ORIGINAL RESEARCH

Trends and demographic characteristics of hemorrhagic stroke in Albania during the period 2004-2015

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Abstract

Aim: Our aim was to describe the trend over time and the demographic distribution of hemorrhagic stroke in Albania in the past decade.

Methods: This study included all patients diagnosed with hemorrhagic stroke and admitted during the period 2004-2015 at the University Hospital Center "Mother Teresa" in Tirana (988 cases overall; 34% women; overall mean age: 57.8±19.3 years). Information about selected demographic characteristics was also collected for all study participants.

Results: The proportion of older patients (≥70 years) was slightly, but not significantly, higher in women than in men (32% vs. 27%, respectively; P=0.163). Furthermore, the proportion of Tirana residents was similar in both sexes (47% in men vs. 45% in women). Overall, there was evidence of a significant linear trend over time (Mann-Kendall test: P<0.01), indicating a gradual increase in the number of hemorrhagic stroke cases in Albania for the period 2004-2015.

Conclusion: This study provides useful information about the increasing trend of hemorrhagic stroke in Albania, a transitional country in Southeastern Europe which is characterized by rapid changes including unhealthy dietary habits.

Keywords: Albania, cerebrovascular disease, hemorrhagic stroke, time trend, Western Balkans.

Conflicts of interest: None.

Introduction
It has been shown that the sudden appearance of acute ischemic stroke is a consequence of a hasty interruption of blood flow to a part of the brain (1). It is argued that in most of the circumstances this situation occurs from embolic or thrombotic arterial vascular occlusion (1,2). In addition, lacunar strokes, arteritis, arterial dissections, and cortical venous occlusions constitute some other vascular events which may result in stroke syndromes (1,2). Intraparenchymal intracranial hemorrhage from a variety of causes (including the spontaneous or hypertensive hemorrhages, vascular malformations, or aneurysmal origin) are observed fairly frequently in the clinical practice. Normally, these additional conditions are involved in the initial differential diagnosis of stroke. Actually, these different conditions have been referred to as stroke subtypes and are considered in the classification of this major disease.

According to the first national health report for Albania which was published in 2014, there is evidence of an increase in the mortality rate from cerebrovascular diseases in the past two decades in this post-communist country (3,4). As a matter of fact, Albania is the only country in the Southeastern European region that exhibits an increase in the death rate from cerebrovascular diseases (3,4), which raises serious concerns for health professionals and policymakers in this transitional country. The increase in the death rate from cerebrovascular diseases has been bigger in males (from about 85 per 100,000 population in 1990 to 157 per 100,000 population in 2010) compared to females (100 and 169 per 100,000 population, respectively) (3,4). It has been argued that this increase in the mortality rate of cerebrovascular diseases in Albania indicates an early evolutionary stage of these conditions, a trend which was evident several decades ago in the Western countries (3).

In any case, accurate information on the extent of cerebrovascular diseases in Albania is scant. As a matter of fact, there is no scientific information about the incidence or prevalence of cerebrovascular diseases in the Albanian adult population. In this framework, we aimed to describe the distribution and the demographic characteristics of hemorrhagic stroke in Albania, a transitional country in Southeastern Europe which has been undergoing a rapid change in the past decades including also drastic changes in lifestyle/behavioral factors.

Methods
We conducted a case-series study which included all patients with hemorrhagic stroke admitted during the period 2004-2015 at the University Hospital Center "Mother Teresa" in Tirana. It should be noted that this is the only tertiary care hospital in Albania. Overall, during the 12-year time period under investigation, there were hospitalized 988 patients (66.1% men and 33.9% women).

For all cases included in this study, the diagnosis of stroke and differentiation of its subtype was done with magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) (5).

Data on selected demographic characteristics (age, sex and place of residence) of all study participants was also collected. Age was categorized in the analysis into four groups: <50 years, 50-60 years, 61-70 years and >71 years. Place of residence was dichotomized into: Tirana vs. other districts of Albania. The time period under investigation was treated as a discrete variable (for the purpose of time trend analyses), but it was also dichotomized into: 2004-2009 vs. 2010-2015.

T-test was used to compare mean age between male and female stroke patients. On the other hand, Fisher's exact test was used to compare the sex-differences related to age-groups, place of residence and time period under investigation (2004-2009 vs. 2010-2015). Conversely,

Mann-Kendall test was used to assess the linear trend in the distribution of the number of hemorrhagic stroke cases in Albania for the period 2004-2015. In all cases, a p-value of ≤0.05 was considered as statistically significant. Statistical Package for Social Sciences (SPSS, version 15.0) was used for all the statistical analyses.

Results

Overall, mean age of study participants was 57.8±19.3 years, whereas median (interquartile range) was 61.0 years (51.5-71.3 years). Mean age in men was slightly higher than in women (58.4±17.8 years vs. 56.6±21.9 years, respectively), but this difference was not statistically significant (P=0.174).

The distribution of ischemic stroke cases by selected demographic characteristics of the study participants is displayed in Table 1. On the whole, 29% of hemorrhagic stroke cases were 70 years or older; 24% were 61-70 years; 25% were 50-60 years; and 22% were less than 50 years of age. Overall, 46% of the hemorrhagic stroke cases were residents in Tirana, whereas the remaining 54% of the patients were residents in other districts of Albania. Notably, most of the hemorrhagic stroke cases (70%) occurred during the period 2010-2015 compared with only 30% of the cases registered in the period 2004-2009.

Table 1. Distribution of hemorrhagic stroke cases by selected demographic characteristics in Albania during the period 2004-2015

Characteristic	Number	Percentage
Sex:		
Men	653	66.1
Women	335	33.9
Total	*988*	*100.0*
Age-group:		
<50 years	222	22.5
50-60 years	243	24.6
61-70 years	237	24.0
>70 years	286	28.9
Residence:		
Tirana	456	46.2
Other districts	532	53.8
Time period:		
2004-2009	298	30.2
2010-2015	690	69.8

Table 2 presents the distribution of selected demographic characteristics by sex of the hemorrhagic stroke cases. The proportion of older patients (70 years and above) was somehow higher in women than in men (32% vs. 27%, respectively), but this difference was not statistically significant (P=0.163). Furthermore, the proportion of Tirana residents was similar in both sexes (47% in men vs. 45% in women, P=0.638). Also, there was no statistically significant difference between male and female hemorrhagic stroke cases regarding the time period under investigation dichotomized into 2004-2009 vs. 2010-2015 (P=0.213).

Table 2. Demographic distribution of hemorrhagic stroke cases by sex

Characteristic	Men (N=653) Number (percentage)	Women (N=335) Number (percentage)	P-value[*]
Age-group:			
<50 years	142 (21.7)	80 (23.9)	
50-60 years	165 (25.3)	78 (23.3)	0.163
61-70 years	168 (25.7)	69 (20.6)	
>70 years	178 (27.3)	108 (32.2)	
Residence:			
Tirana	305 (46.7)	151 (45.1)	0.638
Other districts	348 (53.3)	184 (54.9)	
Time period:			
2004-2009	188 (28.8)	110 (32.8)	0.213
2010-2015	465 (71.2)	225 (67.2)	

[*] P-values from Fisher's exact test.

Figure 1 presents the overall and the sex-specific distribution of hemorrhagic stroke cases for each year included in the study (from 2004 to 2015). Overall, the number of hemorrhagic stroke cases increased from 20 (in 2004) to 44 (in 2005) and, in the next couple of years, remained quite stable. From 2008 to 2012, the number of cases ranged from a minimum of 66 (in 2010) to a maximum of 85 (in 2011). Next, there was a steep increase to 191 cases in 2013, and even more so in the following year (229 cases). Conversely, in 2015, there was a sharp decrease, where there were registered only 47 cases of hemorrhagic stroke. The trend over time was more or less similar in both sexes, notwithstanding the generally higher number of cases in men for each year under investigation.

Figure 1. Trend of hemorrhagic stroke cases in Albania during the period 2004-2015
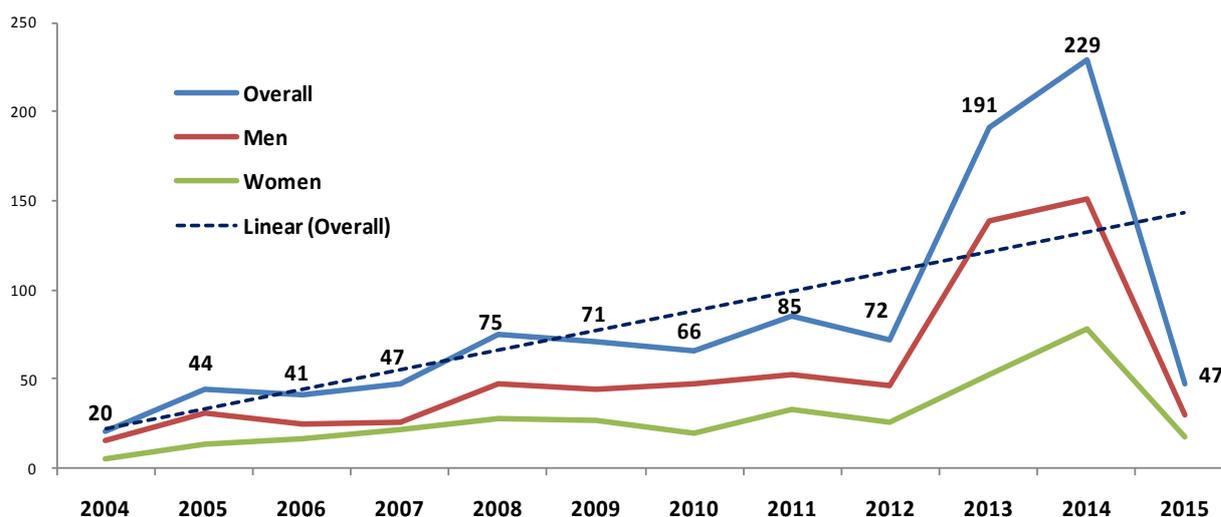
Overall, there was evidence of a significant linear trend over time (Mann-Kendall test: P<0.01), indicating a gradual increase in the number of hemorrhagic stroke cases in Albania for the period 2004-2015 (Figure 1).

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Discussion

This study provides evidence on the distribution and demographic characteristics of hemorrhagic stroke cases hospitalized in Tirana, the Albanian capital for the period 2004-2015. The proportion of older patients was slightly but not significantly higher in women than in men. Furthermore, the proportion of Tirana residents was similar in both sexes. On the whole, there was evidence of a significant linear trend over time, which points to a steady increase in the number of hemorrhagic stroke cases in Albania in the past decade.

The reasons for the sharp decline of hemorrhagic stroke cases in Albania in 2015 are difficult to explain. One reason may be the incomplete reporting for this particular year, pointing to quality deficits in the Albanian health reporting system. Another explanation may relate to the reduction of transferred stroke cases from other districts to Tirana, the Albanian capital, where the only tertiary health care facility is located. In any case, such considerable fluctuations in the number of hemorrhagic stroke cases in Albania deserve further investigation.

We have previously reported about the distribution and demographic characteristics of ischemic stroke in Albania for the same period of time (from 2004 to 2015) (6). According to this previous report, the proportion of older women (70 years and above) with a diagnosis of ischemic stroke was significantly higher compared to men (55% vs. 41%, respectively, P<0.001). On the other hand, there was evidence of a higher proportion of men residing in Tirana compared to women (35% vs. 30%, respectively, P=0.002). Contrary to the current study involving hemorrhagic stroke patients, there was no evidence of a statistically significant trend over time for ischemic stroke for the period 2004-2015, notwithstanding a sharp increase in 2014 (6).

The official reports from the Albanian Institute of Statistics (INSTAT) regarding the death rate from cerebrovascular disease are substantially lower than the Global Burden of Disease (GBD) estimates for both men and women (4). From this point of view, INSTAT reports that mortality rate from cerebrovascular disease in 2009 was about 100 and 120 (per 100,000 population) in males and females, respectively – values which are 57% lower in males and 41% lower in females compared with the GBD estimates for the year 2010 (4). Regarding the age-standardized mortality rate from cerebrovascular disease, in Albania, in the year 2010 it was about 147 deaths per 100,000 population – which constitutes the second highest rate in the region after Macedonia (which, in turn, shows a particularly high mortality rate from this condition, with about 203 deaths per 100,000 population) (3). It should be noted that, among countries of Southeastern Europe, Slovenia has achieved a remarkable decrease in the mortality rate from cerebrovascular accidents (from about 124 to 54 per 100,000 population in 1990 and 2010, respectively). As a matter of fact, all countries except Albania have experienced various degrees of decline in the mortality rates from cerebrovascular disease due to effective treatment, as well as effective primary prevention measures introduced in several (routine) national health programs (3,7).

In the clinical practice, the diagnosis of acute stroke is straightforward in most of the circumstances. From this perspective, the unexpected onset of a focal neurologic deficit in an identifiable vascular distribution with a common presentation (including hemiparesis, facial weakness and aphasia) indicates a common syndrome of "acute stroke" (6,8). However, there are several manifestations which are similar and very difficult to distinguish from an ischemic stroke syndrome (8,9). These are referred to as "stroke mimics" and include both processes occurring within the central nervous system and systemic events (8). Taking into consideration the various treatment regimens of stroke which are currently very complex and

also bear the risk of undesirable effects, it is very important to differentiate these non-cerebrovascular "stroke mimics" from real strokes, as argued elsewhere (8,9).

This study may suffer from several limitations. Stroke patients included in this study may not be fully representative of all stroke cases in Albania. In any case, we included in our study all patients hospitalized in Tirana during more than a decade, regardless of their place of residence (Tirana, or other districts of Albania). Furthermore, the clinical diagnosis and discrimination of the stroke subtype was based on modern technology and scientific protocols employed in similar studies. Demographic information for all patients was based on the medical charts and consisted of hard data such as age, sex and place of residence. Given the administrative requirements, such demographic information is completed accurately and, therefore, there is no evidence of any kind of information biases in this regard.

In conclusion, this study provides useful information about the increasing trend of hemorrhagic stroke in Albania, a transitional country in Southeastern Europe which is characterized by rapid changes including unhealthy dietary habits. Nevertheless, further studies should be conducted in Albania at a national level in order to obtain valuable information about the extent, distribution and the main risk factors of both ischemic and hemorrhagic stroke.

References

1. Brott T, Bogousslavsky J. Treatment of acute ischemic stroke. N Engl J Med 2000;343:710-22.
2. Allder SJ, Moody AR, Martel AL, Morgan PS, Delay GS, Gladman JR, Fentem P, Lennox GG. Limitations of clinical diagnosis in acute stroke. Lancet 1999;354:1523.
3. Albanian Institute of Public Health. National health report: Health status of the Albanian population. Tirana, Albania; 2014.
4. Institute for Health Metrics and Evaluation (IHME). Global Burden of Disease Database. Seattle, WA: IHME, University of Washington; 2014.
5. Weisberg LA, Nice CN. Intracranial tumors simulating the presentation of cerebrovascular disease. Am J Med 1977;63:517-24.
6. Gjorgji P, Kruja J. Ischemic stroke during the period 2004-2015 in transitional Albania. Management in Health 2016;XX/2:16-8.
7. Burazeri G, Achterberg P. Health status in the transitional countries of South Eastern Europe. SEEJPH 2015;1. DOI: 10.4119/UNIBI/SEEJPH-2015-48.
8. Kothari RU, Brott T, Broderick JP, Hamilton CA. Emergency physicians: accuracy in diagnosis of stroke. Stroke 1995;26:2238-41.
9. Norris JW, Hachinski VC. Misdiagnosis of stroke. Lancet 1982;1:328-31.

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