Contents

Section 1: Cardiac Nursing 1

1. Anatomy and Physiology of the Heart 3

Embryology of the Heart 3

Anatomy of the Heart 4

Heart and its Location *4*; Cardiac Tissue *4*; Conduction Tissues *6*; Chambers of the Heart *6*; Heart Valves *7*

Physiology of the Heart 12

Control of Coronary Blood Flow *13*; Direct Effects of Nervous Stimuli on the Coronary Vasculature *13*; Hemodynamics *14*; Vascular Resistance *14*; Venous Return *15*; Velocity of Blood Flow *15*; Conduction System *15*; Action Potential and Contraction of Contractile Fibers *16*; Electrocardiogram *17*; Correlation of ECG Waves with Atrial and Ventricular Systole *18*; Cardiac Cycle *19*

2. Assessment and Diagnostic Evaluation 23

Common Symptoms *23*; Breathlessness *24*; Palpitation *24*; Syncope and Dizziness *24*; Peripheral Edema *24*

Physical Assessment 24

Inspection *24*; Palpation *25*; Jugular Venous Pulsations *27*

Percussion 31

Auscultation *31*

Heart Murmur 35

Causes of Murmur *35*; Characteristics of Heart Murmur *36*; Shape of Murmur *38*; Arterial Bruits *38*

Dynamic Auscultation 38

Respiration *38*; Valsalva Maneuver *39*; Position *39*; Isometric Exercise *39*; Pharmacologic Agents *39*

Laboratory Studies 39

Blood Specimen Collection *39*; Cardiac Markers *41*; Serum Lipids *41*

Hematological Studies 43

Complete Blood Count *43*; Red Blood Cells *43*; White Blood Cells *43*; Platelet Count *44*; Erythrocyte Sedimentation Rate *44*

Coagulation Studies 44

Platelet Count *44*; Prothrombin Time *45*; Activated Clotting Time *45*; Fibrinogen Level *46*; Thrombin Time *46*

Arterial Blood Gas Analysis 46

Purpose *46*; Contraindications *46*; Complications *46*; Interpretation of ABG Values *47*; Acid-Base Disorders *47*; Components of the Arterial Blood Gas *48*; Steps to an Arterial Blood Gas Interpretation *48*

Hemodynamic Monitoring 51

Nursing Management *56*; Electrocardiogram 56; The Cardiac Conduction System *56*; ECG Waves *58*; Basic Electrocardiography *58*; Exercise Testing *71*; Echocardiography *75*

Cardiac Catheterization 88

Indications *88*; Contraindications *89*; Patient Preparation *89*; Procedure *89*; Catheterization Approach *90*; Postprocedure Care *92*; Complications *92*; Coronary Arteriogram *92*

Cardiac Electrophysiology Procedures **97**
Diagnostic Electrophysiology Studies *97*; Interventional Electrophysiology and Catheter Ablation *99*; Nursing Care of the Patient Undergoing Electrophysiology Procedures *100*

Radiology of Chest **100**
Normal Anatomy *100*; Specific Abnormalities *103*

3. Pharmacology of Heart **108**
Inotropes *108*; Phosphodiesterase Inhibitors *109*; Antianginal Drugs *111*; Adrenergic Inhibitors *112*; Few Commonly Used Central-acting α-adrenergic Antagonists *112*; Peripheral-acting α-adrenergic Antagonists *113*; α1-adrenergic Blockers *114*; β-adrenergic Blockers *114*; Few Commonly Used β-adrenergic Blockers *115*; Direct Vasodilators *116*; Angiotensin Inhibitors *118*; Few Commonly Used Angiotensin-converting Enzyme Inhibitors *119*; Angiotensin II Receptor Blockers *120*; Few Commonly Used Angiotensin II Receptor Blockers *120*; Calcium Channel Blockers *121*; Few Commonly Used Calcium Channel Blockers *122*; Diuretics *123*; Few Commonly Used Thiazide Diuretics *124*; Few Commonly Used Loop Diuretics *125*; Potassium-sparing Diuretics *126*; Aldosterone Receptor Blockers *126*; Antilipemics *126*; Few Commonly Used Statins *127*; Fibric Acid Derivatives *127*; Cholesterol Absorption Inhibitor *128*; Antiarrhythmic *128*; Commonly Used Antiarrhythmic Drugs *130*; Anticoagulants *133*

Slow Acting (Oral Anticoagulants) **134**
Coumarin Derivatives *134*; Indandione Derivatives *135*; Antiplatelets *135*

4. Nursing Management of Patients with Hypertension **138**
Definition of Hypertension *138*; Types of Hypertension *138*; Risk Factors for Hypertension *138*; Causes *139*; Normal Regulation of Blood Pressure *139*; Pathophysiology of Primary Hypertension *140*; Pathophysiology of Secondary Hypertension *141*; Classification *141*; Clinical Manifestations *141*; Complications *142*; Hypertensive Heart Disease *142*; Assessment and Diagnostic Studies *143*; Management of Hypertension *143*; Hypertensive Crisis *145*

Case Study: Treating Hypertension in Patients with Diabetes **147**

5. Nursing Management of Patients with Coronary Artery Disease **149**
Coronary Artery Disease *149*; Angina Pectoris *155*; Myocardial Infarction *158*

Case Study 1: Myocardial Infarction **175**

Case Study 2: Risk of Cardiovascular Disease **177**

6. Nursing Management of Patients with Dysrhythmia **178**
Rhythms Originating in Sinoatrial (SA) Node *179*; Rhythms Originating in Atria *182*; Rhythms Originating in the Atrioventricular Junction *186*; Rhythms Originating in Ventricles *188*; Conduction Abnormalities *192*; Management of Arrhythmia *202*

Case Study 1: Dysrhythmias **203**

7. Nursing Management of Patients with Heart Failure **205**
Heart Failure *205*; Cardiomyopathy *215*

Case Study 1: Diagnosis and Management of New-onset Heart Failure with Reduced Ejection Fraction **219**

8. Nursing Management of Patients with Inflammatory Heart Disease **220**
Rheumatic Fever and Rheumatic Heart Disease *220*; Infective Endocarditis *223*; Myocarditis *227*; Pericarditis *230*

Case Study 1: Endocarditis **232**

9 Nursing Management of Patients with Valvular Disorders **234**
Mitral Stenosis *234*; Mitral Valve Prolapse (Barlow Syndrome, Myxomatous Valve Syndrome, Click-murmur Syndrome) *236*; Mitral Regurgitation *237*; Aortic Stenosis *239*; Aortic Regurgitation *241*; Nursing Management of Patients with Valvular Heart Disorders *242*; Surgical Management of Valvular Disorders *243*

Case Study 1: A Case of Valvular Heart Disease **243**

10. Nursing Management of Patients with Congenital Heart Disease **246**

Circulatory Changes at Birth *246*; Increased Pulmonary Blood Flow (Left to Right Shunts) *247*; Obstruction to Blood Flow from Ventricles *252*; Decreased Pulmonary Blood Flow with Right to Left Shunts *255*; Mixed Blood Flow with Right to Left Shunts *258*; Nursing Management of Patients with Congenital Heart Disease *262*

Case Report 1: A Case Report of Tetralogy of Fallot in an Infant without a Cardiac Murmur at Presentation **263**

11. Interventional Cardiology **265**

Interventional Pharmacology *265*; Interventional Devices *267*; Other Types Coronary Stents *270*

12. Pacemaker **274**

Pacemaker *274*; Nursing Considerations *280*

13. Defibrillators **284**

Defibrillators *284*; Types of Defibrillator *285*; Nursing Management of Patients with Cardioversion or Defibrillation *288*; Implantable Cardioverter Defibrillators (ICD) *288*

14. Mechanical Circulatory Assistive Devices **293**

Intra-aortic Balloon Pump *293*

Other Mechanical Circulatory Assistive Devices **298**

Short-term Devices *298*

15. Nursing Care of Patient Undergoing Cardiac Surgery **303**

Cardiopulmonary Bypass *303*; Myocardial Protection *305*; Indications for Cardiac Surgery *306*; Indications and Contraindications for Cardiac Transplantation *308*; Heart–Lung Transplant Recipient Criteria and Contraindications *309*; Indications for Aortic Valve Replacement in Aortic Stenosis *310*; Indications for Aortic Valve Replacement in Aortic Regurgitation *310*; Indications for Mitral Valve Repair or Replacement in Mitral Stenosis *310*; Indications for Surgery for Mitral Regurgitation *311*; Preoperative Care *311*; Intraoperative Care *312*; Postoperative Care *313*; Coronary Artery Bypass Graft Surgery *316*; Valve Surgery *321*; Selection of an Artificial Valve *324*; Complications of Artificial Valve *324*; Cardiac Transplantation *325*; Minimally Invasive Cardiac Surgery *328*

Section 2: Vascular Nursing **335**

16. Anatomy and Physiology of Vascular System **337**

Basic Structure of a Blood Vessel *337*; Arteries *338*; Capillaries *339*; Venules *339*; Anastomoses *340*; Blood Distribution *340*; Exchanges in Capillaries *340*

17. Assessment and Diagnostic Evaluation **342**

Common Symptoms of Peripheral Arterial Disease *342*; Common Abnormalities of Peripheral Arteries *344*; Venous Disease *344*; Physical Examination for Arteries *346*; Physical Examination for Veins *348*; Diagnostic Evaluation *348*; Computed Tomography *350*

18. Nursing Management of Patients with Arterial Disorders **352**

Peripheral Arterial Disease *352*; Thromboangiitis Obliterans (Buerger's Disease) *356*; Raynaud's Disease *358*; Aortic Aneurysm *361*; Aortic Dissection *365*;

Case Study 1: Management of Progressive Peripheral Arterial Disease Despite Initial Medical Management **368**

19. Nursing Management of Patients with Venous Disorders **370**

Superficial Thrombophlebitis *370*; Varicose Vein *383*; Vascular Ulcer *387*

Case Study 1: How to Treat Varicose Veins: A Case Study **390**

Section 3: Thoracic Nursing **391**

20. Anatomy and Physiology of Lungs **393**

Embryology of Lungs *393*; Location of Lungs *394*; Anatomy of Lungs *395*; Physiology of Lungs *398*

21. Assessment and Diagnostic Evaluation **403**

Common Symptoms **403**

Cough *403*; Sputum Production *404*; Hemoptysis *404*; Chest Pain *405*; Breathlessness *407*; Wheeze *408*; General Examination *408*; Examination of Thorax *410*; Diagnostic Evaluation *415*

22. Respiratory Therapies **427**

Oxygen Therapy *427*; Methods of Administration of Oxygen *427*; Artificial Airways *430*; Incentive Spirometry *438*; Chest Physiotherapy *438*; Chest Drainage *440*; Nebulization *443*; Mechanical Ventilation *444*; Ventilator Graphics *445*; Modes of Mechanical Ventilator *446*

23. Drugs Used in Respiratory System **453**

Antiasthmatics *453*; Mucolytics *469*; Expectorants/Bronchial Secretion Enhancers *471*; Nasal Decongestants *471*; Antitussives *473*

24. Nursing Management of Patients with Thoracic Disorders **477**

Bronchial Asthma *477*; Bronchiectasis *481*; Pneumonia *483*; Lung Abscess *487*; Tumors of Lungs *489*; Pulmonary Tuberculosis *492*; Pleurisy *496*; Pleural Effusion *496*; Pneumothorax *497*; Empyema/Pyothorax *500*; Interstitial Lung Disease *500*; Cystic Fibrosis *502*; Chronic Obstructive Pulmonary Disease *504*; Acute Respiratory Failure *509*; Acute Respiratory Distress Syndrome *513*; Pulmonary Embolism *516*; Pulmonary Hypertension *520*

Case Study 1 : COPD Exacerbation **522**

Case Study 2: Worsening Shortness of Breath in a 62-year-old Man **523**

25. Nursing Management of Patients Undergoing Thoracic Surgery **528**

Preoperative Care *528*; Intraoperative Care *530*; Postoperative Care *531*; Thoracic Surgery *532*; Pulmonary Resections *534*; Video-assisted Thoracic Surgery (VATS) *536*; Robotic Thoracic Surgery *536*; Lung Transplantation *536*; Indications *536*

Section 4: Miscellaneous **545**

26. Intensive Coronary Care Unit/Cardiothoracic Unit **547**

Quality Assurance *547*; Standards *548*; Infection Control in CCU/ICTU *550*; Standard Safety Measures *552*; Nursing Management of Patients in CCU/ICTU *557*; Mobile Coronary Care Unit *558*

27. Cardiovascular and Thoracic Conditions: A Major Health Problem **559**

Cardiovascular Problems *559*; Thoracic Problems *561*

28. National Health Programs Related to Cardiovascular and Thoracic Conditions **565**

Cardiovascular Program *565*; Thoracic Program *566*

29. Trends and Issues in Cardiothoracic Nursing **569**

Prevention *569*; Trends in Cardiac Surgery *571*; Trends in Thoracic Surgery *571*; Issues in Cardiothoracic Care *572*

30. Legal and Ethical Issues **573**

Legal Issues *573*; Torts *574*; Ethics *576*

31. Alternate System of Medicine and Complementary Therapies **580**

Definitions *580*; Alternative Medical Systems *580*; Mind-body Interventions *581*; Biologic-based Therapies *582*; Manipulative and Body-based Methods *582*; Complementary and Alternative Medicine in Cardiovascular Disease *582*; Complementary and Alternative Medicine in Lung Disease *584*

Appendices **587**

Appendix 1: NANDA Nursing Diagnosis 2018–2020 **589**

Domain 1. Health Promotion *589*
Domain 2. Nutrition *589*
Domain 3. Elimination and Exchange *590*
Domain 4. Activity/Rest *590*
Domain 5. Perception/Cognition *590*
Domain 6. Self-perception *591*
Domain 7. Role Relationship *591*
Domain 8. Sexuality *591*
Domain 9. Coping/Stress Tolerance *592*
Domain 10. Life Principles *592*
Domain 11. Safety/Protection *592*
Domain 12. Comfort *593*
Domain 13. Growth/Development *593*

Appendix 2: BLS Algorithm **594**

Cardiopulmonary Resuscitation *594*

Appendix 3: ACLS Algorithm **598**

Cardiac Arrest *598*

Appendix 4: Cardiac Rehabilitation **604**

Appendix 5: Nursing Procedures **606**

Central Venous Pressure Monitoring *606*; Jugular Venous Pressure *608*; Angiography *610*; Arterial Blood Gas Analysis *612*; Bronchoscopy *615*; Central Venous Catheterization *617*; Chest Physiotherapy *619*; Aerosol Therapy *622*; Nebulization *623*; Pulse Oximetry *624*

Index *627*