

Sudden Death Due to Association between NAFLD and Cardiovascular Changes in a 37-Year-Old Man: a Case Report

Maryam Ameri¹, Shahrokh Mehrpishneh², Azadeh Memarian¹, and Payam Balvayeh³

¹ Department of Forensic Medicine and Toxicology, Iran University of Medical Sciences, Tehran, Iran

² Department of Neonatology, School of Medicine, Qazvin University of Medical Sciences, Qazvin, Iran

³ Department of Pathology, Legal Medicine Research Center, Legal Medicine Organization, Tehran, Iran

Received: 3 Jun. 2014; Accepted: 24 Dec. 2014

Abstract- Fatty liver disease (FLD) is the most prevalent form of liver disease worldwide. Overnutrition can induce nonalcoholic fatty liver disease (NAFLD), a spectrum of conditions ranging from simple steatosis [or nonalcoholic fatty liver (NAFL)] to nonalcoholic steatohepatitis and cirrhosis. Some of the epidemiological and pathological studies have also suggested an association between the presence of fatty liver and sudden death. A 37-year-old man was found dead when he was asleep in the bed at home. According to his family, he was single and a costermonger. He was not an athlete, and there was no history of any physical and mental disorder. He was not addicted and did not use any drugs or alcohol. The positive points, in this case, were: a large heart with mild coronary stenosis and steatohepatitis in autopsy and sudden death. Since steatohepatitis did not have any complication such as fat embolism, it can be concluded that the combination of steatohepatitis and cardiovascular disorder led to sudden unexpected death. Heart more than 450 gr is susceptible to arrhythmia, and fatty liver disease can cause cardiovascular changes.

© 2016 Tehran University of Medical Sciences. All rights reserved.

Acta Med Iran, 2016;54(4):283-285.

Keywords: Steatohepatitis; Sudden death; Cardiovascular

Introduction

Fatty liver disease (FLD) is the most prevalent form of liver disease worldwide. Overnutrition and excessive alcohol consumption are two major causes of FLD. Overnutrition can induce nonalcoholic fatty liver disease (NAFLD), a spectrum of conditions ranging from simple steatosis [or nonalcoholic fatty liver (NAFL)] to nonalcoholic steatohepatitis and cirrhosis (1).

The diagnosis of NAFLD and non-alcoholic steatohepatitis (NASH) is based on histological findings (2).

Cases of fatty liver disease with inflammation that resembled alcoholic steatohepatitis but occurring in nondrinkers were described 30 years ago, first in the Japanese literature and then in the United States (3-4).

As patients with NAFLD are enriched with risk factors known to cause and exacerbate atherosclerosis, it has been suspected that individuals with NAFLD are at heightened risk for cardiovascular disease (5).

Some of the epidemiological and pathological studies have also suggested an association between the

presence of fatty liver and sudden death (6).

On the whole, patients with NAFLD die of liver-related causes to a greater extent than the general population, but we still see cardiovascular disease and extrahepatic malignancies be the primary and secondary causes of deaths among these patients (7).

The presence of hepatic steatosis (rather than subtypes of NAFLD) seems to be the main risk factor for cardiovascular mortality in patients with NAFLD (8).

Case Report

A 37-year-old man was found dead in the bed at home. According to his family, he was single and a costermonger. He was not an athlete, and there was no history of any physical and mental disorder. He was not addicted and did not use any drugs and alcohol. In postmortem examination, his weight was 90 kg. Less than 24 hours have passed since death. There was no significant finding in the corpse appearance. In autopsy, the heart was larger than normal with the weight of 480

Corresponding Author: A. Memarian

Department of Forensic Medicine and Toxicology, Iran University of Medical Sciences, Tehran, Iran
Tel: +98 912 0922655, Fax: +98 21 6651201, E-mail address: azade.memarian@gmail.com

g and Mild stenosis was detected in coronary arteries. There was no significant change in the myocardium, endocardium, and the valves. The liver was larger than the normal size with yellow-brown color. Microscopic pathology evaluation of the liver revealed steatohepatitis. There was no significant abnormal finding in the other organs. Toxicology was negative. According to the postmortem examination, autopsy findings (microscopy and microscopy) and the result of the lab toxicology, the cause of death association between NAFLD and a mildly enlarged heart, was determined.

Discussion

Several recent studies have shown that adults and children with NAFLD are enriched with risk factors that are generally accepted as surrogates for the risk of cardiovascular disease. Various surrogates used in clinical studies include Framingham Risk Score (consisting age, gender, hypertension, smoking, and hyperlipidemia), carotid artery intima-media thickness, hsCRP, atheroma formation, mediastinal fat pad, endothelial dysfunction, and coronary calcium scores (9).

Cardiovascular disease is one of the most important causes of morbidity and mortality in patients with NAFLD. In a study consisting of 132 patients with biopsy-proven NAFLD followed for 18 years, cardiovascular disease was the second most common cause of deaths after all of the cancers combined (10).

Patients with NAFLD have very high prevalence of cardiac risk factors, and several recent studies have shown that cardiovascular morbidity and mortality are in fact more important than hepatic adverse events in the patient population (9).

People with NAFLD have a higher chance of developing type 2 diabetes and cardiovascular disease (this includes heart attacks and strokes) (11).

Anyone with a heart weighing more than 450 g is a candidate for sudden death with or without coronary artery stenosis. The mechanism of this sudden type of death, where there is no large infarct, seems to be a state of electrical instability from chronic hypoxia though it must be said that death can occur while the victim is asleep or at rest (12).

The positive point, in this case, was: a large heart, steatohepatitis, and sudden death. Since steatohepatitis did not have any complication such as fat embolism, it can be concluded that the combination of steatohepatitis and cardiovascular disorder led to sudden unexpected death. Heart more than 450g is susceptible to

arrhythmia, and fatty liver disease can cause cardiovascular changes.

Healthcare providers should recognize this heightened cardiovascular risk. Mohammad Ebrahim Ghamar-Chehreh et al found that family history for cardiovascular disease, diabetes, dyslipidemia, and hypertension are of clinical importance in NAFLD patient population (13). Patients should be educated as it is our experience that they become singularly focused on liver enzymes and ignore more important cardiovascular health. Weights lose, and optimal management of diabetes and dyslipidemia would improve hepatic histology and also improve cardiovascular morbidity (7).

References

1. Toshikuni N, Fukumura A, Hayashi N, et al. Comparison of the relationships of alcoholic and nonalcoholic fatty liver with hypertension, diabetes mellitus, and dyslipidemia. *J Clin Biochem Nutr* 2013;52(1):82-8.
2. Zois CD, Baltayiannis GH, Bekiari A, et al. Steatosis and steatohepatitis in postmortem material from Northwestern Greece. *World J Gastroenterol* 2010;16(31):3944-9.
3. Adler M, Schaffner F. Fatty liver hepatitis and cirrhosis in obese patients. *Am J Med* 1979;67(5):811-6.
4. Ludwig J, Viaggiano TR, McGill DB, et al. Nonalcoholic steatohepatitis: Mayo Clinic experience with an hitherto unnamed disease. *Mayo Clin Proc* 1980;55(7):434-8.
5. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). *JAMA* 2001;285(19):2486-97.
6. XU XK. Right ventricular fatty replacement as the possible missing link between fatty liver and sudden death. *Med Hypotheses Res* 2004;1(4):253-60.
7. Barclay L. Nonalcoholic Steatohepatitis Linked to Increased Mortality. *Medscape*. (Accessed in May 2015, 10, at <http://www.medscape.com/viewarticle/716586>).
8. Stepanova M, Rafiq N, Makhlof H, et al. Predictors of All-Cause Mortality and Liver-Related Mortality in Patients with Non-Alcoholic Fatty Liver Disease (NAFLD). *Dig Dis Sci* 2013;58(10):3017-23.
9. Misra VL, Khashab M, Chalasani N. Non-Alcoholic Fatty Liver Disease and Cardiovascular Risk. *Curr Gastroenterol Rep* 2009;11(1):50-5.
10. Matteoni CA, Younossi ZM, Gramlich T, et al. Nonalcoholic fatty liver disease: a spectrum of clinical and pathological severity. *Gastroenterology* 1999;116(6):1413-9.
11. Non-alcoholic Fatty Liver Disease. Patient. (Accessed in

May 2015, 10, at www.patient.co.uk/health/non-alcoholic-fatty-liver-disease).

12. Saukko P, Knight B, editors. Knight Forensic pathology. 3rd ed. New York: CRC Press; 2004: p. 504-6.
13. Mohammad Ebrahim Ghamar-Chehreh, Hossein Khedmat,

Mohsen Amini, et al. Predictive value of having positive family history of cardiovascular. Disorders, diabetes mellitus, dyslipidemia, and hypertension in non-alcoholic fatty liver disease patients. *Acta Med Iran* 2013;51(5):307-13.

Archive of SID