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Summary. This article describes the epidemiology of cerebrovascular diseases and problems of organization of stroke treatment in Ukraine and other countries.

Keywords: cerebrovascular disease, prevalence, incidence, mortality, stroke, stroke division, stroke centers.

Резюме. Ця стаття описує епідеміологію цереброваскулярних захворювань і проблеми організації лікування інсульту в Україні та інших країнах.

Ключові слова: цереброваскулярні захворювання, поширеність, захворюваність, смертність, інсульт, відділення, центри.

Резюме. Эта статья описывает эпидемиологию цереброваскулярных заболеваний и проблемы организации лечения инсульта в Украине и других странах.

Ключевые слова: цереброваскулярные заболевания, распространенность, заболеваемость, смертность, инсульт, отделения, центры.

Epidemiology of cerebrovascular diseases in Ukraine and other countries. The incidence of cardiovascular and cerebrovascular diseases (CVD) takes the first place for its prevalence, mortality and disability in the world and in Ukraine. Stroke may occur in 15 millions of patients annually and 5,000,000 of them are dying because of it. (20, 22).

The incidence of stroke in wealthy countries is nearly 150 incidences among 100 000 persons (23, 24).

The incidence of stroke in Ukraine in 2007 has reached 278.2 cases per 100 thousands of patients. For the past 15 years the death rate from stroke in such countries as Western Europe, USA, Japan, Austria was lowered by more than 50% (3-7% annually) and for now it has incidence for nearly 37-47 patients per 100000 persons (25, 26).

Each year more than 7 million of peoples fell with a stroke and almost 4.5 million of them dies. WHO experts believe that by year 2025 the number of stroke patients will increase by one third. This is due to the aging of population and increasing of prevalence of such stroke risk factors as hypertension, heart disease, diabetes, smoking, lack of exercise, stress, alcohol abuse, drug addiction and other (1, 17, 2). Insufficient information about influence of social risk factors (such as stress, night activity, diet and dream disturbance) is also a big problem that needs further research.

All those facts are proving an actuality of this problem in Ukraine, which has second level of stroke mortality in the structure of total mortality of the population for several decades. The "heart" of the problem is increased incidence of stroke among the people of working age and high number of chronic, slowly progressing forms of cerebrovascular diseases, which may often lead to dementia.

Prevalence of stroke in Ukraine is growing steadily. In 1995 this prevalence was 4526.8 per 100 thousands of population, but in 2004 its level has been increased to 1.8 times and reached 7873.5 cases per 100 thousands of population. More than half of all stroke types was appeared due to arterial hypertension.

The highest prevalence of cerebrovascular diseases was discovered in the Eastern, Central Ukraine regions and the city of Sevastopol. The lowest prevalence was in the western territories.

Ukraine has also shown a steadily increased cerebrovascular disease's morbidity - in 1995 it was up to 581.6 per 100 thousands of population, but in 2004 it has reached to 1009.6 per 100 thousands of population (increase in 1.7 times). Main cause of such increase of rates was connected with high prevalence of dyscirculatory encephalopathy (DE), which was registered at 2.8 millions of patients.

Such problem was caused by the prevalence and incidence of hypertension, atherosclerosis, DE in the population. Rising prevalence of cerebrovascular disease leads to the necessity of solving the problem for all doctors around the world (16).

In 2007 the first incidence of brain strokes was discovered in 105,513 people, which means 278.2 patients among 100 thousands of population. Also, nearly of 35.5% of all stroke cases was diagnosed among people of younger, working age.

The share of working-age patients in Ukraine in case of the prevalence of cardiovascular diseases is reached for 36.6% and in case of cerebrovascular disease - for 21.5% (17).

Over the past 5 years one third of the total number of patients with cerebrovascular accidents were under the age of 50 years (18). Approximately 33% of all patients with brain stroke were young persons (19).

Mortality from all forms of cerebrovascular disease for the last 10 years takes the second place in the structure of total mortality in Ukraine. In 2004 cerebrovascular disease has become a death cause for 103,735 of our fellow citizens, but we can see that from 1995 Ukraine has shown a reducing of CVD mortality in 1,1 times (2004 - 231.4 cases per 100 thousands of population, in 1995 - 257.9). In 2010, the death rate from stroke was 86.7 per 100,000 of population. This is almost two times higher than in European countries (3). The highest CVD mortality rates were registered in the eastern regions of Ukraine and the Sevastopol city, and the lowest - in the western regions. However, mortality from stroke in Ukraine is only 40-50% of the CVD mortality.

The incidence of stroke in our country is higher than in developed countries (200 cases per 100 thousands of population) and takes 31% in the structure of all forms of CVD. The analysis of the incidence of stroke in the last decade demonstrates the steadily growth for 0.5 - 2% per year. In 1975 the incidence rate did not exceed 2.0 per 1000 of population, but for 10 years it has grown considerably to 2.2 - 3.5 cases. In the 80's of the last century in most European countries stroke incidence rate was close to 2.0 and since the late 90's we may observe a clear trend towards its growth, even in developed countries (4, 5, 6, 7).

Analysis of morbidity and mortality in 39 countries for the period of 1985-1994 has revealed a significant reduction of mortality from stroke in the last 10 years of the XX century. Actually that was recognized as one of 10 major medical advances of the XX century (8, 9).

Thus, the most important indicators characterizing cerebrovascular disease - morbidity and mortality - are currently show the opposite tendency: rising incidence and mortality decrease (10).

It should be noted that the death rate from stroke has decreased in comparison with 1999 (123.2 per 100 thousands of population, and in developed countries - 37 - 47 cases per 100 thousands of population (3). However, such reduction of mortality from cerebrovascular disease can't testify the solving of the problem because of increasing of the quantity of recurrent strokes and disabled patients (11, 12, 15).

The organization of stroke management. Over the past decade major changes were implemented in the treatment of patients with acute stroke.

Unfortunately, despite the fact that stroke is the most common disease that can lead to irreversible consequences, only a small number of patients with stroke is under constant supervision of neurologists, family doctors, paediatricians, cardiologists, and their preparation for the management of these patients is extremely insufficient.

Actually, stroke should be considered as a disease that requires a multidisciplinary approach, which should consist of the leading specialist - neurologist and assistance team for treatment in the acute period - such as cardiologist, neurosurgeon, instrumental diagnostics, anaesthesiologist, rehabilitation.

In 60-90 years patients with stroke and myocardial infarction were treated very carefully, without transportation, early movements, active treatment and rehabilitation (27).

Since 1990 were actively developed a new strategies to treat stroke and help such patients. The extreme sensitivity of nerve tissue to even brief ischemia has led to the necessity of treating stroke as an emergency condition (28, 29). Thus, for reducing of mortality and improving functional

output were performed implementation in clinical practice of following strategy, which includes (30):

1. Early (first day and in the early hours) stroke hospitalization of majority of patients, the use of neuroimaging (CT, MRI). This allows the early beginning of general and special medical treatment and reduce the number of complications.

2. Start of the intensive therapy in acute period (support of vital functions in the first hours of the disease, adequate hydration, nutrition, surgical treatment).

3. Multidisciplinary approach in the organization of stroke care and active early rehabilitation of patients lead to quick recovery of their functionality.

Organization of stroke units are not new to medical practice in former USSR, where in the 60's already were opened neurovascular specialized departments and special units of intensive care (30).

The USSR was first to formulate the concept of the system of providing medical care to patients with acute stroke (31), which included the creation of neurologic ambulance service, specialized units for treatment of patients with stroke (neurovascular departments, rehabilitation hospitals, neurosurgery, rehabilitation in clinics (32, 33, 34).

In 1974 this system was recommended by the WHO for implementation in all countries (5). However, for now systems of medical care of stroke patients are different in other countries.

The idea of a stroke divisions has emerged on the basis of experience of infarct departments and trauma canters (27, 35).

A new breakthrough in the problem of diagnosis and treatment of stroke was after the introduction of thrombolytic therapy. So in 2002 the Union of European health authorities introduced thrombolysis for the patients with ischemic stroke (36).

According to research data of Lindsberg R.J. et. al (37) thrombolysis was successful in holding of 84% of costs, which were necessary for the treatment of patients with ischemic stroke throughout life, and from 15 to 20% of annual spending on hospital treatment and care for patients with ischemic stroke in big vascular centres.

Over the past 25 years we observed so called "quiet revolution" in management of patients with stroke with the introduction of effective methods that may minimize the consequences after stroke occurrence (38). Were introduced some new approaches such as antiplatelet therapy (aspirin in 1978 (39), clopidogrel (40); carotid endarterectomy in 1991 (42); varfarin (for patients with atrial fibrillation) in 1993 (43, 44, 45).

For optimization purpose were performed the comparison of evidence-based form of stroke treatment – aspirin usage and administration of tissue plasminogen activator (46).

Current data show that treatment of stroke patients in specialized stroke offices (centres) has no alternative.

Treatment with intravenous injection of tissue plasminogen activator in specialized stroke centres (units) - the main priority in the modern treatment of stroke.

Coalition against stroke in the United States has clarified the developed of the guidelines for primary level center to treat stroke and for intensive care center for the total aid for stroke patients (36, 47).

Members of the Coalition against stroke in the US have declared the necessary of determination of the two different types of stroke centers - primary stroke centers and intensive care stroke centers for the complete complex medical aid (36).

In the center for the complete complex medical treatment of stroke patients it is possible to perform a wide range of specialized care (36), proper neurovisualisation research, surgical and endovascular surgery, including operations on intracranial aneurysms, carotid endarterectomy, thrombolytic therapy (48, 49) and other specific treatment methods and software elements such as intensive care and stroke register. Integration of these elements in a coordinated hospital system can improve prognosis and quality of life of patients with stroke and complex vascular diseases of the brain. As a result of implementation of such system in the US, total stroke mortality has decreased by 1/3, and mortality within 30 days - decreased from 27% to 15%.

Such approach in the stroke management was introduced in England, Wales and Northern Ireland and has caused a decrease of mortality by 25% (50).

This strategy is consistent with data from the Swedish national registry of stroke treatment (Riks - Stroke) (51, 52).

In those years, vascular department were implemented in Japan (53), Austria (28) and their positive work was clearly obvious.

Recent studies have confirmed the effectiveness of organized stroke care in stroke patients departments (centers) (54), and showed that treating in stroke rehabilitation department after providing main medical treatment may add 10 years of normal quality life after stroke.

The system of stroke management should coordinate and facilitate accessibility to the patient the whole range of activities and services related to stroke prevention, treatment and rehabilitation.

Working Group of American Stroke Association has developed a system of stroke treatment, which is formulated with the following recommendations (55, 56) to establish a system of stroke management.

The system of stroke treatment must perform three main functions:

1. The system of stroke treatment should ensure an effective relationship between state agencies, services and people.

2. The system of stroke treatment should provide as Service providers and material support necessary for effective aid for the prevention and treatment of stroke and rehabilitation afterwards.

3. The system of stroke treatment should provide assistance for the benefit of patients.

4. The system of stroke treatment should be assigned to the administrative unit.

It should be noted that it is impossible to treat stroke properly without clinical protocols, algorithms, guidelines.

In Ukraine, despite the desire of physicians to improve the management of patients with stroke, major hopes were connected with the Decree of Ministry of Health of Ukraine, №297 from 30.07.2002r. "On improvement of medical care to patients with cerebrovascular pathology" (57) but they were not justified. This decree doesn't take into account the existing recommendations of world science and practice and did not provide real opportunities and mechanisms to implement the modern treatment strategies against stroke, but also it did not have a material and institutional basis. As a result of inconsistency and groundlessness of this decree, the reorganization of the stroke management was performed very slowly. The new system should involves not only the establishment of stroke centers, but first of all, the system of primary and secondary prevention that are implemented at the primary level of skilled care, and work with the patient's family and social environment of the individual.

In our view, a comprehensive national strategy of stroke treatment should be developed by complex efforts of doctors of various specialties, theoreticians and practitioners, economists and lawyers that working in the health field.

In various European countries stroke treatment strategy has its own organizational features, but includes the same key element - specialized regional stroke centers (Stroke unit).

According to the European Stroke Organization (ESO, 2008) Stroke Center - a specialized department (part of the clinic), which treats patients with stroke, usually starting from the acute period. It was approved that stroke centers (units) play a key role in the increased survival of patients with brain stroke.

Systematic reviews (Stroke unit Trialists collaboration Cochrane rev. 2007) confirmed a significant reduction in mortality (absolute reduction of 3%) and disability (an increase of 5% share of functionally independent patients) in patients with stroke who received specialized medical care at stroke centers, compared with those treated in non-specialized hospitals. It was concluded that all categories of stroke patients regardless of age, gender, stroke subtype and its severity should be treated only as a stroke centers (Stroke unit).

According to the European guideline for treatment of ischemic stroke only 4 medical activities all recognized to be positive and recommended for the vast majority of patients in the stroke unit: systemic thrombolytic therapy, the usage of aspirin in the first 48 hours of onset and

surgical decompression (hemocranioectomy) in case of extensive cerebral infarction in middle cerebral artery area (class of recommendation 1, level B).

Participants of the Second Joint Conference that was organized by the WHO and the European Stroke Organization in 2006 have adopted a Declaration on Helsingborg strategy to treat stroke in Europe. The document declares that at the year of 2015 all European residents should have access to a continuum of stroke care, including treatment in acute diseases, rehabilitation and secondary prevention. Optimal statistic for European countries should be like that: 30-day mortality of stroke patients must be at least 15%, independence at home at 3 months after stroke should be present at more than 70% of surviving patients. The main role in achieving of these results are rely on multidisciplinary teams that should work in a stroke centers.

Thus in Spain and France stroke centers may treat 30% of patients with stroke, and in Germany and the Scandinavian countries this figure reaches 71%.

There is a separate hierarchy of stroke centers and units depending on the configuration, range states and specialized medical and rehabilitative care they can provide. However, the adopted common principles of organization of work and mandatory requirements for all departments stroke are quite common:

availability of beds specifically designated for stroke patients;

the availability of computer tomography or MRI, priority evaluation of patients with acute stroke;

multidisciplinary team of specialists and nursing staff with specialized training in stroke management;

the availability of written clinical protocols for each member of the multidisciplinary teams;

the possibility of early mobilization patients and conducting rehabilitation events;

constant raise the awareness of staff and patients and their neighbours.

In stroke center (unit) should be conducted constant monitoring of the level of consciousness and neurological status of the patient using special clinical scales, control blood pressure, ECG, EEG, body temperature, blood glucose and blood oxygenation and second vital parameters of homeostasis, assessment of swallowing function (dysphagia risk), proper skin care and prevention of pressure sores, correct posture changes, prevention of deep vein thrombosis and early detection of possible complications.

In Ukraine, this project is not yet implemented. In some hospitals there are no specially assigned units and chambers, in others - no imaging techniques (CT and MRI) or there is low qualification of specialists in most branches no rehabilitation.

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Повний список літератури знаходиться в редакції.