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Cardiac arrest and its influence on the patient's psyche

Cardiac arrest is defined as a sudden cessation of the pumping action of the heart leading to death, which can be prevented if proper measures are taken immediately (6). Heart arrest usually occurs at home (about two thirds of cases) during the daytime (about three thirds of cases between 8.00 a.m. and 6.00 p.m.) in male patients aged above 50 (11).

The number of out-of-hospital cardiac arrest cases increases with age. Characteristically, women have a lower incidence of cardiac arrest than men.(4) The total number of arrest cases is ca. 97 per 100,000 inhabitants in the age range of 20 to 75 per year and 1 to 4 cases per 100,000 children and adolescents per year. In industrialised countries, there are 30 cases of sudden cardiac death per million inhabitants a week. Recent research done in the United States reports a 10% increase in the number of sudden cardiac death cases in the years 1989–1996 (4).

The term “sudden cardiac death” (SCD) merits an explanation here. SCD is a natural death of a cardiac origin, preceded by a sudden loss of consciousness, within 1 hour after the onset of symptoms. The previously diagnosed heart disease may be involved but the time and the character of death are unexpected (11).

Recently published studies speak of changes in the population of patients with sudden cardiac arrest. What is emphasized are the greater chances of surviving an arrest, probably connected with better and more accessible medical care, reduced smoking, or a less disease prone population. On the other hand, there is an increase in the number of women after cardiac arrest, which does not influence the total number of cases (4).

The etiology of cardiac arrest is very diversified. About 56–66% of cases are assumed to be of a cardiac origin, especially in the male population. The most frequent causes include: ischemic heart disease, non-atherosclerotic disease of coronary arteries, cardiomyopathies, valvular heart disease, inflammatory myocardial disease. The most common causes of cardiac arrest in patients without cardiac disease are: trauma, non-traumatic bleeding, pulmonary embolism, suicide, lung disease, malignancy, drug overdose (4, 6).

There are many factors increasing the risk of cardiac arrest and sudden cardiac death. The most common of these is ischemic heart disease. Approximately 20% of coronary disease cases have cardiac arrest as the first clinical manifestation. The second risk group are patients suffering from heart failure, with low ejection fraction. It is interesting that persons in the classes NYHA II and III are more prone to the disease than those in NYHA IV (4). Other risk factors include left ventricular hypertrophy, a family history of sudden cardiac death or ischemic heart disease, diabetes mellitus, hypertension, obesity, smoking, low vital capacity, high hematocrit, and increased resting heart rate. These risk factors seem to play a less important role when coronary disease has been clinically manifested. What is most important, then, is the extent of heart muscle damage (4).

It is rather difficult to precisely specify the incidence of arrhythmias causing cardiac arrest. This is connected with the fact that the first ECG is made by the ambulance crew a few minutes after the collapse. 80–90% of arrest cases of a cardiac origin involve ventricular fibrillation. With the passage of time, if there is no resuscitation, ventricular fibrillation changes into asystole. In around 25% of patients, fibrillation is still observed 20 minutes after the loss of consciousness. It is, however, known that these patients have smaller chances of survival (because of prolonged cerebral hypoxia) (4). Among adults, 10% of cardiac arrest cases are caused by asystole, which is rather a sign of a dying or a dead heart than an arrhythmia. Asystole is widely spread among children and adolescents as a cause of cardiac arrest and among adults when cardiac arrest has a non-cardiac origin (for example, aneurysm rupture in the brain) (3, 4). A third mechanism of cardiac arrest is pulseless electrical activity, previously called electromechanical dissociation – 5% of patients. It has both cardiac and non-cardiac origins.

There are some interesting data on the conditions of cardiac arrest occurrence, including the diurnal rhythm. Sudden cardiac death occurs more frequently in the morning (4). Ventricular fibrillation is also often registered in the afternoon or early evening. Recurrent cardiac arrest never happens at the same time of the day. These data prove the influence of some personal and environmental factors. An increased risk of sudden death within the first hour after rising from bed may be partly caused by increased blood pressure and heart rate, elevated blood viscosity and platelet aggregability. Toxic substances, e.g. alcohol drink or cigarettes smoked in the morning may also induce cardiac arrest. Other factors include psychological stress and exposing the body to low temperatures (4).

Survival rate after cardiac arrest ranges from 5 to 60% depending on the circumstances of the event. For all patients suffering from out-of-hospital cardiac arrest, the most important survival factors include: the presence or absence of witnesses; the type of accompanying arrhythmia – ventricular fibrillation patients have the best prognosis; resuscitation by witnesses (1, 4). The available literature mentions the conception of the “chain of survival”, which describes the necessary measures for a successful intervention: early access and diagnosis of cardiac arrest, the decision to call the dispatch centre and swift dispatch from the centre; these elements may be improved by educating the society and providing access to an efficient system of communication; swift cardiopulmonary resuscitation – a very important element – conducted by a witness; in the case of ventricular fibrillation, it may prolong life by 10–12 minutes; it is an overture to the first defibrillation; early defibrillation; its value depends on an appropriate functioning of other stages of the chain of survival; early advanced cardiopulmonary life support (1, 11). Early defibrillation is perceived as the single most important intervention. Many researchers have been interested in the question whether improvements in the chain of survival would result in an improved quality of life of patients after cardiac arrest (11).

A comparative analysis of cardiac arrest in women and men also proves to be of much interest. The frequency of cardiac arrests is smaller in women of all age groups (5). A study of women has shown that ischemic heart disease or myocardial infarct are much less frequent in women; they were also a much more seldom cause of cardiac arrest. Generally, it can be stated that cardiac causes of the arrest are much less common in women than in men. The mean age of women who suffer from cardiac arrest is higher. ECG records show a prevalence of electromechanical dissociation whereas in the male group ventricular fibrillation or ventricular tachycardia dominate. It is not completely clear what is the cause of the difference in arrhythmias, one of the possibilities being different cardiac arrest etiology (5). Interestingly, women have greater chances of survival. But it is rather connected with surviving cardiac arrest itself, and not the long-term survival, which is similar for both sexes (4, 5). The possible mechanisms of these gender-dependent differences probably result from the activation of the autonomic nervous system and the hemodynamic response to the severe occlusion of coronary vessels. The activation of the sympathetic system is much quicker in women than in men, which can have a positive, anti-arrhythmic effect (5).

Advanced resuscitation techniques give many patients a second chance for living. But this reduction of mortality may lead to an increased number of people with mental disorders the extent of which is yet unknown (7). It is known that there are people who do not suffer from any neurological disorders after cardiac arrest, others live in a vegetative state (these patients have efficient blood circulation or even healthy breathing function, i.e., they do not need respiratory therapy, but there is no communication with them; they do not respond to external stimuli). Between those two poles there is a wide spectrum of various types of disorders (12).

Persons who experienced cardiac arrest have to adapt themselves to the reality of this experience. Most of these people seem to be surprisingly calm and accept the fact that they almost died. Clinical psychologists agree that this internal calm masks various reactions to cardiac arrest and resuscitation. Anxiety, restlessness, depressive symptoms, denial and other emotional reactions are well hidden. Patients develop defence mechanisms, for example, the mechanism of denial (7). Undoubtedly, surviving cardiac arrest attracts attention, but people who experienced it are rather reluctant to talk about it. They rather try to erase unpleasant details from their memory and to replace them with some more pleasant fantasies, which protect them from an emotional shock. From the pathophysiological point of view, hypoxia causes changes in the central nervous system, which may be responsible for amnesia, hallucinations, delusions or a loss of critical judgment (7).

There are two types of reaction adopted by patients shortly after cardiac arrest (during their stay at hospital) (7). Most of them develop a kind of psychological curtain covering the event. It is beneficial during the first period, but if it persists it may lead to various problems. Others become hyperactive, which manifests itself with nightmares, or more openly – with irritation, anger, vulgarity towards others. The second type of behaviour is more often noticed by medical staff (7). It is difficult to assess the psychological problems of persons after cardiac arrest after they have left hospital, due to the loss of contact with those patients. Research by Libe r t h s o n et al. shows that about 60% of those people return to the pre-arrest level of functioning; 28% have mild and 12% severe neurological deficits. The most common sequela include memory loss (especially the weakening of long-term memory), the feeling of fatigue and reduced efficiency and performance. Persistent mild memory disturbances that have no influence upon professional activity and everyday life are relatively frequent. Cognitive functions such as orientation and the ability to learn remain unaffected (7).

O' R e i l l y et al. conducted research which is also worth mentioning (8). She dealt with memory impairments after cardiac arrest. She analysed three groups of patients – after in-hospital and out-of-hospital cardiac arrest and after myocardial infarct uncomplicated by cardiac arrest. The hypothesis put forward by the researchers was that in-hospital cardiac arrest patients are resuscitated more rapidly and, as a result, they less frequently suffer from memory impairments than out-of-hospital cardiac arrest patients but much more frequently than patients with myocardial infarct. The mean time interval after cardiac arrest was 8.2 months. The study shows that 26% of in-hospital cardiac arrest patients had long-term memory impairments, similarly to the out-of hospital cardiac arrest patients. The study demonstrates that even a short-lasting cardiac arrest and swift resuscitation do not fully protect the patients from memory impairment. This is partly connected with brain hypoxia (8).

Brain damage after a circulatory arrest is the main cause of neurological disorders. Lack of oxygen leads to the damage of the nervous tissue within a few minutes. In the case of total cerebral ischemia, energy reserves in the CNS are consumed after 5 minutes. A decrease in systolic blood pressure < 40 mmHg leads to brain hypoxia within a few minutes (10). B u n c h et al. examined a group of ventricular fibrillation cardiac arrest patients, who underwent defibrillation restoring a circulating rhythm. The study showed that cardiac arrest survivors, compared to an age-matched control, had memory deficiencies which aggravated in time. The authors also found that the memory deficiencies were not paired with a deterioration in the quality of life (2).

Cardiac arrest patients very often complain about sleeping disorders. They are often restless in their sleep and have their diurnal functioning disturbed. Dreams reveal unspoken emotions (7). Patients who report themselves to be calm and collected relate dreams full of violence and aggression. Their spouses confirm an increased level of anxiety and a reduction in self-confidence in those patients. B e d e l l et al. emphasize a persistent sense of fear in persons from this group, which leads them to regulating their everyday lives and limiting their activities to the level which will allow an immediate ambulance intervention in case of another cardiac arrest episode (7).

On discharge from the Intensive Care Unit (acute hospital care), patients show signs of, sometimes acute, depression (7). Six months later, the level of depression is similar to that in a normal community population. Only 8% of patients after one year from the episode were diagnosed with severe depression. That is why accurate diagnosis and treatment of psychological problems, depression in particular, should be appreciated. Most people discharged from hospital after a cardiac arrest episode return to their normal activities. These encouraging results may avert the danger of "producing a large vegetative population as a result of implementing more aggressive resuscitation efforts" (7).

A very important issue is the quality of life of patients after a circulatory arrest. The lack of a clear definition of this phenomenon suggests a complexity of the problem. The quality of life refers to the domains of psychical, physical, and social functioning. The physical aspect involves the presence or absence of physical ailments, e.g., pain, nausea, and the ability to be active in various life areas (12). Cognitive functions such as memory, orientation, and emotions, including anxiety and depression, constitute the psychical or rather the psychological aspect of the quality of life. The social aspect involves contacts with other people, job activity, and hobbies. S a n e r et al. have examined 50 people after an episode of cardiac arrest. Forty-nine of them have assessed their lives as worse compared to the pre-episode state. Thirty-nine persons led their lives without any help from other people. More than half of the subjects returned to their jobs (9).

What is important in assessing the quality of life or its change is the time interval between the episode and the date of the examination. V a n A l e m et al. examined the correlation between the quality of the chain of survival and the quality of life and cardiac arrest consequences. Patients were examined at least three months after the cardiac arrest episode. The data concerning their medical history were provided by their general practitioners. The time intervals were calculated from the loss of consciousness to the time at which the dispatch centre was called, to the intervention, to the first defibrillation, and to advanced cardiopulmonary life support including endotracheal intubation and intravenous medication (1). In the group of patients who did not receive advanced cardiopulmonary life support (because it was not necessary), no severe neurological deficits or psychological problems were observed. At the same time it is known that the time between the beginning of resuscitation and the first defibrillation was very short. The plausible explanation of these studies is that brain damage occurs within a short time after the cardiac arrest (1).

The life of people after a cardiac arrest episode is an exceptionally interesting problem from the point of view of both medicine and psychology. It is difficult to assess the functioning of these patients or the impairment because we do not know what their lives were like before the arrest. The problem demands further in-depth studies. It is certainly essential that the patients remain under permanent medical and psychological care. This will make their everyday lives and functioning in society easier and will enable us to acquire a better understanding of the problem.

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SUMMARY

Cardiac arrest is a very important problem, because of its aetiology and consequences. It is defined as a sudden cessation of the pumping action of the heart, leading to death, which can be prevented if proper measures are taken immediately. A very important issue is the quality of life of patients after cardiac arrest and the presence of neurological and mental disorders. The aim of this study is review of the literature relative to this subject.

Nagle zatrzymanie krążenia i jego wpływ na psychikę pacjenta

Nagle zatrzymanie krążenia jest istotnym problemem z punktu widzenia medycyny i psychologii, zarówno ze względu na etiologię, jak i jego następstwa. Jest to nagłe ustanie czynności serca jako pompy, prowadzące do zgonu, któremu można zapobiec, jeśli natychmiast podejmie się odpowiednie działania. Interesującym zagadnieniem jest jakość życia pacjentów po epizodzie nagłego zatrzymania krążenia oraz obecność zaburzeń neurologicznych i psychicznych u tych chorych. Celem niniejszej pracy jest przegląd piśmiennictwa dotyczącego tego zagadnienia.