Contents

Section 1: General Nuclear Medicine

Nasrin Ghesani, Yi Chen Zhang, Munir Ghesani

Cases

Case 1:	Assessment of Osseous Metastatic Disease		
	in Thyroid Cancer	3	
Case 2:	Evaluation of Hydro	onephrosis	5

- Case 3: Assessment of Gastrointestinal (GI) Bleeding Site 7
- Case 4: Assessment of Postrenal Transplant Complications 8
- Case 5: Assessment of Bilateral Breast Uptake in Gallium Scan 9
- Case 6: Assessment of Neuroendocrine Malignancies 11
- Case 7: Assessment of Liver and Spleen using TC-99M Sulfur Colloid 13
- Case 8: Assessment of Percutaneous Transhepatic Cholangiography Complications 15
- Case 9: Assessment of Traumatic Biliary Injury 17
- Case 10: Assessment of Periprosthetic Infection 19
- Case 11: Assessment of Hyperthyroidism 20
- Case 12: Assessment of New Hearing Loss 21
- Case 13: Assessment of Osseous Metastasis 22
- Case 14: Assessment of Parotid Gland Swelling 23
- Case 15: Assessment of Hepatopulmonary Syndrome 24
- Case 16: Assessment of Osseous Metastatic Disease 25
- Case 17: Assessment of Osteomyelitis 27
- Case 18: Assessment of Suspected Acute Pyelonephritis 28
- Case 19: Assessment of Rising TG Levels Status Postradioiodine Ablation 29
- Case 20: Evaluation of Gastrointestinal Hemorrhage 31
- Case 21: Assessment of Metabolic Bone Disease 32
- Case 22: Assessment of Chronic Hydronephrosis 34
- Case 23: Assessment for Suspected Delayed Gastric Emptying 36
- Case 24: Assessment of Low Back Pain in a Young Patient 37

Case 25: Evaluation of Abdominal Pain Following Renal Transplantation 38

3

- Case 26: Assessment of Right Upper Quadrant Pain 40
- Case 27: Assessment of Renal Ectopia and Associated Complications 41
- Case 28: Assessment of Shortness of Breath 42
- Case 29: Assessment of Diffuse Skeletal Metastases 43
- Case 30: Assessment of Uncontrolled Hypertension 44
- Case 31: Evaluation of Brain Death 45
- Case 32: Assessment of Delayed Visualization of Gallbladder 47
- Case 33: Assessment of Chronic Urinary Obstruction 49
- Case 34: Assessment of Diffuse Renal Uptake on Bone Scan 50
- Case 35: Assessment of Hypercalcemia and Hyperparathyroidism 51
- Case 36: Assessment of Back Pain 52
- Case 37: Assessment of Hyperparathyroidism 53
- Case 38: Assessment of Intracranial Mass Lesion in the Setting of Human Immunodeficiency Virus (HIV) 54
- Case 39: Assessment of Hip Pain 56
- Case 40: Assessment for Metastatic Neuroendocrine Neoplasm 58
- Case 41: Assessment of Ventriculoperitoneal (VP) Shunt Patency 60
- Case 42: Evaluation of Solitary Cold Thyroid Nodule 62
- Case 43: Assessment of SSTR Positive Tumors 63
- Case 44: Assessment of Biliary Obstruction in Neonates 64
- Case 45: Assessment of Lytic Bony Lesions 65
- Case 46: Assessment of Thyroiditis 66
- Case 47: Assessment of Infection/Inflammation with WBC Scan 67
- Case 48A: Evaluation of Osteomyelitis 68
- Case 48B: Evaluation of Osteomyelitis 69
- Case 49: Assessment of Thyroid Cancer Metastases 70

- Case 50: Evaluation of Hyperthyroidism 71
- Case 51: Evaluation of Renal Anomalies 72
- Case 52: Evaluation of Renal Uptake on Gallium Scan 74

83

Section 2: Nuclear Cardiology

E Gordon DePuey, Munir Ghesani

Introductory Cases

Case 1:	Normal Female 83
Case 2:	Normal Male; Nonvisualization of Gallbladder (GB) Due to Prior Cholecystectomy 84
Case 3:	Inadequate Resting Tetrofosmin TAG 85
Case 4:	Short Septum 86
Case 5:	Prominent Anteroseptal Right Ventricle Insertion Site 87
Case 6:	Apical Physiologic Thinning 88
Case 7:	Marked Anterior Breast Attenuation Artifact 89
Case 8:	Inferolateral Breast Artifact 90
Case 9:	Moderate Diaphragmatic Attenuation 91
Case 10:	Subdiaphragmatic Scatter 92
Case 11:	Severe Inferolateral Scar; Left Ventricular Ejection Fraction (LVEF) = 32% 93
Case 12:	Scar Basal Half Inferior Wall 94
Case 13:	Inferoapical Scar; LVEF = 50% 95
Case 14:	LAD Ischemia 96
Case 15:	Marked Inferoapical Ischemia 97
Case 16:	Increased Septal Uptake Due to Left Ventricular Hypertrophy (LVH) (S/P AVR) 98
Case 17:	Hypertrophic Cardiomyopathy 99
Case 18:	Rest/Delayed Thallium; Inferior Resting Ischemia 100
Case 19:	Rest/Delayed Thallium; Scar without Ischemia 101
Case 20:	MUGA, Decline in LVEF Postchemotherapy 102
Interme	diate Cases 103
Case 1:	Anterior, Apical, and Inferior Scar 103
Case 2:	D1 and LCX Ischemia 104
Case 3:	Apical and Inferolateral Ischemia; Multivessel Disease 105
Case 4:	LAD and RCA Ischemia; Transient Ischemic Dilatation (TID) 106

- Case 53: Assessment of Cardiac Ejection Fraction 75
- Case 54: Evaluation of Liver Metastases 77
- Case 55: Assessment of Multigated Equilibrium Angiocardiography (MUGA) Scan Artifacts 79

Case 5:	Anterior and Inferolateral Ischemia; TID, Consistent with Multivessel Disease 107
Case 6:	Apical Ischemia and Basal Inferior Ischemia 108
Case 7:	Extensive Lateral Scar with Moderate Peri-Infarct Ischemia at Anterolateral Border; Mild TID 109
Case 8:	Anterior Ischemia; Lateral Scar + Ischemia 110
Case 9:	Anterior Ischemia with Marked Post-Stress Stunning 111
Case 10:	Left Ventricular Aneurysm with Slight Peri-Infarct Ischemia 112
Case 11:	Pulmonary Hypertension with Right Ventricular (RV) Hypertrophy and Hypokinesis (Rest Only) 113
Case 12:	Permanent Pacemaker with Apical Fixed Defect and Dyskinesis 114
Case 13:	Apical Hypertrophy 115
Case 14:	Status Post Left Mastectomy; Normal Female 116
Case 15:	Shifting Breast Attenuation Artifact; Entire Scan Repeated 117
Case 16:	Left Breast Cancer; Anterior and Lateral Ischemia with Moderate TID 119
Case 17:	Absent Gallbladder Status Post Cholecystectomy; Splenomegaly (CLL); Mild Ischemia Basal Half of the Anterior Wall (No Functional Images) 120
Case 18:	Upper Mediastinal Neoplasm; Normal Myocardial Perfusion 121
Case 19:	Granulomatous Lung Disease (Rest Only); Normal Myocardial Perfusion 122
Case 20:	Hiatal Hernia; Normal Myocardial Perfusion 123
Advance	ed Cases 124
Case 1:	Inferolateral Breast Attenuation Artifact; Diffuse Nonischemic Cardiomyopathy 124

177

- Case 2: D-Shaped Left Ventricle; Dilated, Hypokinetic Right Ventricle; Pulmonary Hypertension Documented by Echocardiography 125
- Case 3: Mild Reversible Apical Defect with Moderate TID (1.25); Catheterization Demonstrated Multivessel Disease Consistent with "Balanced Ischemia" 126
- Case 4: Multiple Axillary Nodes from Breast Cancer; Normal Perfusion Scan 127
- Case 5: Pericardial Effusion with Septal Akinesis; Multivessel Ischemia 128

Section 3: PET/CT

Amir Kashefi, Munir Ghesani

Chest Cases

- 137
- Case 1: Detection of Distant Metastases in Esophageal Cancer with Radiographically Operable Disease 137
- Case 2: Assessment of Recurrence of Pulmonary Malignancy 139
- Case 3: Incidental Cancer while Staging New Pulmonary Malignancy 140
- Case 4: Monitoring Response to Lung Cancer Therapy 142
- Case 5: Characterization of a Suspicious Pulmonary Nodule 143
- Case 6: Initial Staging of Pathologically Proven Pulmonary Malignancy 144
- Case 7: Breast Cancer Evaluation and Response to Therapy 146
- Case 8: Incidental Lung Cancer while Staging another Malignancy 148
- Case 9: Initial Staging of Breast Cancer 149
- Case 10: Restaging of Esophageal Cancer after Chemoradiation Therapy 150
- Case 11: Potentially Resectable Esophageal Cancer with No Distant Metastases 152
- Case 12: Resolving Equivocal Breast Findings on Anatomical Imaging 153
- Case 13: Benign Etiology with Similar appearance to Cancer 154
- Case 14: Incidental Breast Cancer During Surveillance of other Malignancies 155
- Case 15: Discrimination of Post-Radiotherapy Esophageal Tumor Mass 156

Case 16: Complementary Role of Bone Scan and Positron Emission Tomography/Computed Tomography (PET/CT) findings in Breast Cancer 157

Case 6: Reverse TID Due to High Post-Stress

Case 7: Non-Injected Stress Dose 130

Heart Rate 129

Case 8: Normal Scan, Goiter 131

Effusion 133

Perfusion 134

Case 9: Three-Vessel Ischemia 132

Case 10: Severe Anterior and Septal Scar,

Increased L/H Ratio, Left Pleural

Case 11: Herniated Bowel; Normal Myocardial

- Case 17: Physiologic Ovarian Activity 159
- Case 18: Initial Staging of Lymphoma 161
- Case 19: Evaluation of Response to Lymphoma Therapy 162
- Case 20: Lymphoma with Splenic Involvement 164
- Case 21: Thymic Rebound 165
- Case 22: Lymphomatous Involvement of Bone Marrow 166
- Case 23: Muscular Involvement of Lymphoma 168
- Case 24: Prognostic Value of ¹⁸F Fluorodeoxyglucose (FDG) Positron Emission Tomography/ Computed Tomography (PET/CT) after a Single Cycle of Chemotherapy 169
- Case 25: Recurrent Malignant Melanoma 171
- Case 26: Adrenal Metastasis 172
- Case 27: Pleomorphic Sarcoma 173
- Case 28: Benign Muscle Activity 174
- Case 29: Sentinel Lymph Node Identification from Dose Extravasation 176

Abdomen and Pelvis Cases

- Case 1: Colorectal Cancer found During Staging of another Primary Site 177
- Case 2: Local Recurrence at Anastomotic Site 179
- Case 3: Colon Cancer Postsurgical Changes at Anastomotic Site 180
- Case 4: Peritoneal Carcinomatosis 181

Case 5:	Response to Therapy 183
Case 6:	Positive Relapse with Negative CEA 185
Case 7:	Negative Finding with Positive CEA 186
Case 8:	Colorectal with Hepatic Metastasis 188
Case 9:	Cervical Cancer with Metastasis 190
Case 10:	Cervical Cancer with Response to Therapy 192
Case 11:	Ovarian Cancer Spread 194
Case 12:	Ovarian Cancer with Poor Response to Therapy 197
Case 13:	Menses 199
Case 14:	Endometrial Carcinoma with Response to Treatment 201
Case 15:	Endometrial Cancer—Initial Evaluation 203
	Endometrial Cancer—Initial Evaluation 203 Uterine Leiomyoma 205
Case 16:	
Case 16: Case 17:	Uterine Leiomyoma 205
Case 16: Case 17: Head an	Uterine Leiomyoma 205 Large Uterine Leiomyoma 208
Case 16: Case 17: Head an Case 1:	Uterine Leiomyoma 205 Large Uterine Leiomyoma 208 d Neck Cases 209
Case 16: Case 17: Head an Case 1: Case 2:	Uterine Leiomyoma 205 Large Uterine Leiomyoma 208 d Neck Cases 209 Ocular Melanoma 209
Case 16: Case 17: Head an Case 1: Case 2: Case 3:	Uterine Leiomyoma 205 Large Uterine Leiomyoma 208 d Neck Cases 209 Ocular Melanoma 209 Melanoma with Distant Metastases 211
Case 16: Case 17: Head an Case 1: Case 2: Case 3: Case 4:	Uterine Leiomyoma 205 Large Uterine Leiomyoma 208 d Neck Cases 209 Ocular Melanoma 209 Melanoma with Distant Metastases 211 PET/CT of Epilepsy 213
Case 16: Case 17: Head an Case 1: Case 2: Case 3: Case 3: Case 5:	Uterine Leiomyoma 205 Large Uterine Leiomyoma 208 d Neck Cases 209 Ocular Melanoma 209 Melanoma with Distant Metastases 211 PET/CT of Epilepsy 213 FDG PET of Temporal Lobe Epilepsy 216
Case 16: Case 17: Head an Case 1: Case 2: Case 3: Case 3: Case 4: Case 5: Case 6:	Uterine Leiomyoma 205 Large Uterine Leiomyoma 208 d Neck Cases 209 Ocular Melanoma 209 Melanoma with Distant Metastases 211 PET/CT of Epilepsy 213 FDG PET of Temporal Lobe Epilepsy 216 FDG PET of Alzheimer's Disease 217

Case 8: 1	⁸ F-AV45 PET 221	
Case 9: F	FDG PET with Mild Cognitive Impairment	223
	FDG PET/CT and Glioblastoma Multiformes 224	
Case 11: F	FDG PET of Brain Metastasis 227	
Case 12: F	FDG PET False Negative for Glioblastoma	229
	FDG PET/CT with Brown Fat Activity Versus Tumor 230	
Non-FDG	PET/CT Cases	233
	Assessment of Neuroendocrine Tumors (NETs) 233	
	Assessment of Neuroendocrine Tumors (NETs) 234	
Case 2: A	Assessment of Prostate Cancer 236	
Case 3: A	Assessment of Breast Cancer 238	
6456	Assessment of Rectal Adenocarcinoma Response to Therapy 240	
Case 5: S	Staging of Rectal Adenocarcinoma 241	
Case 6: A	Assessment of Alzheimer's Disease 242	
Case 7: A	Assessment of Bone Metastasis 243	
	Assessment of Biologic Therapy Response in Rheumatoid Arthritis 245	
	Assessment of Early Response to Neoadjuva Chemotherapy (NAC) in Breast Cancer 246	
Index		249