Role of Left Ventricular Biopsy in the Management of Heart Disease

Leslie T. Cooper Jr, MD

More than 50 years after the first description of transvenous endomyocardial heart biopsy (EMB),1 the role of EMB remains controversial. EMB is often essential for the diagnosis of allograft rejection and specific forms of native myocardial disease, including amyloidosis and giant cell myocarditis, yet expert consensus for the utility of EMB in more common scenarios is lacking. For example, a 2013 position statement from the European Society of Cardiology Working Group on Myocardial and Pericardial Diseases recommends heart biopsy be performed for all cases of suspected myocarditis, including most acute and chronic dilated cardiomyopathy.3 In contrast, the “2013 ACCF/AHA Guideline for the Management of Heart Failure” recommends that “endomyocardial biopsy should not be performed in the routine evaluation of patients with heart failure.” (class of recommendation III).4 The European Society of Cardiology Working Group and the American College of Cardiology Foundation/American Heart Association recommendations are both based on expert opinion (level of evidence C).

Most authorities in the field agree on the unique ability of EMB to diagnose specific viral heart infections and distinguish prognostically valuable histological patterns such as sarcoidosis or lymphocytic myocarditis.5,6 Lymphocytic myocarditis is a histological biomarker that predicts both successful bridging to recovery after left ventricular (LV) assist device placement in adults7 and the long-term risk of allograft rejection in children.8 Furthermore, case series document that viral genomes (amplified from heart tissue) predict the risk of allograft rejection in children after heart transplantation, as well as the risks of worsening LV function and possibly heart transplantation or death in cardiomyopathy.9–12

The major disagreements arise primarily from different perspectives of the ability of unique EMB data (histology, immunohistology, or molecular diagnostic tests such as viral genomes) to change therapy and thereby alter clinically meaningful outcomes. The data supporting antiviral treatment for myocarditis without high-grade heart block or sustained ventricular arrhythmias, the value of EMB without viral genomes or immunohistology is likely low.16 What does EMB coupled with state-of-the-art molecular diagnostics offer beyond what is available from less invasive and less costly testing to meaningfully influence clinically important events in newly diagnosed or chronic cardiomyopathy?

In this context, Chimenti and Frustaci17 present safety and diagnostic data from the largest published case series of LV biopsies. Theirs is an extraordinary experience that fills a major gap in our knowledge of a procedure that is rarely performed in US medical facilities. A total of 4221 patients underwent EMB: 1153 LV EMBs, 672 right ventricular (RV) EMBs, and 2369 both LV and RV EMBs. The overall risk of major complications was remarkably low (0.33% for LV EMB and 0.45% for RV EMB) and decreased over the 28-year study time frame. Because all EMB procedures were performed by 2 operators (the coauthors), time of study enrollment can serve as a surrogate for operator experience. The risk of perforation was higher in RV than in LV EMB, probably because the thinner-walled RV is more easily perforated by the biopsyome. The low risk of perforation may be explained in part by the selective avoidance of patients with large, thin ventricles at highest risk. The risk of stroke was higher in LV EMB and was numerically attenuated by the use of high-dose aspirin compared with heparin.

Not surprisingly, disorders that primarily affect the LV, such as myocarditis, were more frequently diagnosed by LV biopsy. Indeed, the overall diagnostic yield of RV biopsy in patients with isolated LV involvement on imaging was only 53%. The diagnostic yield for myocarditis increased after 1990, when immunohistochemistry was added to hematoxylin and eosin to identify inflammation. It is surprising that arrhythmogenic RV cardiomyopathy/dysplasia, a disorder that primarily affects the RV “triangle of dysplasia,” was commonly diagnosed on LV EMB.18 These findings extend a smaller comparison study of LV and RV biopsy that found biventricular EMB has a superior diagnostic yield compared with RV EMB.19

The strongest conclusion from these data and the other recently published LV EMB case series is that the risk of major complications from LV EMB is low (<1%) when performed by experienced operators at centers with appropriate infrastructure support. Furthermore, it is safe to conclude that the diagnostic performance of LV EMB is superior to RV EMB when routine immunohistochemistry and viral genome amplification are used in the assessment of suspected LV
Disclosures
None.

References


Key Words: Editorials • biopsy • cardiomyopathies • myocarditis
Role of Left Ventricular Biopsy in the Management of Heart Disease
Leslie T. Cooper, Jr

Circulation. 2013;128:1492-1494; originally published online September 4, 2013;
doi: 10.1161/CIRCULATIONAHA.113.005395

Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2013 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://circ.ahajournals.org/content/128/14/1492

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org//subscriptions/