

Case Study

A Sudden-Death Case with Silent Abnormal Q waves: A Dilemma in Health Checkups

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Although abnormal Q waves can appear in electrocardiograms (ECGs) of healthy individuals without experience of cardiac symptoms (silent abnormal Q waves), a report demonstrated that positive predictive accuracy for diagnoses of myocardial infarction (MI) by abnormal Q waves ranged from 30 to 88%, with a mean value of approximately 50%¹⁾. Should individuals with abnormal Q waves receive further evaluations requiring additional costs even if they had no experience of a cardiac event?

Case

A 58-year-old man came for a health checkup at 10:09 a.m., August 2, 1999. He did not have any particular problems in his medical history or any complaints in his health status and was not on medication. The health checkup of the year before identified this man as a smoker (about 20 cigarettes per d); but there were no yet other major coronary risk factors. Samples of nonfasting blood were obtained for the routine laboratory tests. Physical examination did not uncover any abnormalities except stage-1 hypertension. Despite the absence of a history of remarkable heart events, some abnormalities were found in the ECG: abnormal Q waves in the inferior leads, tall R waves and tall T waves in leads V1 to V3. ST segment deviation was absent. Because the waveform for each lead was identical to that obtained the year before, an old MI was suspected (Fig. 1). The patient was advised to cease habitual smoking and to receive further evaluations in a short time. After a chest roentgenogram

was taken, the patient left the checkup site at 10:45 a.m.

At 11:49 a.m. on the same day, the motorcycle on which he rode suddenly tumbled to the ground, and the patient was found in cardiopulmonary arrest. Upon arrival at the emergency room of a local hospital at 0:15 p.m., an ECG showed cardiac arrest. Despite an attempt at cardiopulmonary resuscitation for 30 min, the patient died at 0:45 p.m. No autopsy was conducted due to lack of consent from the patient's family.

After the patient's death, his blood samples were examined. Although all results from the routine laboratory tests were normal, those of creatine phosphokinase (CPK), MB-fraction of CPK (MB-CK), and cardiac troponin-T (cTnT) measured in additional tests were slightly high. The serum concentration of the ventricular myosin light chain was normal (Table 1), and the chest roentgenogram did not show any abnormality.

Discussion

The cause of death was not elucidated due to lack of an autopsy. Nevertheless, the presence of the ECG abnormalities consistent with old MI implied that a heart attack might be the most likely explanation. Sudden cardiac death (SCD) is related with old MI as well as

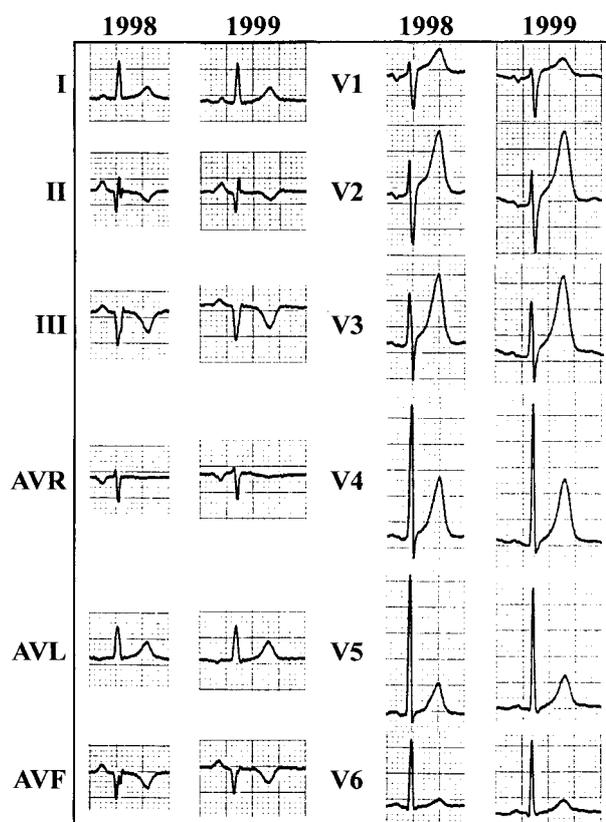


Fig. 1. Electrocardiograms in 1998 and in 1999. Paper speed = 25 mm/s, Amplitude: 1 mV = 10 mm.

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Table 1. Results of the health checkup

		August 3, 1998	August 2, 1999
Demographics	Age (y)	57	58
	Height (cm)	155	155
	Body weight (kg)	54	55
	Body mass index	22.5	22.9
	Blood pressure (mmHg)	147/89	149/87
Physical Examination		Normal	Normal
Blood Cells	WBC count (10 ³ /micro l)	5.7	5.2
	RBC count (10 ⁶ /micro l)	4.84	4.87
	Hemoglobin (g/dl)	14.2	15.5
	Platelet count (10 ³ /micro l)	260	290
Biochemistry	AST (IU/l)	13	19
	ALT (IU/l)	9	19
	GGT (IU/l)	13	17
	Cholesterol (mg/dl)	190	182
	Non-fasting Triglyceride (mg/dl)	82	124
	HDL-cholesterol (mg/dl)	53	52
	Uric acid (mg/dl)	4.7	3.9
	Non-fasting glucose (mg/dl)	134	103
	CPK (IU/l)*		231
	MB-fraction of CPK (ng/ml)**		18.2
Cardiac troponin-T (mg/ml)***		0.36	
VMLC-I (ng/ml)****		2.0	

The reference ranges were 55 to 175 for *, <4.0 for **, <0.25 for ***, and <2.5 for ****. WBC = white blood cell, RBC = red blood cell, AST = Aspartate aminotransferase, ALT = Alanine aminotransferase, GGT = Gamma-glutamyl transpeptidase, HDL = High-density lipoprotein, CPK = Creatine phosphokinase, VMLC = Ventricular myosin light chain.

acute coronary heart disease; Healed MI was found in 40 to 70 per cent of SCD victims, but acute or recent MI in only about 20 per cent of victims²). Moreover, a study demonstrated that 72 per cent of middle-age victims of SCD without a previous clinical history of coronary heart disease had healed myocardial necrosis²).

Accordingly, we infer that individuals with silent abnormal Q waves should receive further evaluation, despite the expense, to estimate the risk of SCD. ECG abnormalities are not promising markers of MI¹). Abnormal Q waves in the inferior leads are particularly far from perfect in detecting MI; a report demonstrated that 55.4% of individuals with abnormal Q waves in the II, III, and aVF did not have an infarction⁴). Nevertheless, lack of cardiac symptom does not guarantee the absence of MI; 23% of infarction cases go unrecognized by patients due to the absence of symptoms or the failure to recognize the significance of the symptoms⁵). Furthermore, abnormal Q waves can be seen in the ECG of patients with nonischemic heart diseases which are often asymptomatic and can cause sudden death, including cardiomyopathies, myocarditis and conduction disturbance⁶). Further studies are required to establish the management of individuals with silent

abnormal Q wave.

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