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Case report

Sudden Death due to Swimming in Elderly Women

Petar Škavić[1] and Din Duraković[2]

[1] University of Zagreb, School of Medicine, Department of Forensic Medicine and Criminology, Zagreb, Croatia
[2] University of Rijeka, School of Medicine, Rijeka, Croatia

A B S T R A C T

The aim was to analyze the rate of sudden death in elderly Croatian women in comparison to elderly Croatian men, who died suddenly due to swimming. In the period from 2002 to 2011 one elderly Croatian woman and five elderly men died suddenly during swimming. In the same time, the same number of elderly foreigners died due to swimming at the Croatian Adriatic coast. One Croatian woman aged 66, who suffered of arterial hypertension with left ventricular hypertrophy of 15 mm, diabetes mellitus and alcoholic liver cirrhosis, drowned in the sea during swimming. She was intoxicated with alcohol and had alcohol level in urine of 3.03‰. One foreign woman, aged 82, who suffered coronary heart and died disease with left ventricular scar after myocardial infarction, arterial hypertension with excessive left ventricular hypertrophy of 22 mm and nephroangiosclerosis, suddenly lost consciousness during swimming. The death rate in elderly Croatian women due to swimming reached 0.25, and the death rate in men is eight times higher: 1.97 (p=0.0701), but the difference is not significant probably because of a small observational number.

Key words: *elderly women, recreational swimming, sudden death.*

Introduction

Physical exercise could be useful for human health, but it must be made under regular conditions. In middle-aged and elderly persons, physical exercise could be sometimes dangerous because of complications from chronic cardiovascular or metabolic diseases[1–5]. People of that age are rarely well prepared for such activities, as are swimming in the summer or manual snow removal in the winter.

The aim of this analysis is to deal with the prevalence and reasons of sudden death in elderly females and to compare the rate of sudden deaths in elderly males, occurring during recreational swimming in Croatia.

Sample and Methods

In the period from 2002 to 2011, one woman and five men aged 65–85 years died suddenly and unexpectedily, during or immediately after recreational swimming in Croatia. At the same period of time, one foreign woman and five men aged 65–85 years died during water sports on the Croatian Adriatic coast. Those deadly events appeared in the summer time from June to September, and in every case all reanimation efforts were unsuccessful. In all cases the Forensic autopsy was carried through. The data are a part of a retrospective study and are collected from the entire population consisting of 4,500.000 people and were found in the registry of Services of Forensic Medicine and Public Health Registry. The statistical difference was calculated using Poisson rates.

Case Reports

In the period of 10 years, one elderly woman from Croatia and one foreign elderly woman died during recreational swimming in the Adriatic sea on the Croatian coast.

Case 1

In June 2002 a foreign woman aged 82, lost consciousness and died suddenly during swimming in the Adriatic sea on the Croatian coast. She was reanimated immediately by a physician from the nearest Health center, and transferred to the nearest University hospital at the coast by a helicopter in 10 minutes, but all reanimation efforts were unsuccessful including hospital interventions.

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An autopsy finding showed brain with no changes. The wall of the left ventricle was thickened: 22 mm. The ascending part of the aorta and coronary orifices were changed and non-elastic because of atherosclerotic processes. Coronary arteries were narrowed to 1 mm because of atherosclerotic processes. There was a scar of the postero-lateral part of the left ventricular wall sized 2 cm. Thoracic aorta was changed by atheroscletic processes also. There were signs of lung edema. The liver was normal, with a weight of 1500 g. The pancreas, spleen, adrenal glands, kidneys, and all parts of gastrointestinal tract were normal.

Autopsy diagnoses were as follows: lung oedema (spumosum), subconjunctival ecchymoses, generalized atherosclerosis mostly of coronary arteries, myocardial scar of a posterolateral wall of the left venticle, and atherosclerotic nephroangiosclerosis.

Case 2

In July 2011, a Croatian woman aged 66, was found floating at the Croatian coast of the Adriatic sea, and was attired in a swimming dress. She was taken from the sea by the Emergency Medical Team and reanimated, but unsuccessfully. By heteroanamnesis, she suffered of arterial hypertension for many years. She drank very often an undefined amount of alcoholic beverages.

The autopsy findings showed three electrodes on the chest wall put during the reanimation attempt. She had 4 skin lacerations on the right forearm 1–2 cm in the length, and one more on the right fist, 2x1 cm large. There was a hemorrhagic suffusion 8x5 cm large on the left hip region, and one more on the left forearm 10x6 cm large. Sclerae were yellow colored.

The heart was enlarged 13x13x4 cm, heavier than normal: 450 g. There were signs of left ventricular hypertrophy: the left ventricular wall reached 15 mm. The ascending part of the aorta was wide: 80 mm, with yellow colored intimal plaques. Coronaries were not narrowed. Left lung weighed 600 g, right 700 g, with abundant foam content. Thoracic aorta was changed by intimal yellow plaques, with similar finding in the abdominal aorta. In the oesophageal cavity under the mucosa there were varicous veins. Liver was enlarged: 2400 g, 32 x 22 x 7 cm, with architectural changes and with the formation of regenerative nodules with a diameter of 0.5–2.0 cm. The liver's color was yellow-gray to red. Spleen was enlarged, prominated under ribs arch, enlarged: 14 x 12 cm, with a weight of 400 g. Pancreas was streaked. In urine, a high concentration of alcohol (3.03‰) was found.

Autopsy diagnoses were as follows: drowning, drunkenness (acute alcohol intoxication), liver cirrhosis, generalized jaundice, varices of the oesophageal veins, liver and spleen enlargement, generalized atherosclerosis, left ventricular hypertrophy, diabetes mellitus, hematoma of the skin of the left hip and left forearm, and skin excoriations of the right forearm.

Results

The Table 1. shows stastical analysis in deceased elderly women and men due to swimming at the Croatian coast of the Adriatic sea, in relation to the total number of male inhabitants in the specific age groups in Croatia, according to the census from 2011 year (the word: total, means a number of inhabitants aged 65–84 multiplied by ten, because the observational period reached ten years). The data about number of inhabitants according to sex and age (census of the year 2011), were taken from the Department of statistics of the Republic of Croatia.

TABLE 1
ELDERS (65–85 YEARS) DIED DUE TO SWIMMING IN CROATIA IN A PERIOD 2002–2011 YEARS

Sex	Died	Total	Rate on 1.000.000 inhabitants
Males	5	2 535 320	1.97
Females	1	3 974 550	0.25

males *vs.* females; p=0.0701 (Poisson rates)

The statistical difference was calculated using the Poisson rates. The death rates are calculated not to 100.000 people involved in recreational or sports activities, but to 1.000.000 male inhabitants, because we have no data how many people could swim and how many of them swim regularly or periodically. That is why calculation of a death rate is done according to the number of the total Croatian population according to sex and age groups.

The death rate in females aged 65–84 reached 0.25, what is lesser than in males: 1.97. In spite of the mentionned fact that mortality rate is eight times higher in males than in females, the difference is not significant, probably because of a small number of cases, and that is why it is not possible to make a strong conclusion. Conventionally, a level of significance is under range 0.05–0.10, what could mean that it could be significant conditionally, but under accepted agreement, the usual significance limit is up to 0.05.

Discussion

Health complications due to recreational or sport physical exercise are rare in swimming. Among them, cardiovascular diseases are at the first place, including consequences of arterial hypertension and coronary heart disease with consequences such is malignant ventricular arrhythmia, acute myocardial infarction (very rare), stroke, subarachnoid hemorrhage etc. By some authors, those complications could be responsible for a quarter of all lethal events during physical exercise[3].

The death rate in elders due to swimming in Croatia reached 1.97 /1.000.000 in male Croatian inhabitants, and 0.25 in females. In the previous study in Croatia[8] a death rate in elderly males reached 2.1/1.000.000 inhabitants,

what is similar to our results. The prevalence of sudden cardiac death in some countries (USA) reached 250 000 yearly, concerning both sexes and all ages. Among 38 non-traumatic deaths in the observational period of nine years, in 30 of those, swimming was the cause of death[6,7]. Beside the physical effort due to swimming in the sea, being in a cold water (sometimes even in summer) could lead to hypothermia and vasoconstriction and coronary vasospasm and reperfusion, to an increase of oxygen demands in the whole body and especially in the myocardium and lead to ventricular fibrillation and cardiac arrest[7]. About one half of cardiovascular complication due to swimming in the sea could be consequences of coronary heart disease and arterial hypertension. We detected in both deceased elderly women coronary atherosclerosis and left ventricular hypertrophy: 15 and 22 mm, as a consequence of arterial hypertension. Arterial hypertension is a second most important reason for cardiovascular complications[3].

We did not find a data in the literature dealing with sudden death due to swimming in elderly women, and we could not make any comparison.

Study Limitations

This is a retrospective study performed from forensic medicine protocols from Forensic Medicine Service and Public Health Registry. We did not have the data about immediate previous symptoms leading to sudden death, as well as no new health data, because they have not been examined by a physician in recent time. So we had very limited information available at the time of the autopsy. We did not have information about the patient's pre-mortem symptoms, clinical status few days before death and laboratory findings (ECG, an ambulatory ECG, ECHO, stress test etc.). The number of cases (N=2) is too small to make any far-reaching conclusions.

Conclusion

In ten years one Croatian elderly woman and five elderly men died suddenly due to swimming, and the same number of elderly foreigners due to swimming at the Croatian Adriatic coast. A woman aged 66, who suffered of arterial hypertension and alcoholic liver cirrhosis, drowned in the sea during to swimming, while acutely intoxicated with alcohol. A foreigner woman aged 82, suffered of coronary heart disease and arterial hypertension, suddenly died during swimming. The death rates in elderly Croatian women due to swimming reached 0.25, and the death rates in men is eight times higher: 1.97 (p=0.0701), but the difference is not significant most likely because of a small observational number.

R E F E R E N C E S

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P. Škavić

University of Zagreb, School of Medicine, Department of Forensic Medicine and Criminology, Šalata 11, 10000 Zagreb, Croatia
e-mail: petar.skavic@zg.t-com.hr

IZNENADNA SMRT ZA VRIJEME PLIVANJA U ŽENA STARIJE DOBI

S A Ž E T A K

Analizirana je stopa smrtnog ishoda u starijih žena i uspoređena sa stopom smrti u muškaraca starije dobi u Hrvatskoj, iznenadno preminulih za vrijeme rekreacijskog plivanja. U vremenu od 2002–2011 jedna žena i pet muškaraca starije dobi preminulo je za vrijeme plivanja. U istom vremenu isti je broj stranaca za vrijeme ljetovanja na hrvatskoj obali Jadrana preminulo tijekom plivanja. Jedna žena iz Hrvatske dobi 66 g., koja je bolovala od bolesti povišenog krvnog tlaka s posljedičnom hipetrofijom lijeve klijetke od 15 mm, šećerne bolesti i alkoholne ciroze jetre, preminula u moru za vrijeme plivanja. Bila je akutno alkoholizirana s koncentracijom etilnog alkohola u urinu od 3,03‰. Jedna strankinja dobi 82 g. koja je bolovala od bolesti vjenačnog krvožilja, ožiljka nakon preboljelog infarkta miokarda lijeve klijetke, povišenog

krvnog tlaka s jakim zadebljanjem stijenke lijeve klijetke srca od 22 mm, i nefroangioskleroze, naglo je izgubila svijest i preminula u moru za vrijeme rekreacijskog plivanja. Stopa iznenadne smrti za vrijeme plivanja u starijih žena u Hrvatskoj iznosi 0,25, a u muškaraca te dobne skupine osam je puta viša: 1,97 (p=0,0701), no razlika nije statistički značajna, vjerojatno zbog malog broja slučajeva (N=2).