Sudden Death during Holter Electrocardiogram Monitoring in a Patient with Variant Angina

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We report a case of sudden death due to variant angina during Holter electrocardiogram (ECG) monitoring. The patient, a 60-year-old man, had been aware of chest discomfort lasting less than one minute at midnight 2 days earlier. Because variant angina or arrhythmia was suspected, Holter ECG monitoring was performed. The patient spent a whole day without a recurrence of chest pain before going to bed, but at midnight he developed sudden chest pain, and died immediately after taking a sublingual tablet of isosorbide-dinitrite. Analysis of the Holter ECG revealed ventricular fibrillation after several ventricular premature beats following ST-segment elevation in both the CM5 and NASA leads. This case shows that sudden death from variant angina may occur within a few days after the first onset, and also highlights whether priority should be given to making a definite diagnosis or giving treatment when variant angina is strongly suspected. (Internal Medicine 35: 966-969, 1996)

Key words: coronary spasm, ventricular fibrillation, nitroglycerin

Introduction

Mortality due to acute myocardial infarction has been decreasing in Japan in recent years with the development of coronary care units, reperfusion therapy and techniques for circulatory assistance. However, cases of sudden death resulting mainly from underlying cardiac disease or cardiac ischemia are still problematic.

As its definition implies, “sudden unexpected natural death” (1) cannot be predicted by nature. However it cannot be denied that some cases of sudden death might have been predictable if retrospective studies had been performed.

In this communication, we describe a case of “sudden death” which might have been caused by spasm of the coronary arteries. This case highlights the need to consider whether the first choice should be either diagnosis or treatment, and also how to choose suitable vasodilators for the relief of angina attacks.

Case Report

A 60-year-old man visited our hospital because of chest discomfort. He had been aware of several episodes of precordial discomfort lasting less than one minute at midnight during the previous 2 days. There was no history of hypertension or diabetes mellitus, but the patient had smoked 20 cigarettes and drank one-third of a quart of liquor per day. Physical examination showed no abnormal findings, Blood pressure was 140/80 mmHg and the heart rate was regular sinus rhythm at 60/min. A chest X-ray film showed no abnormal findings. Although exercise ECG did not reveal any ischemic changes (Fig. 1), variant angina or paroxysmal arrhythmia was suspected because of the patient’s specific complaints, and therefore Holter ECG monitoring was started. No medication was given except several sublingual isosorbide-dinitrate (ISDN) tablets. He returned home and spent a whole day without a recurrence of chest pain before going to bed. He was asleep until 1:28 AM, when he suddenly complained of chest squeezing and immediately became unconscious with a groan after taking a sublingual ISDN tablet. His wife realized the situation was critical and called an ambulance. When the ambulance team arrived about 10 minutes later, the patient was already apneic and pulseless. Cardiopulmonary resuscitation was unsuccessful, and about one hour later, his death was confirmed by a local physician. An undissolved ISDN tablet was found in the oral cavity. An autopsy was not performed.

Analysis of the Holter ECG recording (Fig. 2) showed no abnormalities before the attack. However, there was ST-segment elevation in both the NASA and CM5 leads at 1:28 AM, and an event marker was recorded at 1:29 AM. After the
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Figure 1. Rest and exercise ECG showed no ischemic changes or other abnormalities.

Figure 2. According to the analyzed Holter ECG, remarkable ST-segment elevation in both the NASA and CM5 leads started at 1:28 AM. About 40 seconds later, ventricular premature beats (VPBs) appeared, followed by ventricular tachycardia and ventricular fibrillation.
there was any severe organic stenosis of the coronary arteries. In this case, however, the Holter recording revealed remarkable ST-segment elevation in the NASA and CM5 leads due to myocardial ischemia probably resulting from coronary spasm. Forty seconds after the ST-segment elevation, ventricular premature beats appeared and these changed to ventricular fibrillation within a minute, leading to the patient’s death. The whole process took only 2 to 3 minutes, and the sublingual ISDN tablet would not have been absorbed within this time.

It is well known that a sublingual tablet of nitrite is effective for relief of an angina attack. Nitroglycerin (NTG) and ISDN take 7.8 and 18.2 minutes (9, 10) to reach their maximum plasma concentrations after sublingual administration (Tmax), respectively. It is thought that NTG takes at least 3 minutes to reach its effective plasma level after sublingual use. Therefore, no sublingual nitrites would be effective in cases where fatal arrhythmia or shock develops in only a few minutes after the onset of angina attack. In contrast, spray type NTG, developed recently for clinical application, has a Tmax of 4.7 minutes (9). Its effective plasma concentration is attained in a much shorter time, and this may have been effective in the present case. Thus, it is recommended that this NTG spray be applied more frequently.

When angina is suspected but no definite diagnosis can be made, the physician has a dilemma of whether a definite diagnosis should be made or whether treatment should be given first. Recently, with the development and popularization of Holter ECG and coronary angiography, generally speaking, a definite diagnosis of angina is made before starting treatment. However, as indicated in the present case, variant angina, for which the prognosis is generally excellent, may cause sudden death in a very short time after onset. Therefore, if variant angina is strongly suspected although a definite diagnosis can not be made, not only nitrite agents but also a calcium blocker should be given for the prevention of sudden death.

References

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