Contents

1. Cancer – Reflections from the Past 1
Praful Desai

Radiotherapy 3
Chemotherapy 4
Biological (targeted) therapy 5
The Indian scenario 5
The future 6

2. Surgical Oncology: An Overview 7
Praful Desai

3. Geographic Variations in Frequency and Incidence: A Global Perspective 9
Ganesh Balasubramaniam

Geographic variations in incidence 10
Incidence rates based on economic development 10

4. Primary and Secondary Prevention of Common Cancers 15
Surendra Shastri, Aditi Shastri

Cervical cancer screening and prevention 15
Breast cancer screening 18
Oral cancer prevention and screening 20

5. The Changing Face of Surgical Pathology 24
Anita Borges

6. Current and Future Imaging Techniques: Therapeutic Impact on Treatment Planning 35
Bhavin Jankharia

Plain radiographs 35
Mammography 35
Ultrasound 36
Computed tomography scan 36
Magnetic resonance imaging 37
Positron emission tomography/computed tomography 37
Positron emission tomography/magnetic resonance imaging 39
Interventional radiology 40

7. Role of Nuclear Medicine in Oncology 42
BA Krishna

Principle of nuclear imaging 43
Diagnostic role 43
Types of nuclear scans in oncology 43
Clinical applications 44
Breast cancer 46
Lung cancer 48
Gastrointestinal cancers 50
Genitourinary cancers 52
Head and neck cancer 53
Bone and soft tissue tumors 53
Positron emission tomography-computed tomography in radiotherapy 53
Infections in oncology 54

Evolving applications of positron emission tomography scan with new tracers 54
Therapeutic nuclear oncology 55

8. Tumor Markers in Cancer: Therapeutic Impact **59**
Praful Desai
Therapeutic impact of tumor markers in cancer 59

9. Cancer Chemotherapy: Future Perspectives **61**
SH Advani
Supportive care 62
Introduction of hormone therapy 63
Biological therapeutics 63
Growth signal inhibitors 63

10. Radiotherapy: Prospects and Retrospects **65**
Nagraj G Huilgol, Mukul Roy
Biological basics of radiation therapy 67
Rationale for combination chemoradiotherapy 68
Brachytherapy 70
Development of new radionuclides and radiation physics 70
Brachytherapy types based on dose rate 71
Types of brachytherapy based on sources placed 71
Intensity-modulated radiotherapy 71
Future of radiation oncology 72

11. Hormonal Dependence of Malignant Cells **74**
Rajendra Badwe, Sudeep Gupta, Gautam Goyal
History 74
Pathophysiology 74
Molecular effects of hormonal therapies 75
Breast cancer 76
Hormones in prostate cancer 79
Hormonal use in other tumors 81
Newer perspectives 82

12. Genetics and Cancer **84**
Rajiv Sarin
Genetics of sporadic and hereditary cancers 84
Burden of hereditary cancers 84
Genetic mechanism of cancer development: multistep carcinogenesis and genomic instability 85
Tumor suppressor genes and oncogenes 86
The two-hit model of Knudson and hereditary retinoblastoma 86
Epigenetics and cancer 87
Clinical presentation and evaluation of hereditary cancers 87
Ascertaining family history 88
Genetic testing, its indications and interpretation 91
Cancer screening and prevention in high-risk individuals/mutation carriers 92
Molecular taxonomy of cancers and its clinical relevance 93
Molecular diagnostic techniques in cancer 94

13. Nanotechnology in Cancer Diagnosis and Treatment: A New Frontier **98**
Neil Desai
Nanotechnology application in cancer diagnosis 100
Nanotechnology application in cancer therapy 102

14. Translational Research in Oncology **112**
CS Pramesh, Rajendra Badwe
Research in cancer 112
A brief history of cancer research 112
Translational research 113

15. The Impact of Minimally Invasive Surgery in Oncology 120
Shailesh Puntambekar, Geetanjali Agarwal-Joshi, Saurabh Joshi, Akhil Lawande
Laparoscopy in oncology 121
Esophagus 122
Colon and rectal cancer 125
Hysterectomy 130

16. Toward the Future of Minimal Access Surgery: A Personal Perspective 135
Tehemton E Udwadia
Training 135
Simulator training 136
Technology 137
Pragmatic evaluation 138
The future 138
Socioeconomic reality 139

17. Oral Premalignant Lesions 142
Vijay Haribhakti
Definitions and terms 142
Leukoplakia 142
Erythroplakia 143
Submucous fibrosis (SMF) 143
Oral lichen planus (OLP) 144
Approach to a patient 144
Biopsy interpretation 145
Management 146

18. Oral Cancers 147
Vijay Haribhakti
Anatomical boundaries and subsites 147
General features 147
Approach to treatment 149
Surgical approaches 149
The lips 153
Cheek and gum 153
The mandible 154
Retromolar trigone 157
Floor of mouth/tongue 157
Radiotherapy 159
Chemotherapy 159

19. Cancer of the Larynx 160
Vijay Haribhakti
Diagnosis 161
Staging of cancer of the larynx 162
Management of laryngeal cancer 162

20. Cancer of the Pharynx 168
Vijay Haribhakti
Surgical anatomy 168
General features 168
The nasopharynx 169
The oropharynx 171
The hypopharynx and cervical esophagus 174

21. Salivary Gland Tumors 180
Vijay Haribhakti
Surgical anatomy 180
Clinical features and diagnosis 181

Classification of salivary tumors 183
Mucoepidermoid carcinoma 183
Adenoid cystic carcinoma 183
Adenocarcinoma 183
Others 183
Treatment goals and alternatives 184
Superficial parotidectomy—technique 184
Management of the neck 184
Issues in salivary gland surgery 185

22. Carcinoma of the Thyroid **186**
Praful Desai, Sarabjeet Kaur Arneja

Etiology 186
Pathology 186
Staging 188
Clinical features and investigations 188
Fine needle aspiration cytology 188
Treatment 188
Management of neck nodes 190
Adjuvant radioactive iodine 191
Lobectomy versus total thyroidectomy in thyroid cancers 191
Solitary thyroid nodule—management algorithm 191

23. Parathyroid Tumors **194**
Praful Desai

24. The Metastatic Neck **197**
Vijay Haribhakti

Anatomy of the fascia and spaces of the neck 197
Triangles of the neck 197
Neck levels 198
Determinants of nodal metastasis 199
Clinical features 199
Staging 199
Management of the metastatic neck 200
Nomenclature of neck dissections 200
The surgical pathology report 201

25. The Role of Diagnostic and Therapeutic Endoscopy in Digestive Tract Malignancies **202**
Samir Parikh

Premalignant/dysplastic lesions of digestive tract 203
Diagnosis and staging of digestive cancers 206
Endoscopic treatment 210
Endoscopic resection 211
Laparoscopic surgery 213
Natural orifice transluminal endoscopic surgery 213
Endoscopic palliative treatment 214
Endoscopic treatment of postoperative/postradiotherapy complications 216

26. Cancer of the Esophagus **222**
Praful Desai, Ganesh Balasubramaniam

Associated factors 223
Pretherapy work-up and investigation 223
Surgical approach 224
Localized (locoregional) esophageal cancer 224
Nodal dissection (two-field/three-field) 226
Type of anastomotic disruptions 228
Chemoradiotherapy as definitive treatment 229
Palliation 229

Chemotherapy 229
Tracheoesophageal fistula 231

27. Carcinoma Stomach 233
Praful Desai, Bhavna Parikh, Nagraj G Huilgol, Ganesh Balasubramaniam
Epidemiology 233
Diet 234
Tobacco 234
Alcohol 234
Obesity 234
Ethnicity 235
Genetics 235
Pathology 235

28. Tumors of the Small Bowel 245
Ratna Parikh, Praful Desai
Etiology 245
Clinical presentation 245
Diagnostic work-up 245
Carcinoid tumors 245
Treatment 246

29. Cancer of Colon, Rectum and Anal Canal 250
Praful Desai, Sarabjeet Kaur Arneja, Bhavna Parikh
Carcinoma of the Colon 250
Pathology 250
Diagnosis/investigations 252
Staging 253
Treatment planning 254
Complications of colonic surgery 255
Neoadjuvant chemotherapy in colonic cancers 255
Carcinoma of the Rectum 255
Etiology 255
Clinical presentation and investigations 256
Fundamental principles of therapy 256
Cancers of the Anal Canal 264
Introduction and etiology 264
Diagnosis and pretherapy workup 264
Pathology 265
Treatment 265

30. Pseudomyxoma Peritonei 269
Ratna Parikh, Praful Desai, Sarabjeet Kaur Arneja
Pathology 269
Diagnosis 269
Treatment 269
Chemotherapy 271

31. Gastrointestinal Stromal Tumors 273
Praful Desai, Keyuri Patel
Pathology 273
Clinical 274
Investigations 275
Management 275

32. Hepatic Malignancies 277
Deepak Chhabra, Palepu Jagannath
Hepatocellular carcinoma 277

Surgical treatment of hepatocellular carcinoma 281
Liver transplantation 285
Locoregional therapy 285
Targeted therapy 287
Prevention and surveillance 287
Other primary malignant liver tumors 287
Rare primary liver tumors 288

33. Biliary Malignancies **291**
Deepak Chhabra, Palepu Jagannath

Gallbladder Carcinoma 291
Epidemiology and risk factors for gallbladder carcinoma 291
Clinical presentation 292
Pathology and patterns of spread 292
Staging 293
Investigations 293
Management 295
Extent of liver resection for gallbladder cancers 296
Extent of lymphadenectomy 299
Bile duct resection 299
Neoadjuvant and adjuvant treatments for GBC 299
Palliative care 299

Hilar 299

Cholangiocarcinoma 299
Epidemiology and risk factors for cholangiocarcioma 300
Pathology and patterns of spread 300
Staging 301
Preoperative evaluation 303
Management 304
Principles of surgical resection in hilar cholangiocarcinoma 304
Palliation 306
Systemic and other treatments 306

34. Pancreatic Malignancies **310**
Shailesh V Shrikhande, Palepu Jagannath

Risk factors and molecular biology 310
Clinical features 310
Pretherapy investigations 311
Confirmation of diagnosis 312
Obstructive jaundice in resectable pancreatic head and periampullary cancer: management approach 312
Treatment 312
Adjuvant therapy in pancreatic cancer 319
Neoadjuvant approaches in pancreatic cancer 319
Palliation in pancreatic cancer 319
Uncommon pancreatic tumors 319

35. Breast Cancer **325**
Ratna Parikh, Praful Desai, Anita Borges, Sarabjeet Kaur Arneja, Nagraj G Huilgol, Bhavin Jankharia, Bhavna Parikh, Ganesh Balasubramaniam

Epidemiology 325
Pathology 326
Grading of breast carcinoma 328
Hormone receptor 329
HER2 neu 329
Molecular classification 329
Screening 330
Prevention 330

Diagnosis 330
Noninvasive breast cancer 336
Invasive breast cancer 339
Sentinel lymph node retrieval in breast cancer 343
Locally advanced breast cancer 344
Inflammatory breast cancer 345
Bilateral breast cancer 346
Mucinous breast cancer (colloid or granulomatous carcinoma) 346
Tubular carcinoma 346
Papillary carcinoma 346
Medullary carcinoma 346
Male breast cancer 347
Phyllodes tumor (cystosarcoma phyllodes) 347
Paget's disease 347
Breast cancer and pregnancy 349
Recurrent disease 350
Metastatic breast cancer 350
Systemic therapy of breast cancer 352
Radiation therapy 355

36. Ovarian Cancer **363**

Ratna Parikh, Praful Desai, Ganesh Balasubramaniam, Bhavna Parikh, Sarabjeet Kaur Arneja

Epidemiology 363
Associated factors 363
Surveillance 365
Chemoprevention 365
Prophylactic surgery 365
Pathology 365
Clinical features 368
Investigations 368
Mode of spread 369
Surgery 370
Systemic therapy of epithelial ovarian cancer 371
Management of recurrent disease 372
Common protocols 373

37. Carcinoma of the Cervix **379**

Praful Desai, Keyuri Patel, Bhavna Parikh, Nagraj G Huilgol, Ganesh Balasubramaniam

Epidemiology 379
Human papilloma virus infection 379
Pathology 381
Screening for cervical cancer 383
Papanicolaou smears 383
Problems and challenges 384
Clinical features and pre-therapy work-up 385
Invasive carcinoma of the cervix: surgical management 385

Chemotherapy 389
Neoadjuvant chemotherapy 389
Adjuvant chemotherapy 390
Salvage chemotherapy for metastatic and recurrent disease 390
Standard protocols 390

Radiotherapy 391
Stage IA–C FIGO 391
Stage IA 2 391
FIGO–stage IBI, and IIA A 391
Adjuvant postoperative radiation therapy 391
Acute side-effects 392
Late side-effects 392

38. Endometrial Cancer 394
Praful Desai, Keyuri Patel, Bhavna Parikh, Nagraj G Huilgol, Ganesh Balasubramaniam
Epidemiology 394
Pathology 396
Clinical features 397
Treatment 398
Radiotherapy (RT) 399

39. Management of Lung Cancer 403
Ramakant Deshpande, Tanveer Abdul Majeed
Epidemiology 403
Etiology 404
Pathology 405
Modes of dissemination 405
Clinical features 407
Diagnosis of lung cancer 407
Treatment of lung cancer 409

40. Mediastinal Tumors 424
Ramakant Deshpande, Tanveer Abdul Majeed
Surgical anatomy of mediastinum 424
Incidence and pathology 424
Diagnosis 424
Symptoms and signs 425
Paraneoplastic syndrome 425
Thymus 426
Thymoma 426
Germ cell tumors 428

41. Tumors of the Chest Wall 436
Ramakant Deshpande, Tanveer Abdul Majeed
Histological types 436
Clinical features 439
Diagnosis 440
Chest wall resections and reconstructions 440

42. Tumors of the Adrenal Gland 444
Varun Gunavanthe, Jagdeesh Kulkarni
Clinical presentation 444
Etiopathology of adrenal mass 445
Surgical indications for adrenalectomy 446
Differential diagnosis of adrenal tumors 446
Illustrative case reports 451

43. Renal Cell Carcinoma 454
Hemant B Tongaonkar, Ganesh K Bakshi, Santosh Menon, Kumar Prabhash, Amit Joshi
Epidemiology 454
Etiology 454
Pathology 455
Pathogenesis 456
Diagnosis and staging 456
Treatment of localized renal cell carcinoma 462
Management of tumor extension to renal vein or inferior vena cava 464
Metastatic renal cell carcinoma 466

44. Prostate Cancer 474
Jagdeesh Kulkarni, Varun Gunavanthe, Nasreen Gite, Abhijit Dhale, Devendra Choudhary
Epidemiology 475
Primary chemoprevention 476

Pathology 476
Diagnosis 477
Staging and risk stratification 480
Treatment options and optimum management 480
Castration resistant prostate cancer 484

45. Bladder Cancer **488**

Jagdeesh Kulkarni, Varun Gunavanthe, Nasreen Gite, Abhijit Dhale, Devendra Choudhary

Etiology and risk factors 488
Clinical features 488
Pathology 488
Staging 489
Investigations and staging techniques 490
Contemporary management of bladder cancer 492
Metastatic and recurrent tumors 498
Minimally invasive surgery for bladder cancer 498

46. Testicular Tumors **500**

Jagdeesh Kulkarni, Abhijit Dhale, Devendra Choudhary, Nasreen Gite, Varun Gunavanthe

Epidemiology and risk factors 500
Classification 500
Germ cell tumors 500
Classification of germ cell tumors of testis 501
Clinical features 502
Investigations 502
Treatment of primary tumor—orchiectomy 503
Testes sparing surgery 504
Staging, stage grouping and risk stratification 504
Management of germ cell tumors of the testis 504
Growing teratoma syndrome 508
Salvage therapy 509
Fertility in testicular tumors 509
Tumors in undescended testis 509

47. Stoma Care **512**

Harikesh Buch, Carlo Pezcoller, Louise Forest Lalande

Development of stoma appliance and stoma care 512
Incidence of stomas 512
Marking the stoma site and creation of ideal stoma 512
Indication for intestinal stoma surgery 515
Preoperative preparations 515
Technique of creation of stoma 516
Preoperative and postoperative counseling 520
Common stoma complications and its management 520
Complications related to urostomy 522
Psychosocial issues of ostomates 524
Other common problems that patient will have 525
Management of different types of stoma 526
Stoma support groups 527

48. Neuroendocrine Tumors (Carcinoids) **529**

Praful Desai, Keyuri Patel

Pathology 529
Investigations 532
Gastrointestinal carcinoids (NETs) 533
Molecular based therapy 535

49. Bone Tumors and Soft Tissue Sarcomas **536**

Ajay Puri, Nirmala Jambhekar

Primary bone tumors 536

Osteosarcoma 538
Ewing sarcoma 541
Chondrosarcoma 542
Principles of surgical treatment and reconstruction after wide excision in bone tumors 543
Soft tissue sarcomas 545
Management of metastatic disease from bone and soft tissue sarcomas 547

50. Retroperitoneal Sarcomas **550**
Praful Desai

Etiology 550
Pathology 550
Clinical features 550
Investigations 550
Treatment 550

51. Management of Skeletal Metastases **553**
Jai Prakash Agarwal, Nikhil Kalyani

Clinical presentation and diagnosis 553
Treatment 555

52. Management of Primary Brain Tumors **560**
Rakesh Jalali, Uday Krishna

Epidemiology 560
Imaging of primary brain tumors 561
Histology of CNS tumors 561
Management of common symptoms and complications of CNS tumors 564
Management of individual tumors 565
Management of pediatric CNS tumors 568
Management of benign tumors and intracranial extra-axial tumors 570
Palliative and supportive care 572
Hospice/end of life care 572
Quality of life 573

53. Management of Brain Metastasis **577**
Rakesh Jalali, Uday Krishna

Epidemiology 577
Clinical presentation 577
Diagnosis and evaluation 577
Pathogenesis and spread of metastases to the brain 578
Prognostic factors and staging 578
Medical management of brain metastasis 579
Radiotherapy 580

54. Cancers from an Unknown Primary Site **585**
Praful Desai

Clinical presentation 585
Clinical approach and investigations including histologic studies of the metastatic lesion 585
Treatment 586

55. Paraneoplastic Syndromes in Cancer **588**
Praful Desai

56. Reconstructive Surgery in Oncology **590**
Dhairyasheel Savant, Mridula Kuchekar

Reconstruction techniques in head and neck cancers 591
Reconstructive options for various sites in the head and neck region 593
Mandibular reconstructions 595
Chest wall reconstruction 598
Abdominal wall reconstruction 601
Breast reconstruction 603

57. Emergencies in Oncology 609
Vijaya Patil, Kailash Sharma
Neutropenic sepsis 609
Tumor lysis syndrome 609
Hypercalcemia 610
Anaphylactic reactions due to chemotherapeutic agents 610
Pheochromocytoma 611
Tumor-induced hypoglycemia 611
Superior vena cava syndrome 611
Airway obstruction 611
Cardiac tamponade 612
Cardiac failure 612
Spinal cord compression 612
Hyperviscosity syndrome 612
Hyponatremia 613

58. Pediatric Oncology: A Journey from Nihilism to Cautious Optimism 614
Purna Kurkure
Burden of childhood cancers 614
Neuroblastoma 617
Wilm's tumor 619
Retinoblastoma 620
Barriers to optimal treatment of childhood cancers in India 621

59. Lymphomas in Children 624
Brijesh Arora, Vishal Sodhi
Lymphomas in children 624

60. Adult Lymphomas 644
Manju Sengar
Non-Hodgkin lymphoma 644

61. Evidence-based Medicine in Oncology: Problems, Challenges and Opportunities 653
Praful Desai
Problems and challenges 653

62. General Principles in Oncologic Anesthesia 657
Sateesh Gupte
Gastrointestinal 657
Fever 658
Hematological abnormalities 658
Hypoglycemia 658
Hypercalcemia 658
Renal dysfunction 659
Endocrinologic 659
Neurologic 659
Lactic acidosis 659
Anesthetic problems in specific operations 660
Tumors of endocrine gland 661
Adrenal 661
Cancer chemotherapy 662

63. Cancer Pain Management 666
KS Sharma, PN Jain
Epidemiology 666
Definition and types of pain 667
Practical approach to a patient with cancer pain 668
Pharmacological management of cancer pain 668
Interventions in pain management 672

64. Palliative Care and Quality of Life in Advanced Cancer 674
Mary Ann Muckaden, Jayita Deodhar, Shrikant Atreya

Incidence of advanced cancers 674
Definition of palliative care 675
Goals of care 675
Physical symptoms and their control 675
Gastrointestinal symptoms 675
Psychological care 679
Place of care 680
Spiritual care 680
Ethics and palliative care 681
End-of-life care 681
Ethics in end-of-life care 681
Bereavement support 682
Research and palliative care 682
Pediatric palliative care 682
Community-based palliative care 682
Epilogue 683

65. Microbial Pathogens and Infection Control in Immunocompromised Cancer Patients 685
Rohini Kelkar

Etiology 685
Epidemiology 687
Laboratory diagnosis 687
Viral infections 688
Fungal infections 689
Mycobacterial infections 693
Cytomegalovirus infections 693
Infections in surgical oncology: surgical site infections 694
Multidrug-resistant organisms: current scenario 694
Principles of antimicrobial prophylaxis in surgical oncology 696
Infections in hematopoietic cell transplant recipients 697
Management principles 698
Guidelines for antimicrobial therapy 698
Prevention and control of infectious complications 699
Prevention of surgical site infections 700

66. Cancer Control in Developing Countries 706
Praful Desai, Bhagwan Nene, Manoj Chauhan

Methodology—low cost/low technology effort—a replicable module 706
Comprehensive cancer centers 707
Community cancer centers 707

67. The Future: Cure, Control or Peaceful Coexistence? 711
Praful Desai

68. The Conquest of Mortality: Science, Medicine and Technology's Final Destination? 714
Praful Desai

Index *719*