment of Cancer* outlines the current clinical applications of image guidance in the detection (Part I) and treatment (Part II) of carcinoma of the prostate, central nervous system, and breast in order to define the future paradigm of genetic-based imaging and its potential clinical applications (Part III).

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