Myocarditis: Dallas Criteria Revisited

John T. Fallon, MD, PhD, FCAP
Director of Laboratory Services, Westchester Medical Center
Chairman of Pathology New York Medical College

In 1984, the Myocarditis Panel met in Dallas to set forth criteria and guidelines to characterize the morphologic diagnosis of myocarditis. The panel was convened by Dr. Margaret Billingham with the major purpose of developing a practical set of pathological criteria to diagnose myocarditis on endomyocardial biopsies. The success of the endomyocardial biopsy in monitoring of cardiac transplant patients for rejection had been established. However, the diagnosis of myocarditis on endomyocardial biopsy was problematic with published rates of myocarditis ranging from 5% to 80% in patients clinically suspicious of having myocarditis. Clinical cardiologists were frustrated and needed reproducible criteria to carry out clinical trials of immunosuppressive therapy for patients with biopsy proven myocarditis.

The central tenet of the Dallas criteria is that myocarditis is defined as the presence of a cellular inflammatory infiltrate in direct association with myocyte degeneration or necrosis not typical of ischemic necrosis. In clinical trials, application of this criteria revealed that the incidence of Dallas criteria myocarditis was uncommon in patients clinically diagnosed as having myocarditis. In the multi-institutional Myocarditis Treatment Trial, of the 2000 plus subjects entered in the trial with a clinical suspicion of myocarditis, only 111 patients had myocarditis based on the Dallas criteria as applied by local pathologists. Furthermore, only 66 of the 111 patients in the trial were diagnosed as having Dallas criteria myocarditis by the trial’s expert panel of pathologists.

The Dallas criteria were considered to be inadequate in the diagnosis of patients with clinically suspected myocarditis. It was recognized that the Dallas criteria were still limited by variability in interpretation, lacked prognostic value and had low sensitivity due to sampling error. However, it was also realized that clinically suspicious myocarditis was a heterogeneous disorder caused by a myriad of mechanisms. These limitations have led to the application of PCR to determine virus involvement, immunohistochemical stains of endomyocardial biopsies for leucocytes and surface antigens, such as ICAM or HLA-DR as well as serum immunological studies for circulating antimyocardial antibodies.

In a study of 181 consecutive patients with clinically suspected myocarditis-endomyocardial biopsies were examined for inflammation using the Dallas and immunohistological criteria. Virus genome was detected by polymerase chain reaction. Immunohistological detection of inflammation was shown to be a significant predictor of poor outcome in the univariate analysis, whereas Dallas criteria myocarditis and detection of viral genome were not significantly related to outcome.

Finally, the recently published TIMIC study evaluated the efficacy of immunosuppression in patients with virus-negative inflammatory cardiomyopathy. The diagnosis of myocarditis was performed according with Dallas criteria and confirmed by immunohistochemistry. Clinical improvement in the immunosuppression treated subjects with myocarditis was reflected in significantly lower average New York Heart Association (NYHA) class at 6 months.
Endomyocardial biopsy remains an important diagnostic tool in patients with clinically suspicious myocarditis. The Dallas criteria identify a subset of patients with cellular myocarditis. In addition to the Dallas criteria, studies of endomyocardial biopsies based on markers of immune upregulation, antimyocardial antibodies and evidence of viral infection by PCR are needed to diagnose additional subsets of this patient population. With the application of more sophisticated testing, we will be in a better position to define the actual pathophysiological basis for the ventricular dysfunction in individual patients with clinically suspicious myocarditis and to provide rational therapeutic options.

Key Words:
- Myocarditis
- Inflammatory dilated cardiomyopathy (iDCM)
- Endomyocardial biopsy
- Histopathology
- Immunohistochemistry
- HLA
- Viral PCR

Selected References:


