Additional Board of Directors

Joseph Rumore: Heart Transplant 2006; former Managing Director of a national insurance company.

Clement Weinberger, PhD: former Director of Medical Communications and Training for a major international pharmaceutical company.

Elizabeth Schultz, M.D.: Board Certified Clinical Pathologist and current co-director of a private charitable foundation.

Lori Blauwet, M.D.: Cardiovascular Diseases Associate Consultant, Mayo Clinic, Rochester, MN

DeLisa Fairweather, PhD: Myocarditis researcher, John Hopkins University, Baltimore, MD

Michael Austry: Media Executive, Dallas, TX

Candace C. Moose, Executive Director, is a Giant Cell Myocarditis survivor and heart transplant recipient. She is a retired nurse, wife, mother and grandmother, a speaker and advocate for organ donation and is also the author of the book, The Grateful Heart: Diary of a Heart Transplant.

Mario C. Deng, M.D. is the Director of the Advanced Heart Failure Program, including Medical Directorship of Mechanical Circulatory Support and Heart Transplant- at the University of California in Los Angeles. He is an advanced heart failure and transplantation cardiologist. Additionally, he has authored many scientific publications and most recently served as a board member of the International Society of Heart and Lung Transplantation.

James A. Moose, MBA, is a healthcare executive with expertise in pharmaceuticals, diagnostics, and medical devices. He has held various management positions at Johnson & Johnson and other major companies. Mr. Moose is currently retired and provides consulting services in addition to his work for the Myocarditis Foundation.

Jeff S. Grant, retired founding board member, is a computer programmer, and a Giant Cell Myocarditis patient, currently undergoing treatment.

Medical Advisory Board

Akira Matsumori, MD—Professor of Medicine, Department of Cardiovascular Medicine, Kyoto University Graduate School of Medicine, Kyoto, Japan.

Bruce M. McManus, PhD, MD, FRSC, FCAMS—Professor & Director, The James Hogg iCAPTURE Centre, University of British Columbia- St. Paul’s Hospital Scientific Director, The Heart Centre-Providence Health Care, Vancouver, British Columbia, Canada.

Dennis M. McNamara, MD—Associate Professor of Medicine; Director, Heart Failure Section; Director, Cardiomyopathy Clinic and Heart Failure Research Program, Cardiovascular Institute at University of Pittsburgh Medical Center Presbyterian, Pittsburgh, PA.

Steven D. Colan, M.D.—Professor of Pediatrics at Harvard Medical School and Associate Chief of Cardiology at Boston Children’s Hospital.
Myocarditis is a rare, potentially life-threatening inflammatory disorder of the myocardium. It is a common cause of heart failure in otherwise healthy children and accounts for up to one-third of the cases of pediatric dilated cardiomyopathy. The true incidence of myocarditis in children is unknown because some cases are subclinical, and the presentation of those cases severe enough to be detected in pediatric care can vary widely, risking a timely and accurate diagnosis challenging.

In the developed world, the most frequently identified causes of pediatric myocarditis are viral infections of the myocardium and particular, cardiovascular system, with parvovirus B19 being a significant cause. Although many other viral entities have since been shown to be causative agents including influenza virus, adenovirus and human bocavirus, enteroviruses, most frequently coxsackievirus A and B19, Lyme disease, fungi, protozoa, rickettsiae and toxoplasmosis. Influenza epidemics and particularly during summer and fall are immune-mediated diseases, such as collagen vascular diseases, including rheumatoid arthritis and systemic lupus erythematosus. Enteroviruses, most frequently coxsackievirus A and B19, are a major cause of pediatric myocarditis and are important as a cause of nonspecific fever, rash and gastrointestinal illness.

Diagnosis
Myocarditis is a rare, potentially life-threatening inflammatory disorder of the myocardium. It is a common cause of heart failure in otherwise healthy children and accounts for up to one-third of the cases of pediatric dilated cardiomyopathy. The true incidence of myocarditis in children is unknown because some cases are subclinical, and the presentation of those cases severe enough to be detected in pediatric care can vary widely, risking a timely and accurate diagnosis challenging.

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Diagnosis

The variable nature of the pediatric myocarditis patient’s presenting signs and symptoms makes accurate diagnosis of many of these conditions challenging. Often, lack of evidence of cardiac involvement in the initial signs and symptoms makes accurate diagnosis of many of these conditions challenging. Often, lack of evidence of cardiac involvement in the initial signs and symptoms makes accurate diagnosis of many of these conditions challenging. Often, lack of evidence of cardiac involvement in the initial signs and symptoms makes accurate diagnosis of many of these conditions challenging. Often, lack of evidence of cardiac involvement in the initial signs and symptoms makes accurate diagnosis of many of these conditions challenging.

Variable Clinical Presentation in Pediatric Myocarditis

- Chest pain/palpitations
- Dyspnea on exertion/exercise intolerance
- Fatigue/lethargy
- Abnormal heart sounds/murmurs
- Hypotension (late)
- Tachycardia/ arrhythmias (gallop with S3 gallop)
- Fatigue/lethargy
- Anorexia/poor feeding/failure to thrive
- Intercostal retractions
- Respiratory distress (tachypnea, dyspnea, wheezing, nasal flaring)
- Hypotension
- Abnormal heart sounds/murmurs (mitral regurgitation)
- Chest Radiography:
  - Cardiomegaly and pulmonary venous congestion
  - Hypertrophy with associated repolarization changes
  - Diminished ventricular function
  - Infarction pattern
  - Heart block
  - Left ventricular hypertrophy
  - Hypotension
  - Respiratory distress
- Echocardiogram:
  - Dilated cardiomyopathy
  - Atrial fibrillation
  - Abnormal heart sounds/murmurs
  - Hypotension
- Laboratory:
  - Serology: polymerase chain reaction
  - Cardiac MRI:
    - Reduced left ventricular ejection fraction
  - ECG:
    - QT intervals and/or atrioventricular block

Possible Diagnostic Findings in Pediatric Myocarditis

- Tachycardia/ arrhythmias (gallop with S3 gallop)
- Cold extremities/ weak peripheral pulses/ poor capillary refill
- Palpitations
- Hypotension (late)
- Abnormal heart sounds/murmurs (mitral regurgitation)
- Respiratory distress (tachypnea, dyspnea, wheezing, nasal flaring)
- Intercostal retractions
- Fever
- Hepatomegaly

Physical Exam: Findings on initial exam commonly associated with myocarditis are presented in Table 1. Tachycardia partially compensates for myocardial dysfunction, leading to diminished cardiac output. Decreased peripheral perfusion manifests as cool extremities, cyanosis, decreased time to capillary refill, and/or decreased urinary output. Vasoconstriction initially maintains an adequate perfusion pressure, but as myocardial hypotension results as a late finding of cardiac failure. A variety of abnormal physical exam findings will help to guide where tissue damage may be occurring and the extent of myocardial damage.

Electrocardiograms are usually abnormal in pediatric myocarditis and may not suggest obvious cardiac injury. Echocardiography is the diagnostic test of choice for myocarditis in the differential diagnosis of children presenting with nonspecific symptoms. However, the clinical diagnosis of myocarditis is often challenging. Often, lack of evidence of cardiac involvement in the initial signs and symptoms makes accurate diagnosis of many of these conditions challenging. Often, lack of evidence of cardiac involvement in the initial signs and symptoms makes accurate diagnosis of many of these conditions challenging. Often, lack of evidence of cardiac involvement in the initial signs and symptoms makes accurate diagnosis of many of these conditions challenging. Often, lack of evidence of cardiac involvement in the initial signs and symptoms makes accurate diagnosis of many of these conditions challenging. Often, lack of evidence of cardiac involvement in the initial signs and symptoms makes accurate diagnosis of many of these conditions challenging.

Conclusions
Children with myocarditis should be evaluated so that the diagnosis can be made and appropriate treatment initiated. The echocardiogram is a useful tool for evaluating myocarditis and may even be helpful in guiding initial therapy. The echocardiogram is a useful tool for evaluating myocarditis and may even be helpful in guiding initial therapy. The echocardiogram is a useful tool for evaluating myocarditis and may even be helpful in guiding initial therapy. The echocardiogram is a useful tool for evaluating myocarditis and may even be helpful in guiding initial therapy.

The Myocarditis Foundation
The Myocarditis Foundation was founded in 1979 by Dr. H. Eric Topol and his wife, Linda, to provide support and resources to those affected by myocarditis. The foundation is dedicated to educating healthcare professionals and the public about myocarditis, raising awareness, and funding research to find cures. The Myocarditis Foundation is a 501(c)(3) organization and is accredited by the National Committee for Healthcare Organizations. For more information, visit myocarditis.org.