



## TRANSIENT ISCHEMIC ATTACK AS A PREDICTOR OF STROKE

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### INTRODUCTION

Transient ischemic attack (TIA) is a brief episode of neurological dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting less than one hour, and without evidence of acute infarction.<sup>[1]</sup>

It can be manifested with signs of damage to the front or posterior cerebral circulation, caused mainly due to degenerative changes in the blood vessels. Symptoms of TIA can sometimes give tumor processes in the brain.

Stroke is a condition of a disrupted brain function due to a reduced blood supply or a complete cessation of blood flow to a particular irrigation area, usually due to degenerative changes in blood vessels, with symptoms and signs lasting more than one hour with the most clearly marked zones of brain dysfunction with radiological methods.

Degenerative changes in blood vessels are a long-lasting process. It happens often that during the development of degenerative changes in the blood vessels manifestations in terms of TIA, which is usually a sign of a stroke. TIA is more often in the posterior circulation of the brain (vertebrobasilar arterial system) while ischemic stroke arising from the anterior circulation, which involves the carotid arteries.

### OBJECTIVE

The objective is to analyze the predictive role of transient ischemic attacks in the formation of a definite ischemic stroke in a five-year period.

### MATERIALS AND METHODS

In this paper, we analyzed the patients with a transient ischemic attack in the period June 2011 - June 2013 (outpatient and hospital patients) in the region of Sarajevo and we were monitoring their condition in terms of the occurrence of ischemic stroke in the next five years. We took the medical history of patients and performed a detailed neurological examination.

All patients had laboratory tests with particular reference to the values of glycemia and lipids profile, cardiac investigations (blood pressure, ECG and examination of specialist in internal medicine), brain computed

tomography (CT) with transcranial doppler ultrasound (in the period of 3 days from the onset of symptoms) and doppler ultrasound of carotid arteries.

### RESULTS

In this three-year period, 1037 patients who had TIA were treated, ages between 42 and 77. 527 was male (50.8%) and 510 were women (49.1%). Arterial hypertension was present in 787 (74.45%) patients, diabetes mellitus at 356, (34.32%), hyperlipidemia in 489, (47.15%) and cardiac arrhythmia in 259 (24.97%) patients.

After the transcranial ultrasound was done, circulatory changes in intracranial arteries were founded in 897 (86.49%) of patients, all values were lower compared to standard. 453 women (50.50%) and 444 men (48.50%) had reduced values of cerebral flow. Degenerative changes in neck arteries, with a degree of narrowing above 40%, were recorded in 454 patients (43.78%).

In the five-year follow-up period of these patients, a definite ischemic stroke developed in 329 patients (31.7%), in 177 men (53.79%) and 152 women (46.21%). Stroke was more common with those who had repeated transient ischemic attacks (2 or 3 attacks) as well as those who had several risk factors at the same time.

### DISCUSSION

In the three-year period, the number of men and women who had symptoms of TIA was almost equal but men had a slightly higher likelihood of a TIA.<sup>[2-5]</sup>

Our results are consistent with other studies that have reported no major sex differences in presenting symptoms.

In our study (five-year follow-up period) a definite ischemic stroke developed in 31.7% of patients. In

people who have a TIA, the incidence of subsequent stroke is as high as 11% over the next 7 days and 24–29% over the following 5 years.<sup>[6]</sup> Also, the risk of stroke and other vascular events at 90 days in the historical cohorts was 12 to 20%.<sup>[7,8]</sup>

In our patients, we monitored modifiable risk factors (hypertension, diabetes mellitus, lipid profile, cardiac arrhythmia and circulatory changes of blood vessels). Nearly three-quarters of patients had hypertension. Previous studies also have shown that blood pressure is a major risk factor for TIA and ischemic stroke.

Women have a better compliancy in treatment, more regularly take the therapy, and perhaps this could be the reason for better control of hyperlipemia, hypertension and diabetes mellitus. Due to better risk factor control in women, prevalence of stenosis of carotid arteries and coronary disease in men is bigger.<sup>[9,10]</sup>

A lipid lowering therapy in women than in men has also been previously described in patients with stroke and may be in part attributable to sex differences in patient preferences or in eligibility for treatment, specifically a greater prevalence of both carotid stenosis and coronary artery disease in men.

About 25% of patients with symptoms of TIAe had a cardiac arrhythmia. Atrial fibrillation has been known to increase the incidence of stroke, but no relation has been proved with TIA.<sup>[11]</sup>

TIAe are often early warning signs of atherosclerotic disease. Atherosclerotic disease of the neck arteries has long been recognized as a risk factor for stroke. About 10% of patients with a TIA presenting to California emergency departments returned to the emergency department with a stroke within 90 days.<sup>[12]</sup>

Half of the patients in our study had reduced values of cerebral flow. Intracranial atherosclerosis is a significant risk factor for ischemic strokes and TIAe, accounting for ~10% of such events.<sup>[13,14]</sup>

Our study indicates that TIAe are associated with an increased risk of stroke particularly if the TIAe occur more often than once a month or are associated with high blood pressure or other cardiovascular diseases. This may imply that early treatment of hypertension and other risk factors for atherosclerosis will have a preventive effect.

Diagnosing transient ischemic attack identifies a patient who is at risk for subsequent stroke. The risk of stroke after transient ischemic attack is somewhere between 2% and 17% within the first 90 days.<sup>[15]</sup>

Among patients with transient ischemic attack, one in five will have a subsequent stroke (the most common outcome), a heart attack or die within one year.<sup>[16,17]</sup>

## CONCLUSION

The presence of risk factors leads to degenerative changes in blood vessels, especially in carotid arteries, which results in transient ischemic attacks. In addition, various heart rhythm disorders can lead to transient ischemic attacks.

TIA is a serious warning sign of an ischemic stroke. It is equally common in men and women. That is why patients with TIA should be seriously understood and treated to prevent the onset of definitive stroke, but also his later complications.

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