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Genetic Factors and Strokes: Is there any Biological Clock? About two homozygous twin sisters.

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ABSTRACT

We reported two simultaneous cases of ischemic stroke in homozygous 75 years old twin sisters living in two different geographical areas. Apart from traditional factors (High blood pressure, diabetes ...), genetic diseases have also been incriminated as a cause of stroke. Derived from this observation it is wise to also emit the following hypothesis: Biological clock matters in the occurrence of strokes.

Key words: stroke–genetic–biological clock

1 INTRODUCTION

Strokes are a major cause of morbidity and mortality in adults [1] . Multiple risk factors are involved in their genesis, especially genetic diseases. The causes of strokes are multiple [2–4] . Besides traditional factors (hypertension, diabetes ...), genetic diseases have also been incriminated [5] . Recent research works have also demonstrated genes predisposing to strokes. ***Objective***: In two simultaneous cases of ischemic stroke in two homozygous twin sisters living in two different geographical areas we have evoked the hypothesis of a genetically programmed biological clock.

2 OBSERVATION

Two 75-year-old homozygous twin sisters were referred to the Department of Radiology in the Lamordé National Hospital of Niamey. The patients had to perform a cerebral scan because of left hemiplegia with a coma for the first twin and right hemiplegia with a coma for the second twin. The history of their illness revealed the abrupt appearance of a loss of consciousness in the first twin. Spontaneously they wanted this information to be reported to her twin sister in another village several kilometers away. Not responding to the telephone, a person was sent to her usual place of residence. She was also found in a comatose state. The two patients were evacuated to the Lamordé National Hospital in Niamey where they were admitted to the medical and cardiology department for treatment. No **seizures** were reported in their medical history. A cerebral CT scan was performed within 24 hours following the accident for each of the two patients. The cerebral scanner performed in the first twin showed a large hypodense lesion of the right **CGN** with a large effect on the right lateral ventricle and V3. In the second twin, the scanner showed three hypodense lesions. Two of these lesions were located on the left at the level of the external capsule and the parietal lobe and on the right on the parietal lobe. Strokes are a major cause of morbidity and mortality in adults [1] . Multiple risk factors are involved in their genesis, especially genetic diseases. The causes of strokes are multiple [2–4] . Besides traditional factors (high blood pressure, diabetes ...), genetic diseases have also been incriminated [5] . Recent research works have also demonstrated genes predisposing to strokes.

Objective: In two simultaneous cases of ischemic stroke in two homozygous twin sisters living in two different geographical areas we have evoked the hypothesis of a genetically programmed biological clock.

3 DISCUSSION

There are two types of strokes: cerebral infarction and cerebral or meningitis hemorrhages. The cerebral infarctions (80

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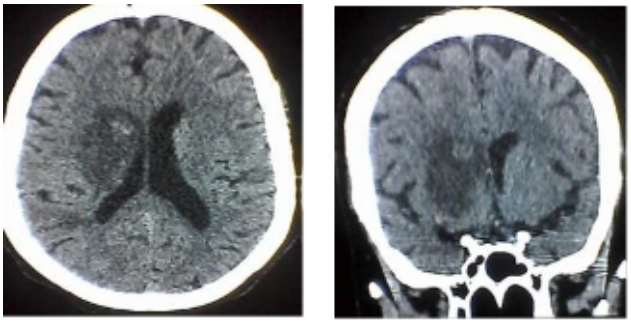

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Figure 1. Brain scan without PC injection showing hypodense lesion of the right CGN in the first twin

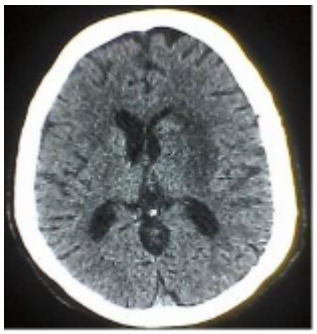

Figure 2. Brain scan without CP injection showing hypodense lesion of left CGN in the second twin

to 85% of strokes) are mainly the consequence of the occlusion of a cerebral artery by a blood clot (thrombus) [5] . These brain attacks are most often included in high blood pressure, diabetes, smoking, hypercholesterolemia, and obesity [6] . Although, many genetic diseases with the dominant and recessive transmission, have also been discovered. They are responsible for an increased risk of stroke [7] . Some studies have revealed chromosomal abnormalities predisposing to stroke [8, 9] . These abnormalities were described as two genetic modifications on chromosome 12 at the NINJ2 gene that would be associated with a high rate of stroke [6] . According to Brass, in homozygous twins, the risk of a stroke is multiplied by 5 compared to dizygotic twins and thereby confirming the existence of genetic factors predisposing to stroke [10] . British researchers and their collaborators have also identified alteration of the HDAC9 gene that would occur in about 10% of human chromosomes and responsible for an increased risk of ischemic strokes [9] . In Japan, Yasumok and colleagues showed a variation that would affect the sequence of the protein encoded by the PRKCH gene. This variation would be responsible for an increase in the enzymatic activity in endothelial cells and would confirm its role in the occurrence of strokes [9] . In France, researchers from the National Institute of Health and Medical Research, the Pasteur Institute-Lille, and the University of Lille have demonstrated the role of several genes in the appearance or not of strokes in young adults [6] . Our cases of ischemic stroke in these two homozygous twin sisters have upheld this notion of genetic causes of stroke. Basically, this observation has introduced the hypothesis of a genetic clock in the occurrence of strokes [11] .

4 CONCLUSION

The causes of stroke are multiple. In addition to traditional factors (hypertension, diabetes ...), genetic diseases have also been incriminated. Recent findings have also revealed that gene variations in chromosomes directly raise the risk of strokes. According to this case of ischemic stroke in two homozygous twin sisters, it is wise to issue the hypothesis of a biological clock in the occurrence of strokes.

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