

## Sudden Cardiovascular Death Associated With Sexual Activity A Forensic Autopsy Study (1972–2004)\*

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### Abstract

In recent discussions about potency-enhancing drugs such as sildenafil, health hazards associated with sexual activity have attracted increasing attention (1). In a medicolegal postmortem study performed in the Center of Legal Medicine at the University Hospital in Frankfurt/Main over a 33-year period (1972–2004), about 32,000 forensic autopsies revealed 68 (0.22%) natural deaths occurring during sexual activity. Except for 5 women (7.4%; average age 39.8 years), in most cases, men were involved (92.6%; average age 59.1 years). The most frequent cause of death was myocardial infarction ( $n = 28$ ; 41.2%). In three cases, pericardial tamponade accompanied by myomalacia were observed. In 20 patients (29.4%), coronary artery disease (CAD) without signs of acute myocardial infarction (MI) was diagnosed. The medical history of 19 of the deceased indicated previous MI. There were seven cerebral hemorrhages (10.3%). The annual incidence of sudden cardiovascular death during sexual activity is estimated to be 1.9 per 1000 autopsies for men and 0.16 per 1000 autopsies for women (1). It is necessary to inform patients with CAD about prodromes and risk in relation to any form of physical and/or emotional stress.

**Key Words:** Sexual activity; coital death; sudden coronary death; myocardial infarction; coronary artery disease.

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### INTRODUCTION

In the last few decades, physiological parameters involved in sexual activity have been the subject of research. Coital death has often been attributed to various natural causes such as cardiac diseases or intracerebral hemorrhage (2). Like any form of physical exercise, sexual intercourse increases heart rate and blood pressure (BP) (3). During orgasm, the heart rate can rise to 110–180 beats per minute (bpm), the respiration rate up to 40 breaths per minute (4). The systolic blood pressure (SBP) increases more than 20 to 60 mmHg before it reaches its plateau phase. The diastolic pressure (DBP) is 10 to 20 mmHg higher. The increase of cardiac and pulmonary parameters corresponds with values observed under a bicycle ergometer load of approximately 75 W (5). Rate-pressure product and oxygen consumption increase only by approximately 25% (6), so that sexual

activity represents only moderate stress to most men (7). However, this physical stress situation may bare certain health risks, in particular for coronary patients. Hellerstein and Friedman (5) documented cases of angina pectoris during sexual intercourse in 20% of their coronary patients. Severe arrhythmia is described to occur during sexual activity (8,9). The physiological risk in a healthy man during sexual activity is low, because work and energy requirement are modest (10,11). Although sexual activity declines with age, 52% of men and 36% of women are still sexually active at the age of 70 (12).

During recent discussions about potency-enhancing drugs like sildenafil, the health hazards involved with sexual activity have attracted increasing attention. The US Food and Drug Administration (FDA) was informed of patients who had suffered sudden cardiovascular death in combination with potency-enhancing drugs (13–15). Specific risks arise from a combined administration of nitrates and sildenafil, which may lead to a dramatic decrease in BP. Consequently, a combination of these substances is contraindicated (16). The risks are

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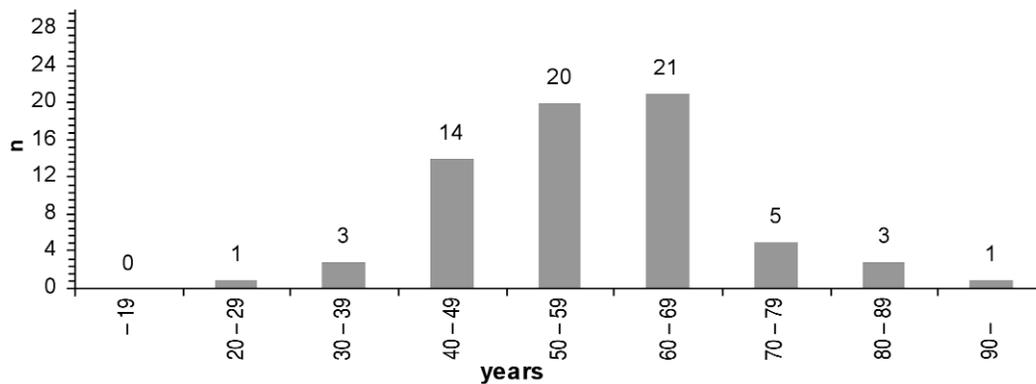


Fig. 1. Age distribution.

increased even further when alcohol is consumed. But even without the administration of these drugs, sexual activity, combined with heart diseases, is associated with a certain, albeit low risk of sudden death. Bratzke et al. (17), Muller et al. (18), Smith et al. (11), and Steeno (19) mentioned the lack of data and insufficient information about coital death and suggested epidemiological research. The present study was initiated to fill this gap and to provide data about the risk of sudden death based on autopsy findings (20).

## METHODOLOGY

This epidemiological retrospective follow-up mortality study of natural deaths during sexual activity is based on data collected in the Center for Legal Medicine at the Johann Wolfgang Goethe University in Frankfurt, Germany (20). Over a period of 33 years (1972–2004), 31,691 autopsies were conducted. The randomized control group comprised 68 natural deaths representing the same period, unrelated to sexual intercourse. Death during sexual activity is defined as natural death occurring during any form of sexual activity, including the coital act, masturbation, or viewing or participating in a striptease show, and the like. The main cause of a forensic autopsy in Germany is to distinguish natural from unnatural deaths. Therefore, systematic histopathology and toxicology in 15 cases of death associated with sexual activity were only performed when necessary from a legal point of view (2).

## RESULTS

### *Incidence, Age, and Gender Distribution*

Among 31,691 autopsies, 68 sudden natural deaths (0.21%) were linked with sexual activity. The annual incidence of sudden cardiovascular deaths during sexual activity is estimated to be 1.9 per 1000 autopsies for men and 0.16 per 1000 autopsies for women. Except for 5 women (7.4%), the victims were men ( $n = 63$ ; 92.6%). On average, the men were 59.1 years old (SD = 12.1), the women 39.8 years old (SD = 10.5). The frequency distribution among the various age groups (male and female) is shown in Fig. 1.

Table 1  
Causes of Death Associated With Sexual Activity

<i>Causes of death (N = 68)</i>	<i>Number of cases</i>
Coronary artery disease without signs of myocardial infarction	20
Myocardial reinfarction	15
Myocardial infarction	13
Cerebral hemorrhage	7
Dissection of aortic aneurysms	4
Cardiomyopathy without heart failure	5
Cardiomyopathy with heart failure	2
Myocarditis	1
No data	1

### *Causes of Coital Death*

All causes of coital death (7,21,22) are listed in Table 1. Myocardial infarction (MI) was the main cause of death in 13 cases (primary infarction) and 15 cases (reinfarction), respectively. In 20 cases, acute heart failure with underlying coronary artery (CAD) without MI was the cause of death. The pathological findings are listed in Tables 2 and 3. In nearly 60% of these cases ( $n = 15$ ) the main location of the MI was the posterior wall. The atrioventricular septum of the heart was affected in 20%, the anterior wall in 20% of the cases. Pericardial tamponade caused sudden heart failure in the 3 cases of myocardial rupture following acute MI and in 4 of dissecting aneurysms. There were 7 cerebral hemorrhages. In other cases, heart failure was diagnosed in connection with signs of hypertrophy and/or dilatation. Histologically, myocarditis as the cause of death in a 45-year-old woman and a cardiomyopathy in a 52-year-old man were diagnosed.

### *Anthropometric Data*

The average body weight of the men was 81.6 kg (SD = 16.2), the average body height 174 cm (SD = 7.2); the average body weight of the five women was 68 kg (SD = 22.0), their average height 163 cm (SD = 8.0). In Table 4, the weight