Adherence to Attendance at Outpatient Clinic and Longterm Survival of Patients after Stroke in Outpatient Setting: the Data of REGION-M Registry

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Aim. Assess the two-year survival rate of patients who have undergone acute cerebral circulation disorder, depending on their commitment to visiting the district polyclinic before and after discharge from the hospital.

Material and methods. The outpatient part of the REGION-M register included 684 patients attached to the Moscow City Polyclinic №64, discharged from the Moscow City Clinical Hospital n.a. F.I. Inozemtsev of from 01.01.2012 to 04.30.2017 with a confirmed diagnosis of acute cerebral circulation disorder (cerebral stroke / transient ischemic attack).

Results. Of the entire cohort, 83.2% of patients and 84.2% after hospital discharge attended the clinic during the year before the development of reference acute cerebral circulation disorder. Patients who attended the clinic before and after the reference stroke were older, more likely to have diabetes, comorbid disease and disability. For 22 months of follow-up, mortality was 28.8% (197 out of 684 people). Among those who applied and did not apply to the clinic before the reference acute cerebral circulation disorder, the difference in mortality tended to be reliable (27.4% versus 35.7%, p <0.1), while mortality was almost twice as low among patients who applied to the clinic at least 1 time after discharge (25.7%) than among patients who did not apply after discharge – 45.4%, p<0.0001. When adjusting for sex and age (the relative risk of death for them was 1.009, 95% confidence interval 1.005-1.012, p<0.0001), the statistical validity of reducing the risk of death was maintained when patients were committed to visiting the clinic after discharge – the relative risk of death 0.366 (95% confidence interval 0.269-0.500, p<0.0001).

Conclusion. Lower mortality among those who visited the district polyclinic after undergoing stroke confirms the important role of medical observation in the posthospital period. At the same time, there is a reserve in improving the long-term prognosis of the lives of patients who have suffered a cerebral stroke or transient ischemic attack, due to greater coverage of patients with medical supervision in the clinic.

Key words: cerebral stroke, transient ischemic attack, registry, long-term survival, mortality, medical follow-up, adherence to visiting a polyclinic.

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Introduction

Acute cerebrovascular accident (ACVA) remains one of the most significant causes of death from cardiovascular diseases (CVD) all over the world [1]. Most of these patients die in the acute stage of the disease, but the surviving patients also have a poor prognosis, primarily due to the high risk of developing cardiovascular complications (CVC) and repeated acute cerebrovascular accident [1,2]. The features of the development and outcomes of the acute phase of acute cerebrovascular accident/transient ischemic attack (TIA) have been studied in many Russian registries [3-6]. The presented publication is the first that provides the results of a two-year follow-up of patients who underwent acute cerebrovascular accidents from the outpatient part of the REGION-M register (Register of patients who underwent acute cerebrovascular accident and hospitalized in a Moscow hospital), taking into account the fact that they visited a district clinic. Evidence-based medicine data indicate that early initiation of a set of measures for secondary prevention of CVC in persons who have undergone acute cerebrovascular accident can significantly reduce the risk of recurrent stroke [7, 8], but this requires continued medical observation and treatment at the outpatient stage. An important role in ensuring effective secondary prevention of cardiovascular diseases is played by the adherence of patients not only to treatment, but also to visiting medical and prophylactic institutions (MPI), including after discharge from the hospital. The literature contains data from the Russian register LIS-3 [9,10], which didn't reveal a statistically significant effect on the risk of developing myocardial infarction (MI) and acute coronary syndrome (ACS) before the development of a reference event, but they revealed an improvement in the quality of therapy in patients who regularly visited medical and prophylactic institutions. To date, there are no published results of studies examining the effect of adherence to medical and prophylactic institutions visits on the short and long term prognosis of patients who have suffered a stroke.

If we take into account the high social significance of stroke and the importance of secondary prevention of cardiovascular complications, then it is extremely important to study the effect of adherence to visits to medical institutions on the survival of patients after suffering from acute cerebrovascular accident/TIA in a real outpatient practice.

Aim of the study: to assess the two-year survival rate of patients who underwent acute cerebrovascular accident or TIA, depending on their adherence to visiting the district polyclinic before and after discharge from the hospital.

Material and methods

The protocol of the complete hospital-polyclinic retrospective-prospective register REGION and its individual parts was published in more detail earlier [11-13]. In this part of the study, data from the outpatient prospective part of the REGION-M register were used, which included all patients assigned to the City Polyclinic №64 of Moscow, discharged from the Moscow City Clinical Hospital named after Inozemtsev in the period from 01/01/2012 to 04/30/2017 with a confirmed diagnosis of acute cerebrovascular accident: cerebral stroke or TIA. The fact of the patient's attachment to the City Polyclinic №64 was established at the registration address indicated by the patient or his relatives upon admission to the hospital. 684 patients were identified on the basis of the electronic database of the City Polyclinic №64, who were discharged from this hospital during the specified period with a diagnosis of acute cerebrovascular accident. Information contained in outpatient records of patients, such as socio-demographic signs, type of acute cerebrovascular accident, the presence of risk factors, cardiovascular and concomitant diseases, the fact of visiting the clinic and prescribed drug therapy before admission to the hospital for acute cerebral impairment circulation, was entered into the individual observation card in the first 6 months after discharge and at a later date (6-22 months after discharge) during the last visit to the polyclinic at the end of the observation period. This card also included data from the outpatient card and the documents enclosed in it. It also took into account the data on the last treatment of patients in the polyclinic with doctors of any specialty and therapy prescribed by doctors of the following specialties: cardiologist, therapist, neurologist, psychiatrist. The presence of the disease was recorded on the basis of any mention of reference ACVA in the diagnosis. The adherence of patients to visiting medical and preventive

institutions was understood as the fact of contacting doctors of any specialty registered in the patient's outpatient card (№4). The median follow-up was 22 months [13;37.7]. The endpoint was «death from all causes» as the most accurately assessed follow-up outcome. There were no persons with an unknown life status at the end of the observation period, but some of the patients included in the outpatient part of the REGION-M register didn't apply to the polyclinic after discharge from the hospital, therefore their life status was established on the basis of data from the Unified Medical Information and Analytical system or in a telephone conversation with relatives. The proportion of patients who visited the polyclinic and the proportion of patients who didn't visit the polyclinic within 12 months before the reference ACVA was 569 out of 684 (83.2%), and the proportion of visits to the polyclinic once after discharge for 2 years of follow-up was 576 out of 684 (84.2%)

Statistical analysis

The statistical software package SPSS Statistics 23.0 (IBM, USA) was used for statistical processing of the results. Quantitative indicators are presented as M (mean) ± σ (standard deviation) with a normal distribution, and quantitative indicators are presented as median (IU) and interquartile range [25%; 75%] with an abnormal distribution. Nominal and ordinal variables are presented as an absolute number and a percentage of the total. Differences between patient groups were determined using Pearson's χ^2 test with Yates' correction. Regression analysis with the determination of the relative risk and 95% confidence intervals adjusted for known significant indicators (gender and age of patients) was used to determine the prognostic significance of the effect of specific factors on overall mortality. The level of statistical significance was established at $p < 0.05$.

Results

684 patients included in the outpatient part of the REGION-M register consisted of 286 (41.8%) men and 398 (58.2%) women. The average age of men was 65.1±12.8 years, the average age of women was 71.1±14.5 years, that is, women were statistically significantly older ($p<0.01$). Table 1 shows the clinical and anamnestic characteristics of patients included in the outpatient part of the REGION-M register. We see that most of the patients had an ischemic stroke (75%) or TIA (17%) and had a significant comorbid burden of cardiovascular diseases [arterial hypertension, ischemic heart disease, chronic heart failure, atrial fibrillation] and other somatic diseases [sugar diabetes, chronic kidney disease, chronic lung disease]. In addition, nearly 18% of patients have had a stroke before.

16.8% of patients didn't visit the polyclinic during the last year before the development of a reference stroke, despite the presence of chronic diseases in most patients, and 15.6% of patients didn't come to the district polyclinic after being discharged from the hospital within 22 months of observation. The proportion of patients who came to the polyclinic in the first 6 months after discharge from the hospital was statistically significantly lower than before the reference ACVA and later than 6 months (Table 2).

The possible relationship with the presence of disability and diabetes mellitus, in which patients are el-

Table 1. Clinical and anamnestic characteristics of patients who underwent acute cerebrovascular accident in the outpatient part of the REGION-M register (n=684)

Sign	n (%)
ACVA type	
• TIA	118 (17,2)
• ischemic	514 (75,1)
• hemorrhagic	48 (7)
• ischemic + hemorrhagic	4 (0,05)
Coronary artery disease	423 (61,8)
History of myocardial infarction	84 (12,3)
History of ACVA/TIA	121 (17,7)
Chronic heart failure	103 (15)
Atrial fibrillation	112 (16,4)
Arterial hypertension	574 (83,9)
Heart disease	13 (2)
Diseases of the thyroid gland	91 (13,3)
Chronic lung diseases	99 (14,5)
Anemia	39 (5,4)
Massive bleedings	6 (0,9)
History of thrombosis	8 (1,1)
Chronic kidney disease	97(14,2)
Oncological diseases	64 (9,4)
Diabetes	122 (17,8)

ACVA – acute cerebrovascular accident, TIA – transient ischemic attack

Table 2. Visiting the polyclinic by patients who underwent acute cerebrovascular accident at various stages of follow-up (n=684)

Parameter	Visiting the clinic	
	Yes	No
Before ACVA, n (%)	569 (83,2)	115 (16,8)
After ACVA (at any time), n (%)	576 (84,2)	108 (15,8)
During the first 6 months after discharge from the hospital after the transferred reference ACVA, n (%)	438 (64,0)	246 (36,0)**
Later than 6 months after ACVA, n (%)	536 (78,4)	148 (21,6)

** - p<0.01 compared with patients who went to the polyclinic
ACVA – acute cerebrovascular accident

igible for preferential drug provision, as well as with the presence of several chronic comorbidities, was analyzed to determine the factors that could cause patients to go to the polyclinic or not to go to the polyclinic after the reference ACVA. We found that patients who attended the polyclinic before the reference ACVA were more likely to have disability (38.5% vs 11.3%, p <0.001), they were statistically significantly older (69.1±13.7 vs 66.2±16.1 years, p<0.05), among them there were more women (59.5% versus 47%, p<0.05), they more often had arterial hypertension, ischemic heart disease, diabetes mellitus, a history of ACVA, chronic heart failure, atrial fibrillation, kidney disease and oncological diseases (Fig. 1).

Thus, the analysis showed that mainly comorbid patients and patients with disabilities went to the polyclinic before the reference ACVA. Patients who had disabilities before the reference ACVA were statistically significantly more likely to visit the polyclinic before, in the first 6 months and later (p <0.001 for all).

Patients who visited the polyclinic after reference ACVA also more often had disability (56% versus 32.0%, p <0.001), were statistically significantly older (69.1±13.7 vs 66.2±16.1 years, p<0.05), among them there were more men (45% vs 35%, p<0.05), they more often had arterial hypertension, coronary heart disease, including a history of myocardial infarction (15.6% vs 4.8%, p<0.001), diabetes mellitus, history of ACVA, chronic heart failure, atrial fibrillation, kidney disease and oncological diseases (Fig. 2).

Thus, patients' adherence to polyclinic visits could be due to the presence of chronic diseases and drug benefits. Among 122 patients with diabetes mellitus, 110 (90.2%) patients attended the polyclinic before the reference acute cerebrovascular accident and 104 (85%) patients attended the polyclinic after it. Among 232 persons with disabilities before hospitalization, 219 (94.4%) patients attended the polyclinic before the reference acute cerebrovascular accident and 209 (90.1%) patients attended the polyclinic after it.

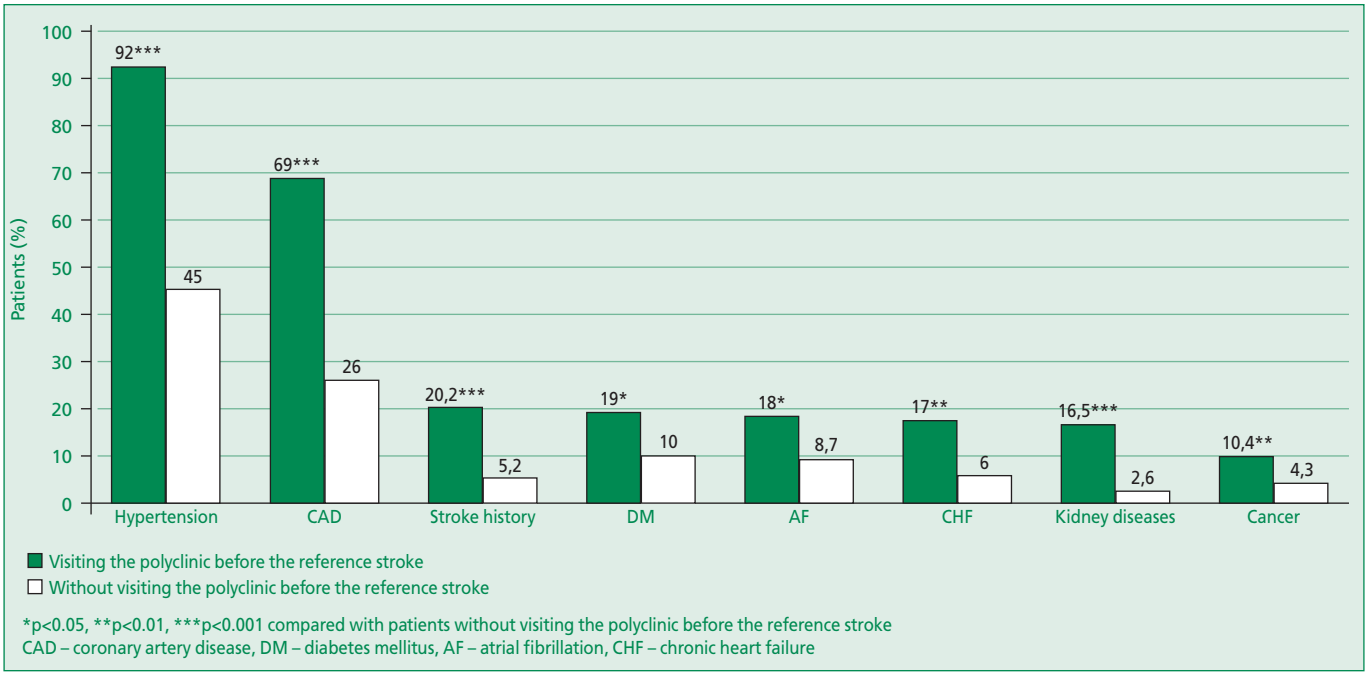

Figure 1. Clinical characteristics of patients depending on the visit to the polyclinic before the reference stroke

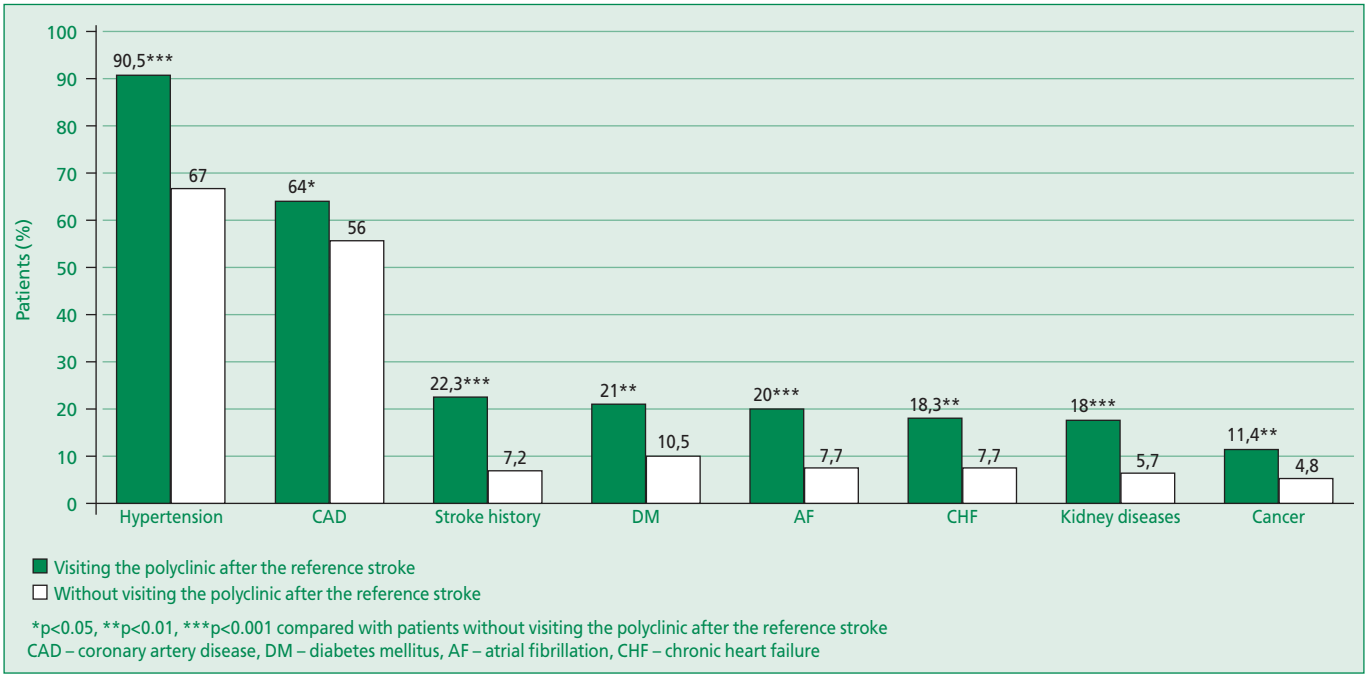

Figure 2. Clinical characteristics of patients depending on the visit to the polyclinic after the reference stroke

According to the Unified Medical Information and Analytical System, over 2 years of follow-up, 28.8% (197 out of 684) of patients discharged from the hospital after suffering from acute cerebrovascular accident died. The proportion of men who died was less than that of women (37.6% vs 62.4%, p<0.001). The average age of the deceased patients was higher than that of the survivors and amounted to 76.7±11.2 years vs 65.3±13.9 years (p<0.001).

A separate analysis of mortality in the subgroups of patients who underwent acute cerebrovascular accident, who went to the polyclinic and didn't go to the polyclinic within 2 years after discharge from the hospital, revealed that 25.7% (n = 148 out of 576) of patients died among those who applied to the polyclinic at least 1 time, and 45.4%, (n = 49 out of 108) patients died among those who never applied to the polyclinic, p<0.0001 (Fig. 3).

The difference in mortality among those who applied to the polyclinic and those who didn't apply to the polyclinic tended to be statistically significant (27.4% vs 35.7%, p<0.1) before the reference ACVA.

When corrections for gender and age were made, the independent contribution of the outpatient attendance factor after reference ACVA was retained in multivariate analysis. The relative risk of death for attending the polyclinic was 0.366 (95% CI 0.269-0.500, p<0.001) and for gender/age was 1.009 (95% CI 1.005-1.012, p<0.001). Thus, adherence to visiting the polyclinic after discharge from the hospital turned out to be an independent prognostically favorable factor.

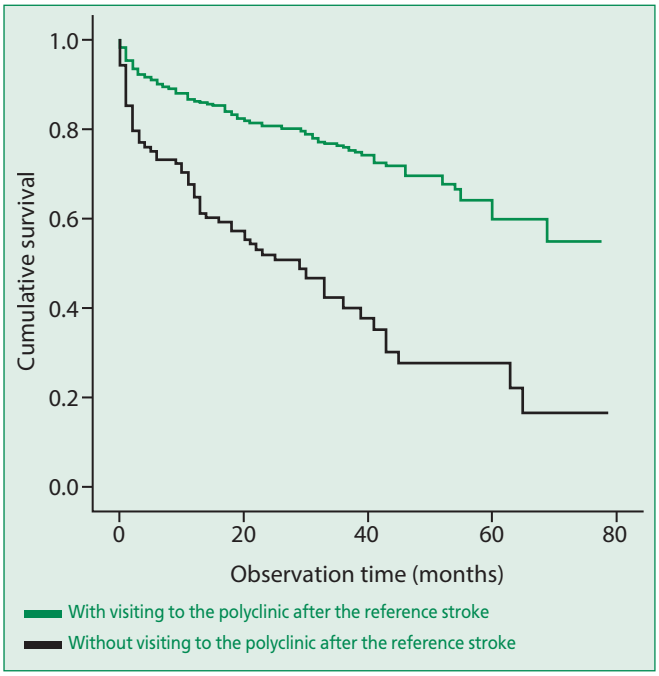

Figure 3. Kaplan-Meier curves for patient survival with and without the polyclinic visiting after the reference stroke

Discussion

In our study, an analysis of patients who went to the polyclinic before the development of ACVA showed that about 83% of all patients visited the polyclinic within the last 12 months before the reference event. An in-depth analysis showed that mainly patients with disabilities and chronic diseases, that is, comorbid diseases, attended the polyclinic. However, before the development of a reference ACVA, doctors observed not all patients with a high cardiovascular risk, in whom primary and secondary prevention of cardiovascular complications should have been performed. A similar situation was found in the LIS-2 hospital registry, where only a small proportion of patients received treatment before the development of a reference ACVA [14].

Only 84.2% of patients after discharge went to the polyclinic within a year. It was not possible to establish the exact reason for the non-appearance of patients in the polyclinic after discharge from the hospital, only 5% of patients had a note in the card that they were being observed in another medical institution. We could assume that some of the patients couldn't come to the polyclinic due to motor disorders that arose after ACVA, however, such severe consequences usually lead to a patient receiving a disability group, and the analysis showed that among 289 patients with disabilities after reference ACVA, 266 (92%) of patients visited the polyclinic after discharge from the hospital. The number of patients who applied to the polyclinic in the first 6 months was statistically significantly less than before hospitalization and later than 6 months. It follows from this that the patients who visited the polyclinic in the first 6 months after discharge from the hospital continued to visit it in the future, and some of the patients who didn't visit the polyclinic immediately after discharge came later. However, 15.8% of patients in 2 years have never visited the clinic after being discharged from the hospital. We didn't find data on the factors influencing the visit of patients to polyclinics after discharge from the hospital after suffering an acute cerebrovascular accident, but there is data on patients who have had acute coronary syndrome. Hospital register LIS-3 showed that only 43.4% of patients discharged from the hospital regularly visited doctors of medical and prophylactic institutions before the development of acute coronary syndrome, and 24.4% never visited medical and prophylactic institutions for cardiovascular diseases. In this study, factors positively associated with adherence to visits to medical and prophylactic institutions were female gender, age, inactive lifestyle, higher education, history of cardiovascular diseases (coronary heart disease, previous myocardial infarction, acute cerebrovascular accident, arterial hypertension, diabetes mellitus), and smoking and employment at work were factors negatively associated with adherence to visits to medical and prophylactic institutions [9-10].

Another possible reason for the non-appearance of patients at the polyclinic was that some of the patients after the reference ACVA didn't need a sick leave or free medication, had no disability or reasons to visit a doctor. This is confirmed by the younger age among patients who didn't go to the polyclinic after discharge from the hospital (66.2±16.1 years vs 69.1±13.7, $p<0.05$), a lower percentage of disabled people (32% vs 56%, $p<0.001$) and a lower percentage of comorbid patients, which is similar to the results of the study of adherence to medical and prophylactic institutions by patients after acute coronary syndrome in the LIS-3 study. During the telephone survey, the following reasons were named for non-attendance of medical and prophylactic institutions by patients after acute coronary syndrome ($n = 53$): lack of free time/well-being (24.5%), difficulties in making an appointment with a doctor (11.3%), physical difficulties in movement (20.8%), disbelief in the need to visit a polyclinic (24.5%), preference for inpatient treatment over outpatient treatment (5.7%) [15].

Surprisingly, during 2 years of follow-up, the mortality rate among those who had never visited the polyclinic after the reference acute cerebrovascular accident, who were initially less burdened, was almost 2 times higher than in patients who visited the polyclinic (45.4% vs 25.7%, $p<0.001$). Perhaps, the differences in mortality rates are explained by the fact that patients who went to the clinic after suffering a stroke are under medical supervision and receive treatment aimed at secondary prevention. This assumption is consistent with the data of Yu.V. Semenova et al. [9,10,15]. Adherence to visiting medical and prophylactic institutions didn't affect the immediate

prognosis after acute coronary syndrome, but statistically significantly improved the quality of drug therapy received before and after acute coronary syndrome [9,10,15]. We also found indirect confirmation in the results of a Russian clinical study [16] on the rehabilitation of patients after suffering from acute cerebrovascular accident at the outpatient stage. This study revealed a significant difference in the mortality rate among patients who received effective secondary prevention of cardiovascular complications, both non-drug prevention (rejection of bad habits, increased physical activity, weight loss) and drug prevention. 61 out of 350 patients died during an average of five years of follow-up, so the mortality rate was 17.4%, and the annual mortality rate was 5.5%. The most common cause of death was recurrent stroke, myocardial infarction, or acute cardiovascular failure. The majority of patients (n=281) underwent effective prevention of recurrent stroke. And only a small part of patients (45 out of 326) refused to regularly take medications, even if there were recommendations from doctors. Death from stroke, heart attack, or acute vascular death developed in 5% of 281 patients who took regular treatment, and in 47% of 45 patients who didn't constantly take antihypertensive drugs or antiplatelet drugs after suffering an ischemic stroke. Men, smokers and alcohol abusers were statistically significantly more likely to refuse from regular medication intake. The group of patients who had an ischemic stroke and regularly took treatment, significantly less often compared with patients who refused regular treatment, observed repeated stroke (3 and 16%, respectively), myocardial infarction (1 and 7%) and death from cardiovascular diseases (1 and 13.8%). Thus, the likely reason for the higher mortality among patients who didn't visit the clinic after suffering from acute cerebrovascular accident was their unwillingness to take care of their health, visit a doctor and take medications.

Despite the identified shortcomings in the secondary prevention of cardiovascular diseases at the outpatient stage in patients after acute cerebrovascular accident, which will be presented by us in separate publications, adherence to visiting medical and prophylactic institutions after discharge from the hospital increased the survival rate of patients who are under the supervision of polyclinic doctors.

Conclusion

The lower mortality rate among people on outpatient treatment after suffering from acute cerebrovascular accident confirms the important role of medical supervision in the posthospital period. At the same time, there is a reserve in improving the long-term prognosis of the life of patients who underwent acute cerebrovascular accident, due to the greater coverage of patients with medical supervision and treatment at the outpatient stage.

Relationships and Activities: none.

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