

Department of Neurology, Medical University of Lublin

KRYSZYNA MITOSEK-SZEWCZYK, MONIKA MIAZGA,
MIROSLAW MIAZGA, MARTA PIECYK

Retrospective analysis of mortality rates among the patients with cerebral stroke hospitalized at the Department of Neurology of the Medical University of Lublin in 1990 and 2000

The vascular diseases of the brain still result in numerous deaths and severe disabilities. In the classification of the highest mortality diseases they follow neoplasms and cardiac diseases. The causes of cerebral circulation insufficiency include: stenosis or occlusion of the cerebral vessel supplying blood to the brain, rupture of the cerebral vessel (cerebral or subarachnoid haemorrhage), hemodynamic disorders of the cerebral vessels, impaired flow of blood caused by increased blood density (8).

The vascular diseases develop not only in elderly patients, they become increasingly common among young and middle-aged individuals. To decrease the mortality rate and prevent permanent disability, cerebral stroke requires prompt diagnosis and treatment (2). The introduction of modern diagnostic procedures resulted in better understanding of the pathomechanism of cerebral stroke, however the treatment results are still unsatisfactory (10). In Poland, about 60,000 new cases are registered yearly. The statistical data show that the stroke incidence rate is 177/100,000 in men and 125/100,000 in women. These values are similar to those found in other European countries. However, the values of stroke mortality and disability requiring continuous rehabilitation are much higher in Poland compared to Europe (11). It is believed that about 1/3 of the patients die within one month and a half within a year (12). In the recent years, the periapoplectic mortality in Western Europe decreased from 40% to 21%, which can be explained, among others, by better style and standard of living, elimination of risk factors, primary and secondary prevention methods and mostly by the created stroke units (1, 2). Numerous studies revealed that the treatment at the stroke units provided by the interdisciplinary team consisting of a neurologist, internist, rehabilitation technician reduced mortality, disability and length of hospital stay (3). In our country, the

incidence and mortality rates for stroke are still high and the clinical condition of the patients is more severe than in other European countries.

OBJECTIVE AND METHODS

The aim of the study was to determine whether and how the mortality rate among the cerebral stroke patients of our Department had changed. According to the WHO definition, cerebral stroke is a clinical condition characterized by sudden, focal or generalized disorders of the cerebral functions, whose symptoms last longer than 24 hours or result in death. Our study dealt with two periods – 1990 and 2000. The retrospective analysis involved medical records (431) of the patients hospitalized due to cerebral stroke. There were 223 women and 208 men. Their age ranged from 17 to 89 years. The following parameters were examined: the type of stroke, age, sex, the length of hospital stay, types of complications. Only the patients with the determined diagnosis of stroke (by clinical examination in active stage, by CT or MRI, or anatomicopathological examinations) were selected for the analysis. Those highly specialized examinations were also used to determine the type of stroke (haemorrhagic, ischaemic). In the mathematical analysis of the results, the χ^2 Pearson's test was used; $p < 0.005$ was statistically significant. The calculations were performed using the Statistica programme.

RESULTS

A similar number of patients was registered in 1990 and 2000; in the former – 216 (110 women and 106 men), in the latter – 215 (113 women and 102 men). Haemorrhagic stroke was diagnosed in 98 patients, ischaemic stroke – in 117. Using the SSS (Scandinavian Stroke Scale), severe deficiency symptoms were found in 31% of the patients. The average hospital stay was about 23 days (both in 1990 and 2000). After completing their treatment at the Department of Neurology, some patients continued therapy at the Department of Rehabilitation, where their motor functions were improved. The length of hospitalization depended on the severity of clinical conditions, the extent of the infarcted focus and complications.

In 1990, 56 haemorrhagic and 160 ischaemic stroke cases were observed; in 2000 – 42 and 173, respectively. In 2000, haemorrhagic stroke was confirmed in 42 patients: 24 women and 18 men, in 1990 it was diagnosed in 26 women and 30 men. The total number of deaths in 1990 was 56 (26%). In 2000, the mortality rate was 41.6% in the haemorrhagic stroke women and 22.2% in haemorrhagic stroke men. In 1990, this mortality rate was significantly higher, in men – 65.4%, in women – 43.3% (Table 1).

Table 1. Haemorrhagic stroke

Year	1990			2000		
	Incidence	Deaths	%	Incidence	Deaths	%
F	26	17	65.4	24	10	41.6
M	30	13	43.3	18	4	22.2

In 1990, the mortality rate in the ischaemic stroke women was 28.6% and was significantly higher than that in 2000 (26.9%). The male mortality rate in 1990 was 32.9% and was higher than that in 2000 (21.4%).

Table 2. Ischaemic stroke

Year	1990			2000		
	Incidence	Deaths	%	Incidence	Deaths	%
F	84	24	28.6	89	24	26.9
M	76	25	32.9	84	18	21.4

The average age of the patients was 61.6 for women and 42.4 for men. The number of ischaemic stroke cases in 2000 was 173 (89 women and 84 men – similar).

Table 3. Average age in 2000

	Women	Men
HCS	61.6	62.4
ICS	73.8	66.4

Table 4. Average age in 1990

	Women	Men
UKM	65.13 ± 15.20	58.5 ± 12.36
UNM	76.25 ± 8.84	69.23 ± 8.37

The results concerning ischaemic stroke in 1990 are as follows: the mortality rate in women was 28%, in men – 33.3%. The highest risk of death was observed during the first 10 days from the onset, additionally in haemorrhagic stroke two “peaks” of death were detected – at the 2nd and 5th day of the disease (Fig. 1). This is caused by the “spontaneous haemorrhaging” which develops between the 2nd and 4th post-stroke day (5).

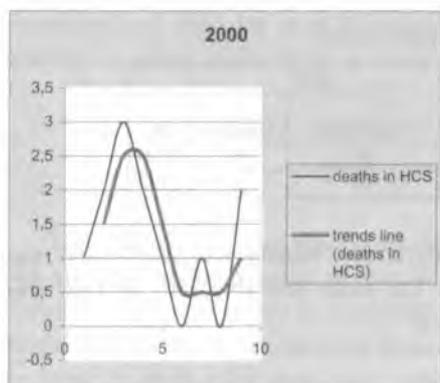


Fig. 1.

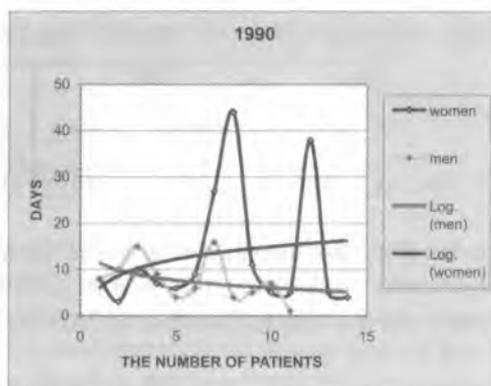


Fig. 2.

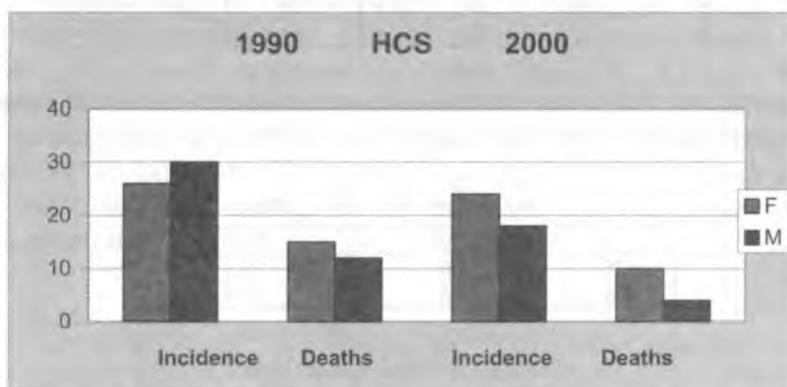


Fig. 3. Correlation between incidence and death

DISCUSSION

The highest mortality in the examined population concerned the first 10 days from the onset. The study did not include the percentage of patients who died in the pre-hospital period. The risk of death and complications substantially increases with age. The most common death causes observed were vascular injuries to the cerebral trunk, recurrent stroke, cerebral oedema, and circulatory-respiratory insufficiency. The major risk factor of stroke was hypertension – 66.7% (higher than 160/95 despite daily drugs).

The course and prognosis of the disease were mainly affected by age. Haemorrhagic stroke developed much more frequently in younger patients and was associated with longer hospitalization and slower subsidence of deficiency symptoms (9). The diseased men were younger than women, which is likely to be related to the quicker development of atheromatous lesions and to the presence of “some” risk fac-

tors, e.g. obesity or smoking (7). Our analysis showed that the mortality rate in the haemorrhagic stroke women was higher than in men in 1990 and 2000. The statistical analysis revealed that the number of deaths in men and women with haemorrhagic stroke decreased in 2000 compared to 1990. This value is statistically significant – $\chi^2=3.91$; $p<0.005$.

No statistically significant mortality changes were found in the patients with ischaemic stroke comparing 1990 and 2000.

Thanks to the diagnostic procedures, quicker evaluation and treatment are possible. Thus, it may be assumed that decreased mortality observed by us in the haemorrhagic stroke cases in 2000 greatly results from a wider range of diagnostic methods (CT). An additional aspect that slightly improved the statistical results may be the fact that the stroke unit was founded in 2000.

In conclusion, it is worth stressing that eliminating the risk factors, mainly arterial hypertension, hyperlipidaemia, atrial fibrillation, should reduce the incidence of cerebral stroke. The preventive measures should include wider education concerning cerebral stroke issues (10). Other relevant elements are: better organization of medical services, larger number of stroke units and the management of the stroke patients as in acute life-threatening cases.

CONCLUSIONS

1. There were no differences in mortality rates found among the ischaemic stroke patients in 1990 and 2000.
2. Compared to 1990, the haemorrhagic stroke mortality in 2000 decreased.
3. In both years, the haemorrhagic stroke mortality was higher in women than in men.
4. The men with cerebral stroke were older in comparison with the women.
5. Arterial hypertension is the factor increasing the risk of stroke.

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SUMMARY

The aim of the study was to assess the mortality rate among the patients with cerebral stroke treated at the Department of Neurology of the Medical University of Lublin. The retrospective analysis included 413 patients hospitalized in 1990 and 2000. The following parameters were evaluated: the type of stroke, age, sex, the length of hospitalization, kinds of complications. The patients' age ranged from 17 to 89 years. The examinations were performed only in the patients with the determined diagnosis of stroke (confirmed clinically, by CT, MRI and anatomicopathologically). These examinations were also used to determine the type of stroke (haemorrhagic, ischaemic). The statistical analysis was carried out using the χ^2 Pearson's test; $p < 0.005$ was assumed to be statistically significant. The findings reveal a statistically significant decrease in the mortality rate among the patients with haemorrhagic cerebral stroke in 2000 compared to 1990. The mortality rate in the ischaemic stroke patients was also reduced, however the result was not statistically significant.

Retrospektywna ocena częstości zgonów w udarach mózgowych u chorych hospitalizowanych w latach 1990 i 2000 w Klinice Neurologii AM w Lublinie

Celem badania była ocena śmiertelności wśród pacjentów z udarem mózgu w Klinice Neurologii Akademii Medycznej w Lublinie. Retrospektywną oceną objęto 413 pacjentów hospitalizowanych w latach 1990 i 2000. Brano pod uwagę typ udaru, wiek pacjentów, płeć, czas hospitalizacji, rodzaje powikłań. Wiek pacjentów wahał się od 17 do 89 lat. Do naszej oceny zakwalifikowano tylko takich chorych, którzy posiadali „pewne” rozpoznanie udaru (tzn. na podstawie badania klinicznego, CT lub MRI, czasem również badania anatomopatologicznego). Te badania posłużyły również do określenia typu udaru (krwotoczny, niedokrwienny). Do statystycznej analizy wyników wykorzystano test χ^2 Pearsona, poziom istotności stwierdzono przy $p < 0,05$. Zauważyliśmy istotny statystycznie spadek śmiertelności u pacjentów z udarem krwotocznym w roku 2000 w porównaniu z rokiem 1990. W udarze niedokrwiennym również zanotowano spadek liczby zgonów w roku 2000, jednak nie był to wynik istotny statystycznie.