

PROGNOSTIC INVESTIGATIONS OF THE MORTALITY DUE TO CEREBROVASCULAR DISEASE IN THE REGION OF VARNA DISTRICT

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Cerebrovascular disease (CVD) occupies one of the first places in our country concerning the total morbidity structure and population mortality as well (3, 7, 8).

Because of the high lethality and invalidization percentage the problem of prophylaxis and treatment of the cerebrovascular illnesses is not only a medical but also a social-economic one. The effectivity of CVD control depends to a great extent on indexes prognostication thus enabling a reliable basis for rational prophylaxis (2, 5, 6).

The purpose of the present study is the elaboration of a prognosis for CVD mortality rate in the region of Varna district on the basis of real individual components calculated according to generally accepted method for the years 1981–1985, inc.

Material and Methods

The prognosis is elaborated on the basis of single and multiple linear regression per 100 000 inhabitants. Real values of intensive parameters are used in the multiple analysis as reflected in the legend of table 1.

Table 1

Prognosis for CVD mortality during the period 1987–1991 /per 100 000/ in the Varna district

year	1	2	3	4	5	6	7	8	9	A
1981	241	229	252	65	73	28	2812	1501	241	D=1.0
1982	289	249	282	66	84	49	1655	2048	289	R=1.0
1983	266	273	304	79	88	71	1472	1955	266	=7.10 ⁻³
1984	249	252	247	78	98	59	1602	1471	244.8	Coeff. 1/-0.46
1985	300	300	301	79	89	69	1818	1708	300	2/+2.64
1986	285	290	291	82	97	76	1387	1587	358.7	263.8
1987	208	296	294	83	99	80	1359	1575	371.9	3/- 22.01
1988	291	302	296	85	101	83	1306	1564	356.9	4/- 4.53
1989	294	307	299	86	102	86	1262	1553	370.2	5/7.0
1990	296	311	301	87	104	89	1223	1541	376.4	6/- 0.16
1991	299	315	303	88	105	91	1189	1530	378.7	7/- 0.52
										230

year 2000 – 175

Legend: 1 – mortality – total; 2 – mortality – males – total; 3 – mortality – females – total; 4 – CVD mortality – total (30-60 years); 5 – CVD mortality – males (30-60 years); 6 – CVD mortality – females (30-60 years); 7 – CVD mortality – males over 60 years; 8 – CVD mortality – females over 60 years; 9 – prognosis – total CVD mortality; A – Programme for control of socially significant diseases (total CVD mortality)

Prognostication is based on real individual components of the totality calculated according to generally accepted method for the years 1981–1985, inc. A regression analysis for the period up to 1991 is carried out for every index mentioned in the table on the basis of mathematical modelling according to following formulae:

$$y_1 = 227. x_1^{0.13} \quad y_2 = 259.6. x_2^{0.06} \quad y_3 = 63.6 + \ln x_3 \quad y_4 = 74.3 + 12.6 \ln x_4$$

$$y_5 = 31.1 + 25 \ln x_5 \quad y_6 = 2413. x_6^{-0.3} \quad y_7 = 1658. \exp(-7.2) x_7$$

A multiple linear regression is carried out based on real values of both intensive parameters and digital data prognosticated after the aforementioned formulae by interpolation for the period 1981–1991 which results into the following equation:

$$y = (-0.46). x_1 + (2.64). x_2 + (-22.07). x_3 + (-4.53). x_4 + (7.0). x_5 + (-0.16). x_6 + (-0.52). x_7$$

Multiple correlation coefficient is $R = 1.0$ and determinant is $D = 1.0$ with standard error of evaluation $7^1.10^{-3}$. The interpolation by real data for the retrospective period results in total CVD mortality rates completely identical with the real ones.

Results and Discussion

Our data elaborated for a longer period confirm the tendency proved for our country towards CVD mortality elevation (fig. 1). While in 1981 total CVD mortality rate for the region of Varna district is 241/100 000 inhabitants in 1985 it rises by 59/100 000 inhabitants. Only for 1985 in the classification concerning CVD mortality rate the district of Varna is ranked on the 10th place in our country (300.19/100 000 inhabitants).

Our patients' distribution according to sex and age is interesting, indeed. During this period there is an increased probability for CVD mortality in almost all the age groups. The age between 30 and 60 years has priority in both sexes. Our data coincide with those of other investigators (1, 2 a. oth.).

Fig. 2. shows an outlined difference with prevailing increased CVD mortality in females. Literature data about it are rather contradictory. According to N. K. Bogolepov (1971) the female-male ratio is 54 per cent to 46 per cent while according to N. S. Misiuk (1979) and N. Golemanov (1984) these differences are insignificant.

The prognosis for the single parameters for the period 1986–1991 based on the aforementioned models reveals a probability increase of dying from CVD. Concerning 1990, mortality rate is 146/100 000 inhabitants too much as compared with the planned one in the programme for control of socially significant diseases. The analysis of equation coefficient demonstrates that prognostically, total lethality parameters and parameters of females aged abetween 30 and 60 years are most significant. It is to be noted that these parameters show the most accelerated rate when analyzed individually. These facts are of essential importance for the planning of prophylactic measures with risk contingents.

The results from the analysis of the structure of CVD lethality in the district of Varna during the period 1981–1985 enable us to confirm the data from the Institute of Neurology of the Academy of Sciences of the Soviet Union that ischemic brain lesions are more frequent than haemorrhagic ones: 284 cerebral infarctions and 141 haemorrhagiae (ratio 2:1) (table 2).

The comparison of lethality rate in a structural aspect according to years indicates another important tendency, namely an increased relative incidence rate of lethal brain haemorrhages. Other authors also report about a similar regularity in recent years (9, 10). It is due to enlarged

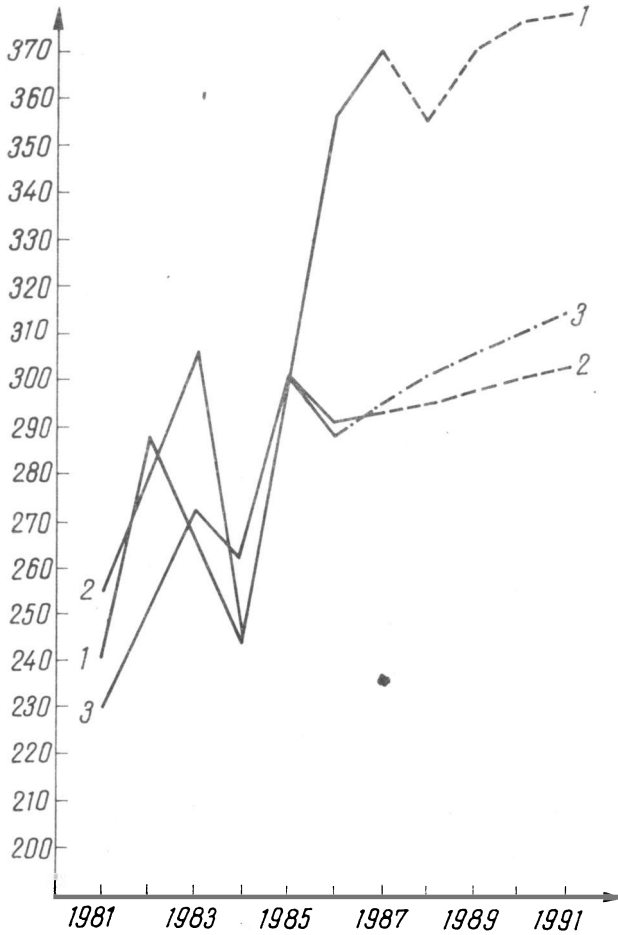


Fig. 1. Dynamics of CVD mortality rate during the period 1981- 1985 in Bulgaria and Varna district. 1 - Bulgaria; 2 - Varna district

Table 2

Structure of CVD lethality in the district of Varna

years	cerebral infarction	cerebral haemorrhage
1981	79	5
1982	34	39
1983	34	20
1984	76	41
1985	61	36
total	284	141

indications for early transportation and hospitalization of patients with haemorrhagic cerebral insult which enables a more realistic statistical authenticity of both clinical and autopsy materials. However, one should not ignore the increasing role of hypertension as an etiological factor in the age group between 30 and 60 years.

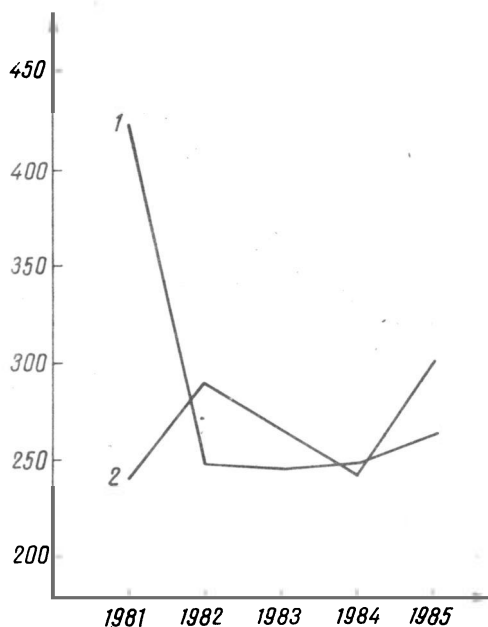


Fig. 2. Prognosis for CVD mortality rate during the period 1987–1991 per 100 000 inhabitants in Varna district.

1. -- Prognosis -- total CVD mortality rate; 2 -- Mortality rate -- total females; 3 -- Mortality rate -- total males

Having in mind the poor prognosis of cerebral hemorrhage we must emphasize that measures of CVD control are extremely insufficient. One must improve the primary prophylaxis of vascular cerebral accidents by means of active inquire of patients with an initial and transitory insufficiency of the cerebral circulation. It is necessary to create neuroangiological laboratories within the neurological clinics where planned screening of risk contingents can be performed as well as to elaborate specified questionnaires for detection of patients with an initial cerebrovascular insufficiency. In this relation, we propose small divisions for mass prophylactical examinations where programmes for early CVD diagnosis can be engaged.

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ПРОГНОСТИЧЕСКИЕ ИССЛЕДОВАНИЯ СМЕРТНОСТИ ОТ ЦЕРЕБРОВАСКУЛЯРНОЙ БОЛЕЗНИ НА ТЕРРИТОРИИ ВАРНЕНСКОГО ОКРУГА

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РЕЗЮМЕ

За период с 1981 по 1985 г. вычислены реальные индивидуальные компоненты. На их основании авторами разработаны прогнозы смертности от цереброваскулярной болезни на территории Варненского округа. Устанавливаются тенденции повышения смертности. Авторы рассматривают мероприятия, необходимые в целях предупреждения цереброваскулярных заболеваний.