Editorial

Does Myocardial Necrosis Occur in Rhabdomyolysis?

Gabriel M. Aisenberg, MD, FACP
Herbert L. Fred, MD, MACP

Review articles[1,2] and standard textbooks[3-5] imply that myocardial necrosis does not occur in rhabdomyolysis. We disagree.

In support of our position, we used the term "myocardial rhabdomyolysis" to search PubMed®, Embase®, The Cochrane Database, and Google for relevant cases published in the English-language medical literature. On the access date (18 November 2015), we found 381 articles. To qualify for further review, the article had to supply laboratory data consistent with rhabdomyolysis and contain an electrocardiogram (ECG) or description thereof. We extracted other data, when present, on serum troponin I levels, results of coronary angiography, myocardial histologic findings, and outcomes of the cases.

We identified 26 patients (age range, 13–75 yr).[6-24] The presumed cause of their rhabdomyolysis was as follows: alcohol or illicit drugs in 9 patients,[9,12,16,19,20] trauma or extreme heat in 8,[10,11,13,14,22,24] medications in 7,[7,8,15,17,18,23] and thyroid storm in 1.[6] In the remaining patient, the cause was unclear.[21] Serum creatine kinase (CK) levels varied from 115 to 762,000 U/L; the CK-MB fraction, obtainable in 9 cases,[7-9,12,14,15,21,23,24] ranged from 0 to 7,888 ng/mL. The ECG was normal in 3 patients,[15,19] displayed evidence of old myocardial infarction in 2[6,13] and acute myocardial infarction in 1,[22] and exhibited a variety of nonspecific changes in the others. Serum troponin I levels were elevated in 9 of 10 patients.[8,10,13-15,17,23,24] Results of coronary angiography were normal in 4 patients[11,13,21,23] and were not mentioned in the other reports of cases.

Eight patients died, and all 8 underwent autopsy.[6,8,12,16-18,22] In 7 of the 8, myocardial necrosis was evident; the other report did not describe the heart.[8] Information on the coronary arteries was available in 3 patients, each of whom had clot-free vessels.[16,18,22] Myocardial inflammation, mentioned in the cases of 4 patients,[9,12,16,17] consisted of a pleomorphic and nonspecific cellular infiltrate.

The mechanism responsible for myocardial necrosis in rhabdomyolysis remains speculative. We believe that a single causative factor, such as alcohol,[19] heroin,[9,16,20] or propofol,[8,17] affects the myocardium and the skeletal muscles simultaneously. The possibility of separate triggers—one for the skeletal muscles and another for the heart—seems much less likely.

What can one draw from this work? To answer that question, we turned specifically to the 7 patients in whom there was histologic proof of myocardial necrosis. Surprisingly, one of them had the lowest[16] and another had the highest[17] CK concentration of the entire study group. Obviously, therefore, one cannot use the concentration of CK per se as a clue to myocardial necrosis in rhabdomyolysis. So we focused next on the known markers of myocardial damage accessible in these 7 patients. Three of them had ECGs (aforementioned) that were consistent with old[6,13] or new[22] myocardial infarction. One of these 3,[13] as well as 2 others,[8,17] had elevated serum troponin I levels. And 2 patients had elevated CK-MB concentrations.[8,12]

In summary, the evidence offered here shows that myocardial necrosis does occur in some patients with rhabdomyolysis. Therefore, until more knowledge on this topic is forthcoming, we recommend obtaining an ECG and measuring CK-MB concentration and troponin I levels in all patients who present with rhabdomyolysis.

From: *Division of Internal Medicine (Dr. Aisenberg), Lyndon B. Johnson General Hospital, Houston, Texas 77030; and Division of Internal Medicine (Dr. Fred), John P. and Kathrine G. McGovern Medical School, The University of Texas Health Science Center at Houston, Houston, Texas 77030*

Dr. Fred is an Associate Editor of the Texas Heart Institute Journal.

Address for reprints: *Herbert L. Fred, MD, MACP, 8181 Fannin St., Suite 316, Houston, TX 77054*

E-mail: *hlf1929@yahoo.com*

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