Editorial Comments

Recognition of an additional mechanism leading to myocardial abnormalities

Yongming YU

Shriners Burns Hospital, Harvard Medical School, Boston, MA 02114, USA

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A growing body of evidence explicitly suggests the significant role of inflammatory processes in the development and progressive deterioration of vascular diseases and cardiomyopathies. In recent years, a large variety of infections have been reported to be associated with the development of cardiomyopathy; the pathogenic factors include rickets, bacteria, protozoa and other parasites, and also, at least 17 viruses. Thanks to the latest development of molecular biology techniques, quite a number of virus genomes have been identified in heart tissues taken from biopsies and/or autopsies. Thus, they have provided further and stronger evidence to support the pathogenic linkage between viral infections and myocardial dysfunction. Currently, there is a consensus that viruses are one of the important causes of myocarditis at least in certain areas of the world, North America and Europe.

The review article by Matsumori in this issue of the Journal has summarized a series of extensive investigations by the author and his colleagues on the association between hepatitis C virus (HCV) infection and cardiomyopathy, especially in the elderly population. Their epidemiological findings include: a higher prevalence of HCV antibodies found in patients with hypertrophic cardiomyopathy (HCM; 10.6%) and dilated cardiomyopathy (DCM; 6.3%); a higher prevalence of positive HCV immunoradiometric assay among a 10-year series of the author’s patients suffering from DCM (9.9%) and HCM (14.1%). Therefore, in his study, the positive rate of serum HCV findings in cardiac patients was significantly higher than that in volunteer blood donors (2.41%). Further laboratory work using RNA technology, identifying HCV RNA in the serum and heart tissues of cardiac patients, has provided more direct supportive evidence on the molecular pathogenic link between HCV infection and cardiomyopathy. Furthermore, the findings on the existence of both positive and negative RNA in the myocardium of patients with dilated cardiomyopathy also imply that HCV is able to replicate in human myocardium.

In the same paper, the author also reports his observations on a higher frequency of HLA alleles in HCV patients, thus the author proposed a possible connection between genes of major histocompatibility complex (MHC) and cardiomyopathies due to HCV infection. Finally, using cardiac troponin T and TL-201-PECT as markers, the author reports two successful cases of interferon treatment on DCM. Although the number of cases is limited, it may lend further support to the link between HCV infection and cardiomyopathy, and the potential strategy of anti-virus treatment in the therapy of cardiomyopathy.

The author’s view on the relationship between HCV and cardiac disease is novel. This paper has proposed a potentially important issue in assessing the risk and in developing new treatment modalities in the care of cardiac patients. Nevertheless, as the author points out, further investigations are required to confirm these initial findings, including the suggestion of a global network to clarify the extent to which HCV infection should be considered as a risk factor of cardiomyopathy, especially in the elderly population. In this regard, some aspects of approaches might be worth consideration.

First, as reviewed in the paper, the rate of HCV infection varies among different countries ranging from 0.1% to 10% or more, with the highest reported value of 22% in Egypt. The HCV prevalence in Japan ascends with age. It reaches 7% in the population over 70 years old. In order to further assess the risk of HCV in myocarditis and cardiomyopathy, we may have to take a look at the other side of the coin. That is, to survey the incidence of cardiac abnormalities among the HCV positive population, both clinically and pathologically, in different age groups in different parts of the world. If the incidence of cardiac myocarditis and other myocardial abnormalities among the HCV positive population exceeds their corresponding average occurrence rates in the HCV negative groups, the results would further confirm that HCV could be a risk or precipitating factor to the development of cardiomyopathy, and also, how “risky” it is.
Second, the geographical differences in the positive genomic findings may be another topic of interest for global investigation. As the author reported in the present paper, virus genome was found in none of the 24 hearts taken from Vancouver, Canada as compared to a positive finding of 8 out of 23 hearts from Utah, U.S.A. Other controversial reports on this issue also can be found in the literature.

Finally, the efficacy of interferon treatment on HCV myocarditis and other cardiomyopathies needs to be further examined in more patients following a series of well-designed clinical trials.

In summary, this scientific communication has provided evidence to support the author’s novel view on the pathogenic linkage between HCV and cardiac diseases. Because of the higher vulnerability to HCV infection and the prevailing morbidity of impaired cardiac function among the elderly population, special attention should be paid to the linkage between these two disease entities in our routine clinical care of these patients. While aggressive interventional and anti-thrombotic therapies have revolutionized the management of acute cardiac syndromes, inflammation and infection have each been implicated as additional mechanisms contributing to the pathogenesis of myocardial abnormalities, especially in aged patients. Therefore, a new frontier in prevention and treatment of cardiovascular diseases in the elderly should include the prevention of HCV infection as well as taking HCV as a factor in assessing the risk of cardiovascular diseases among them.

The possible metabolic etiology of cardiomyopathy in relation to viral infection may be worth further investigation. Of interest is the recent series of investigations on the peroxisome proliferating factor-activated receptor (PPAR) pathways in the regulation of fuel utilization by the heart muscle, which has been proven to lead to pathological cardiac muscle and cardiomyopathy in certain disease conditions. It may be worthwhile to explore if the development of cardiomyopathy in viral infection, especially in the elderly population who suffer from insulin resistance, shares a similar PPAR signal pathway.

References

Metabolic syndrome

Charles Saeffer
Desert Cardiology Center, Eisenhower Medical Center, Rancho Mirage, California, USA

See related article, pages 95-100.

The emergence of cardiac disease as the number one world-wide cause of death justifies efforts to identify individ-