Extensive cerebral arteries thrombosis.

S Mourgela, A Sakellaropoulos

Citation

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Abstract

Cerebral artery thrombosis is one of the major causes of death. It is usually not clear what kind of pathologic processes participate in this pathological entity. We report a case of a 47-year old female patient with recurrent episodes of cerebral arterial thrombosis, without permanent neurological deficits and history of heavy smoking, hypertension, hypothyroidism, hypercholesterolemia, metabolic syndrome and insulin resistant postprandial hyperglycemia. Brain magnetic resonance angiography (MRA) revealed total thrombosis of the left internal carotid artery (ICA) and partial thrombosis of the right ICA. Although, the extent of the cerebral arteries thrombosis due to the coexistence of many risk factors, the clinical symptoms are mild, because of the sufficient blood supply from the vertebrobasilar system and the efficient collateral circulation.

INTRODUCTION

Thrombosis of the cerebral vessels intracranial with clinical manifestations of brain ischemia is the result of various pathologic entities such as hypertension, hypercholesterolemia, or exaggerated platelet aggregation [1] . No agreement exists on the mechanism of occlusive thrombosis in cerebral arteries. Some consider that it is caused by a break or ulceration of the atherosclerotic intimae similar to that in coronary artery thrombosis [2] and others believe the procedure of thrombosis is initiated by haemorrhage from intramural capillaries [3,4] .

We describe herein a rare case of a 47-year-old female patient with extensive thrombosis of internal carotid arteries bilaterally heralded by recurrent episodes of thrombotic attacks without permanent neurological deficits. Her previous history was that of hypothyroidism, hypertension, metabolic syndrome, diabetes mellitus of type II and heavy smoking.

CASE PRESENTATION

A 47-year old female patient with recurrent episodes of transient ischemic attacks was referred to our clinic for consultation. As a child, at the age of 7 years, she had a large goiter without thyroid hormones' dysfunction. Many years later, at the age of 30 years a diagnosis of hypothyroidism and hypertension was established. Meanwhile, she developed metabolic syndrome and insulin resistant postprandial hyperglycemia.

When she was 39-year-old, she presented recurrent episodes of numbness of the right hemibody, blurring of vision, dysarthria, gait instability, inability to focus and loss of recent memory. These attacks were lasting from 5-30 minutes and were accompanied by severe migraine. The neurological examination revealed no pathologic findings. The diagnostic work-up including brain magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), Triplex of the carotid arteries and Holter monitoring for cardiac rhythm revealed no pathologic findings.

Seven months later the patient experienced a faint attack, which lasted for more than 5 minutes. Brain MRI (Fig. 1) revealed micro-ischemic changes in white matter and basal ganglia, while MRA (Fig. 2) revealed total occlusion of the left ICA.

Figure 1

Fig.1: Brain MRI-microischemic changes (age 40)

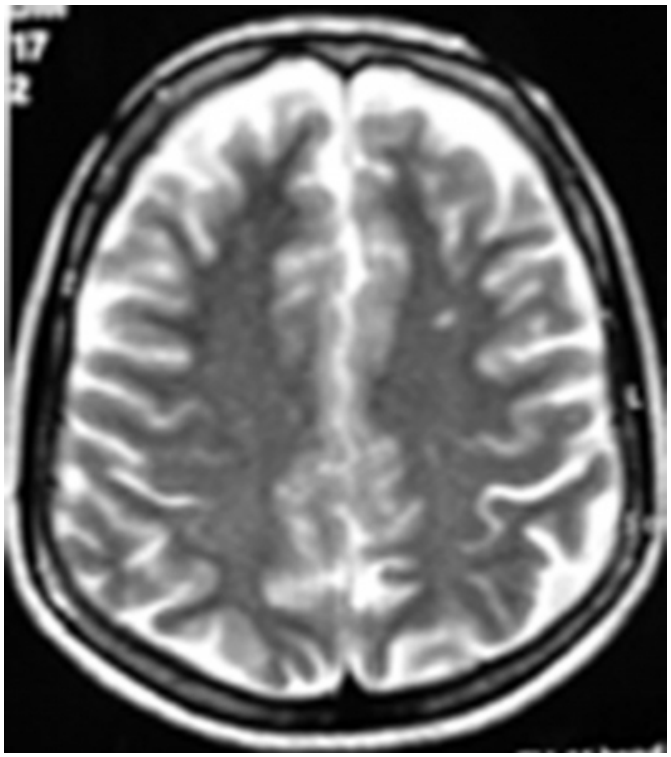
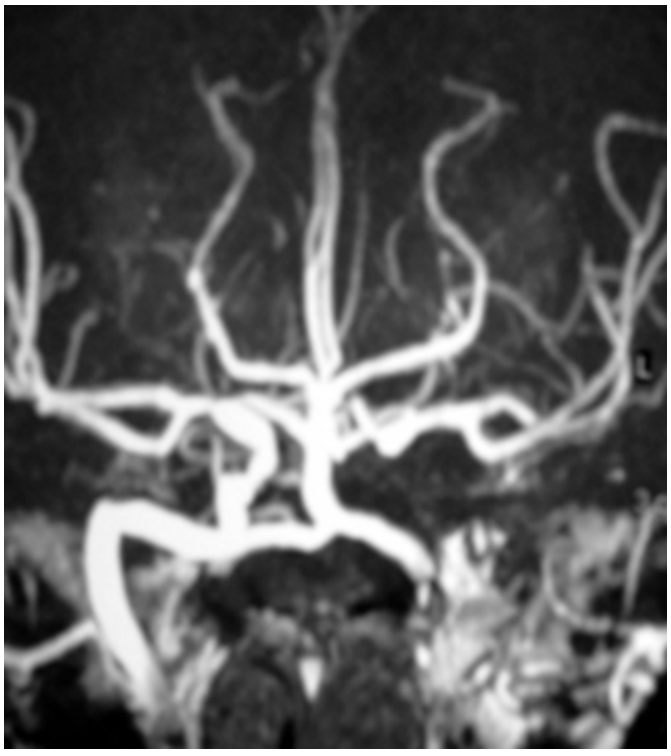


Figure 2

Fig.2: Brain MRA-occlusion ICA left



In a laboratory investigation elevated homocysteine levels (14,08mmol/lit, normal values: 4, 5-7,9mmol/lit) were measured, as well as elevated title of antibodies against prothrombine (14,26U/lit, normal values: 0-10U/lit). In most measurements blood homocysteine levels were normal but high.

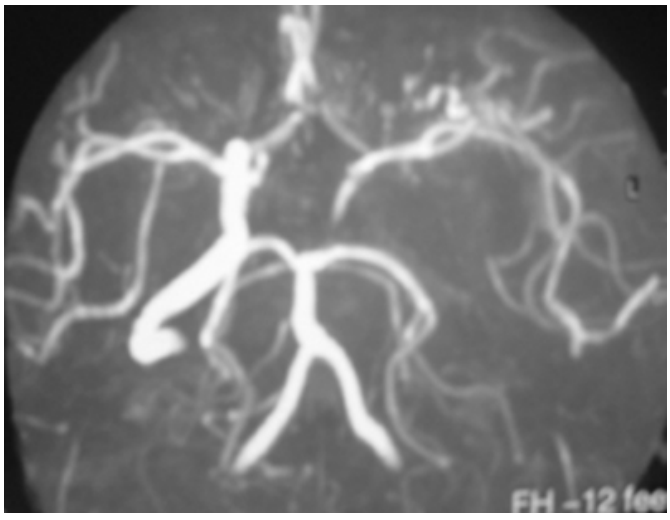
At the age of 46 years the patient presented angina pectoris. Coronary artery angiography showed a stenosis of the anterior descending artery and right coronary artery, which were not critical. Whole body arteriography revealed atheromatic disease of the abdominal aorta, femoral, popliteal and renal arteries, which were not clinically important.

The laboratory investigation for thrombophilia revealed the existence of the C677T mutation of MTHFR gene in heterozygote form. Haematological and coagulant parameters were all normal in most measurements. The levels of Lp (a) were elevated in all measurements.

The patient is being admitted from time to time in our clinic because of cerebral thrombotic attacks with numbness of the right or left hemibody, once or twice every year, while she is suffering constantly under migraine. The most recent brain MRA (Fig. 3) revealed the existence of atheromatic stenosis of external carotid arteries bilaterally in the neck, total occlusion of the left ICA, partial occlusion of the right ICA at the level of carotid siphon and at its cavernous portion intracranially with efficient collateral circulation.

Figure 3

Fig.3: Brain MRA: total occlusion ICA left and partial occlusion ICA right



The patient is under therapy with statins, thyroxin, vitamin B, foliate and acetylsalicylic acid.

DISCUSSION

Cerebral thrombosis
also known as ischemic cerebrovascular disease is when a blood clot forms in an artery that supplies blood to the brain, which prevents the blood flowing into the brain and cells are starved of oxygen. This leads to brain tissue ischemia, softening, and necrosis, resulting in neurological symptoms.

The mechanisms of thrombus formation in atherosclerotic cerebral arteries are still controversial, although intraplaque haemorrhage and rupture of the atheromatous plaques have been proposed [2,3,4] . Factors that play a role in the formation of clots include injury to a blood vessel, alterations from normal blood flow, to the coagulability of the blood, high blood lipids and hemodynamic disturbances. It is worth to notice that all these precipitant factors exist in our patient.

The first pathological entity diagnosed in our patient, still as a child, was a large goiter and subsequently hypothyroidism. There is enough evidence that overt hypothyroidism is associated with several traditional and newer atherosclerotic risk factors, especially hypertension, hyperlipedemia and hyperhomocysteinemia. Hypothyroidism has been associated with signs of aortic and coronary atherosclerosis, but no case control or cohort studies have ever investigated hypothyroidism as a possible risk factor for atherothrombotic stroke [5] . In our case hypothyroidism was the initial pathologic condition diagnosed, while the presentation of the rest risk factors was subsequent.

A point also very important in our case was the permanent migraine. Migraine (MA) pathophysiology is explained by disturbances in neurological pathways, in vascular tension and cerebral blood flow [6,7] . An association between migraine and stroke has been established [8,9,10] . Our patient has remaining and persistent migraine, may be due to the ongoing nature of her disease.

The elevation in circulatory homocysteine (chemical in the blood produced when methionine is broken down in the body) levels is believed to be another cause for migraine. Homocysteine may alters the coagulant properties of the blood [11] and may leads to temporary cerebral thrombosis, altered blood flow and ischemic stroke [12,13,14] . Hyperhomocysteinaemia can also be caused by vitamin B and foliate deficiency, hypothyroidism and by the existence of the genetic variant methylenetetrahydrofolate reductase (MTHFR), which impairs foliate production. The C677T variant in the MTHFR gene may represent a risk factor for MA and stroke [12,15] . By our patient in many examinations high but normal blood homocysteine levels were found may be due to the heterozygotic MTHFR and profound hypothyroidism.

Folic acid and vitamin B complex were successful in lowering homocysteine levels [16,17] . Although, the patient in our case had once in all these years elevated homocysteine levels she is receiving vitamin B and foliate.

Our patient did not developed vein thrombosis, a fact that excludes antiphospholipid syndrome as a possible diagnosis. Antiphospholipid antibody syndrome (APS) is a disorder of coagulation due to antibodies against phospholipids (a cell membrane substance), which causes thrombosis in arteries and veins. Bleeding is rare when this syndrome occurs. The exact cause is not known but activation of the coagulation system is evident. Our case may be is not a typical case of this syndrome [18] .

Cerebral hemodynamic status in patients with carotid artery occlusive disease is influenced by both individual anatomic and functional characteristics. Evaluation of the intracranial hemodynamic adaptive status, with particular attention to the number of collateral vessels and the related cerebral vasomotor reactivity are necessary for the management of these patients [19] .

Although, the extent of the cerebral arteries thrombosis visualized in MRA the clinical symptoms of our patient are mild, a fact that it is very unusual and is due to the efficient collateral circulation and cerebral blood flow. In our case the vertebrobasilar arterial system supplies with blood the brain mainly.

CONCLUSIONS

From our case we conclude that chronic hypothyroidism may be is the cause of the whole pathology in our patient, which appeared years after the initial presentation of goitre. We suggest that chronic hypothyroidism is responsible for the development of all these risk factors, since from the time of the observation of the large goitre to the investigation of the laboratory diagnosis of hypothyroidism twenty three years without medical attention passed.

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Author Information

S. Mourgela
Department of Neurosurgery, Anticancer Institute “gios Savas”, Athens, Greece

A. Sakellaropoulos
Department of Pulmonary and Critical Care Medicine, “Neon Athineon” Hospital, Athens, Greece