

THE INCIDENCE OF STROKE AT DEPARTMENT OF NEUROLOGY, DUBROVNIK GENERAL HOSPITAL IN 2008

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SUMMARY – Data on all patients admitted in 2008 to the Department of Neurology, Dubrovnik General Hospital, were retrospectively analyzed. In a total of 663 patients, there were 247 (37.25%) stroke patients. Ischemic stroke was diagnosed in 217 (87.85%) and hemorrhagic stroke in 30 (12.15%) patients. In the cohort of stroke patients, there were 136 (55.00%) women and 111 (45.00%) men. The group of patients with ischemic stroke consisted of 124 (57.15%) women and 93 (42.85%) men, and the group of those with hemorrhagic stroke of 12 (40%) women and 18 (60%) men. The majority of patients with ischemic stroke (89.86%) and hemorrhagic stroke (76.66%) were over 60 years of age. Only 9 (4.14%) patients with ischemic stroke and 5 (16.66%) patients with hemorrhagic stroke were employed. The mortality rate was 20.24% in the overall stroke group and 19.35% in the ischemic stroke group. In the group of patients with hemorrhagic stroke, 26.66% of patients died at our Department, however, additional 20% of patients with this type of stroke were transferred to the Hospital Intensive Care Unit or to Departments of Neurosurgery in Split and Zagreb, so precise data on the disease outcome in these patients were missing. Eighteen (7.29%) patients were from other countries, mostly from Bosnia and Herzegovina. The majority of them had ischemic stroke (83.33%) and 12 (66.66%) patients were over 60 years of age.

Key words: *Brain ischemia-epidemiology; Cerebral hemorrhage- epidemiology; Stroke - mortality; Stroke- incidence; Croatia - epidemiology*

Introduction

Acute stroke is the leading cause of disability in modern society^{1,2}. In developed countries, stroke is the second cause of death^{1,2}, and in Croatia the leading cause of death³. Despite a steady decline in the incidence of cardiovascular diseases in developed countries, the incidence is still increasing in developing countries^{4,5}. Croatia belongs to a region with a high incidence of stroke^{6,7}. In clinical practice, the classification taking the pathoanatomical and

pathophysiological parameters in consideration, and differentiating hemorrhagic stroke that accounts for 15%-20% and ischemic stroke accounting for 80%-85% of cases, has been widely accepted. Hemorrhagic stroke is further divided into the subtypes of intracerebral hemorrhage of typical or atypical localization, accounting for some 15%, and subarachnoid hemorrhage (SAH) occurring in some 5% of all stroke cases. Ischemic stroke is divided into the subtypes of thrombotic, embolic and hemodynamic stroke. According to the International Classification of Diseases, cerebrovascular diseases are categorized in a similar way, with the following subgroups encoded I60-I69: SAH, intracerebral hemorrhage, other nontraumatic hemorrhages, cerebral infarction caused by extracerebral or intracerebral occlusion, and nonspecific stroke⁸.

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Table 1. Number of patients hospitalized in 2008

Diagnosis	n	%
Stroke	247	37.25
Other diagnoses	416	62.75
Total	663	100.00

Patients and Methods

We analyzed epidemiological and clinical characteristics of stroke patients treated at the Department of Neurology, Dubrovnik General Hospital, in 2008. The Department has 20 beds and stroke patients from a large part of the Dubrovnik-Neretva County (catchment area of about 127 000 people) are hospitalized there. Computed tomography (CT), extracranial and transcranial Doppler sonography (CDFI and TCD) are used in neurological diagnosis. Data on all patients admitted in that period were retrospectively analyzed from Department records.

Results

During 2008, a total of 663 patients were admitted to the Department, 247 (37.25%) of them with stroke (Table 1). Ischemic stroke was diagnosed in 87.25% and hemorrhagic stroke in 12.15% of patients (Table 2). In the ischemic stroke group, there were 57.15% of women and 42.85% of men. About 40% of hemorrhagic stroke patients were women and 60% men (Table 2). Most of the patients with either ischemic or hemorrhagic stroke were in the >60 age group (88.26%), while 23.33% were younger than 60 (Table 2). In the ischemic stroke group, 58.06% of patients were retired and 4.14% were employed, while in the hemorrhagic stroke group the respective figures were 46.66% and 16.66% (Table 2).

The mortality rate was 20.24% in the overall stroke cohort and 19.35% in the ischemic stroke group. In the hemorrhagic stroke group, 26.66% of patients died at the Department, and additional 10.12% of patients were transferred to the Hospital Intensive Care Unit or to Departments of Neurosurgery in Split and Zagreb, so precise data on their outcome are missing (Table 2).

As Dubrovnik-Neretva County is a tourist region, we analyzed the number of patients from other countries hospitalized at our Department, their sex distribution, age, type of stroke and countries they arrived from. Five (2.02%) patients were from other Croatian counties and 13 (5.27%) from Bosnia and Herzegovina.

Table 2. Patient distribution according to type of stroke, sex, age groups, working status and disease outcome

	Type of stroke					
	Ischemic		Hemorrhagic		Total	
	n	%	n	%	n	%
	217	87.85	30	12.15	247	100.00
Sex distribution						
Male	93	42.85	18	60.00	111	45.00
Female	124	57.15	12	40.00	136	55.00
Total	217	100.00	30	100.00	247	100.00
Age (yrs)						
<40	2	0.92	1	3.33	3	1.21
40-49	3	1.38	1	3.33	4	1.61
50-59	17	7.83	5	16.66	22	8.90
≥60	195	89.86	23	76.66	218	88.26
Working status						
Employed	9	4.14	5	16.66	14	5.66
Retired	126	58.06	14	46.66	140	56.68
Housewife	61	28.11	6	20.00	67	27.12
Farmer	1	0.46	2	6.66	3	1.21
Unemployed	20	9.21	3	10.00	23	9.31
Disease outcome						
Discharged	156	71.89	16	53.33	172	69.63
Died on neurological ward	42	19.35	8	26.66	50	20.24
Transferred to other wards	19	8.75	6	20.00	25	10.12

Table 3. Stroke patients from other countries: distribution according to type of stroke, sex and age groups

	Type of stroke					
	Ischemic		Hemorrhagic		Total	
	n	%	n	%	n	%
	15	83.33	3	16.67	18	100.00
Sex distribution						
Male	9		2		11	
Female	6		1		7	
Total	15		3		18	
Age (yrs)						
<40	–	–	–	–	–	–
40-49	1		–	–	1	
50-59	5		–	–	5	
≥60	9		3		12	

na, Slovenia, Germany, Australia, Ireland and Spain. Ischemic stroke was diagnosed in 15 (83.33%) and hemorrhagic stroke in three (16.67%) patients (Table 3). In the ischemic stroke group, there were six women and nine men, and in the hemorrhagic stroke group one man and two women (Table 3). Twelve patients with either ischemic or hemorrhagic stroke were in the >60 age group (Table 3).

Discussion

Stroke continues to be a major public health concern worldwide. In this study, we analyzed epidemiological and clinical characteristics of stroke patients treated at the Department of Neurology, Dubrovnik General Hospital, in 2008. According to data from our Department records, the leading type was ischemic stroke (87.85%), whereas hemorrhagic stroke was found in 12.15% of patients. Comparing the rise in the proportion of ischemic stroke (from 84.0% to 88.0%) and hemorrhagic stroke (from 12.5% to 15.1%) in the last five years, the results obtained were quite consistent with literature data⁸.

As the Department catchment population is approximately 127 000 and 18 patients were from other countries, the hospital based incidence rate of stroke

was 1.80 per 1000 population. These results supported a relatively high stroke incidence in our region and were higher compared with those recently observed in northern, western and Central Europe⁹⁻¹². They were close to those in eastern Europe (1.64) or in Tartu, Estonia (1.85)¹³. As many as 89.86% of ischemic stroke patients were aged >60, while hemorrhagic stroke patients were younger, with 24% of them aged <60. According to sex, 57% of ischemic stroke patients were women and 60% of hemorrhagic stroke patients were men.

Population projections show that the proportion of elderly population throughout the world shall increase¹⁴. Therefore, the number of stroke cases and the burden of stroke upon the society are likely to increase greatly.

The mortality rate recorded in the ischemic stroke group was consistent with literature data, but it could not be calculated in the group of patients with hemorrhagic stroke because 20% of these patients were transferred to other wards and precise data on the disease outcome in these patients were missing. As Dubrovnik-Neretva County is a tourist region, we had 7.29% of stroke patients from other countries, the majority of them with ischemic stroke.

The crude incidence worldwide is mainly attributable to differences in the proportion of elderly people in the population rather than to differences in vascular risk¹⁵. Many factors including lifestyle and socioeconomic variables, differences in healthcare systems and genetic factors result in variation in stroke incidence between countries and regions¹⁶.

The high stroke incidence and general decline in stroke mortality could be expected to imply an ever greater stroke health burden in the future.

Conclusion

The high crude incidence rates in our study reflected the rising burden of stroke in our aging population. Stroke incidence and mortality rate should be reduced with better prevention of stroke and implementation of a modern approach in the diagnosis and management of stroke. Neurological intensive care unit, new neuroimaging diagnostics (magnetic resonance imaging, digital subtraction angiography), thrombolysis and neurosurgical interventions can improve the treatment and disease outcome in stroke patients.

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Sažetak

ZASTUPLJENOST MOŽDANOG UDARA U DUBROVAČKO-NERETVANSKOJ ŽUPANIJI U 2008. GODINI

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Retrospektivnom analizom obuhvaćeni su podaci o svim bolesnicima liječenim na Neurološkom odjelu Opće bolnice Dubrovnik tijekom 2008. godine. U tom razdoblju hospitalizirano je 663 bolesnika, od čega 247 (37,25%) s moždanim udarom. Ishemijski moždani udar imalo je 217 (87,85%), a hemoragijski moždani udar 30 (12,15%) bolesnika. U ukupnom broju bolesnika s moždanim udarom bilo je 136 (55,00%) žena i 111 (45,00%) muškaraca. U skupini ishemijskih moždanih udara bile su 124 (57,15%) žene i 93 (42,85%) muškaraca, a u skupini s hemoragijskim moždanim udarom 12 (40%) žena i 18 (60%) muškaraca. Većina bolesnika s ishemijskim (89,6%) i hemoragijskim (76,66%) moždanim udarom bili su stariji od 60 godina. Samo 9 (4,14%) bolesnika s ishemijskim moždanim udarom i 5 (16,66%) bolesnika s hemoragijskim moždanim udarom su bili zaposleni. Stopa smrtnosti je ukupno iznosila 20,24%; 19,35% za ishemijski i 26,66% za hemoragijski moždani udar. Također, 20% bolesnika s hemoragijskim moždanim udarom premješteno je na Odjel intenzivnog liječenja naše bolnice ili na neurokirurške klinike u Splitu i Zagrebu, pa nisu bili dostupni podaci o ishodu liječenja tih bolesnika. Isto tako, 18 (7,29%) bolesnika je bilo iz drugih zemalja, najviše iz Bosne i Hercegovine. Većina ih je imala ishemijski moždani udar (83,33%), a 12 (66,66%) bolesnika je bilo starije od 60 godina.

Ključne riječi: *Moždana ishemija – epidemiologija; Moždano krvarenje – epidemiologija; Moždani udar – učestalost; Moždani udar – smrtnost; Hrvatska – epidemiologija*