

## **Table of Contents**

*Contributors, x*

*Preface, xiv*

### **1 Ultrasound physics, 1**

*Vladimir Fridman*

Ultrasound generation, 7

Image formation, 9

Doppler ultrasound, 15

Summary and key points, 22

References, 22

### **2 The transthoracic examination, 23**

*Vladimir Fridman and Dennis Finkielstein*

Performing the echocardiogram, 33

Using the transducer, 35

Steps involved in a comprehensive transthoracic echocardiogram, 37

References, 40

### **3 Transesophageal echocardiography, 41**

*Salim Baghdadi and Balendu C. Vasavada*

Preparation of the patient, 42

Acoustic windows and standard views, 45

Clean-up and maintenance, 54

References, 56

### **4 Ventricles, 57**

*Deepika Misra and Dayana Eslava*

Left ventricle, 57

Right ventricle, 66

Atria, 72

Contrast echocardiography, 74

References, 77

## **5 Left-sided heart valves, 79**

*Muhammad M. Chaudhry, Ravi Diwan, Yili Huang, and Furqan H. Tejani*

Aortic valve, 79

Mitral valve, 94

References, 111

## **6 Right-sided heart valves, 113**

*Michael J. Levine and Vladimir Fridman*

Tricuspid valve, 113

Pulmonic valve, 122

Qp/Qs: Pulmonary to systemic flow ratio, 127

References, 127

## **7 Prosthetic heart valves, 129**

*Karthik Gujja and Vladimir Fridman*

Echocardiographic approach to prosthetic heart valves, 132

Approach to suspected valve dysfunction, 134

References, 140

## **8 The great vessels, 141**

*Vladimir Fridman and Hejmadi Prabhu*

Aorta, 141

Pulmonary artery, 147

D-septal shift, 151

References, 152

## **9 Evaluation of the pericardium, 153**

*Chirag R. Barbhaiya*

Pericardial effusions, 153

Cardiac tamponade, 154

Echo-guided pericardiocentesis, 159

Constrictive pericarditis, 161

Differentiation of constrictive pericarditis and restrictive cardiomyopathy, 163

Effusive–constrictive pericarditis, 165

References, 165

## **10 Specialty echocardiographic examinations, 167**

*Cesare Saponieri*

TTE in a VAD patient, 167

Intracardiac echocardiography, 169

TEE in the operating room, 171

Echocardiography to guide percutaneous closure devices placement, 172

References, 173

## **11 Common artifacts, 174**

*Padmakshi Singh, Moinakhtar Lala, and Sapan Talati*

References, 182

## **12 Hypotension and shock, 183**

*Sheila Gupta Nadiminti*

Determination of central venous pressure, stroke volume, cardiac output, and vascular resistance, 183

Hypovolemia, 184

Septic shock, 188

Cardiogenic shock due to left ventricular failure, 189

Cardiogenic shock due to right ventricular failure, 189

Cardiogenic shock due to acute valvular insufficiency or shunt, 190

Acute pulmonary hypertension/pulmonary embolism, 190

References, 193

## **13 Chest pain syndrome, 195**

*Sandeep Dhillon and Jagdeep Singh*

Myocardial Infarction, 195

Aortic dissection, 198

Pulmonary embolus, 199

Other causes, 201

References, 202

#### **14 Cardiac causes of syncope and acute neurological events, 204**

*Erika R. Gehrie*

Hypovolemia, 205

Arrhythmias, 205

Aortic stenosis, 207

Cardiac tamponade, 207

Pacemaker malfunction, 207

Endocarditis, 207

Pulmonary embolism, 208

Stroke and transient ischemic attacks, 208

Cardiac masses, 212

References, 215

#### **15 Acute dyspnea and heart failure, 216**

*Mariusz W. Wysoczanski*

Echocardiogram in "heart failure", 216

Intracardiac pressures, 217

Echocardiographic approach to dyspnea with hypoxemia, 222

Differential diagnosis for cardiac induced dyspnea, 223

Algorithm for treatment, 223

References, 225

#### **16 Evaluation of a new heart murmur, 226**

*Vinay Manoranjan Pai*

Acute valvular regurgitation, 226

Intracardiac shunts, 231

Pericardial effusion, 232

Post myocardial infarction, 232

References, 233

## **17 Infective endocarditis, 234**

*Luis Aybar*

Diagnosis and diagnostic accuracy, 234

Guidelines for use of echocardiography to diagnose endocarditis, 236

Appearance on echocardiography, 236

Complications and risk stratification, 238

Prosthetic valve endocarditis, 239

Cardiac device-related infective endocarditis, 240

References, 241

## **18 Post-procedural complications, 244**

*Vladimir Fridman*

Noncardiac procedures, 244

Cardiac procedures, 245

References, 247

## **19 "Quick echo in the emergency department": What the EM physician needs to know and do, 248**

*Dimitry Bosoy and Alexander Tsukerman*

Goal of FOCUS, 248

Clinical use of FOCUS, 250

References, 252

Index, 253