HEMATOLOGIC CONDITIONS AS CAUSE OF ISCHAEMIC STROKE IN YOUNG ADULTS

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ABSTRACT

Although rare, ischemic stroke in young patients raises the problem of ethiopathogeny. During 1 year we admitted in the Department of Neurology of the University Hospital of Bucharest 8 young patients (16-45 years), 4 females and 4 males, with ischemic stroke (6 involving the territory of carotid artery and its branches and 2 involving vertebro-basilar arterial system).

All 8 patients had coagulation abnormalities: 4 patients with protein S deficiencies, 2 with protein C deficiencies, 1 patient with protein C and antithrombin III deficiencies, 2 patients with resistance to the activate protein C.

4 patients (2 males, 2 females) had recurrent ischemic strokes, although they where previously treated with Aspirin (2 patients), Acenocumarol (1 patient) or association of Acenocumarol and Aspirin (1 patient).

6 patients had also associated other risk factors for ischemic stroke: 3 patients with dislipidemia, 1 patient with high level of anticardiolipin antibodies, 1 patient with patent foramen ovale, 1 patient with diabetes mellitus, 3 patients with immunological abnormalities.

Key words: ischemic stroke, young, protein C, protein S, antithrombin III, antiphospholipid antibodies

INTRODUCTION

Stroke in young patients constitutes a challenge because of its social impact.

Ischemic stroke in young patients (under 45 years old) raises the problem of revealing the ethiopathogeny. Strokes before age of 45 have different causes comparing to those after 65 and refers to nonatherosclerotic vascular diseases, cardiogenic emboli and hematology abnormalities.

To all young patients with stroke the patient's history must conducted in order to reveal the existence hypertension, cardiac diseases, and diabetes mellitus, of a previous stroke, a cervical trauma, migraine attacks, the use of oral contraception, alcohol use and smoking habit and also the family history of stroke.

Also in young patients with stroke, the patient's history and examinations could disclose the presence of vascular diseases (especially others than atherosclerosis such as - arteritides, dissection, migraine, venous occlusive disease, fibromuscular displasia, and moyamoya syndrome), cardiogenic emboli (associated with arrhythmias, valvular disease, endocarditis, cardiomiopathies) and blood-element abnormalities affecting erythrocytes, platelets or proteins (coagulopathies).

It is also of importance to reveal the presence of migraine (and its association with oral contraceptives and smoking, association who raise the risk for stroke in young females).

AIM

The aim of the study is to investigate the relationship between coagulopathies and stroke in young patients.

MATERIAL AND METHODS

We evaluated the presence of coagulopathies in young patients admitted with ischemic stroke in the Neurological Department of University Emergency Hospital during 1 year.

After the history and physical and neurological examination, all young patients have to have a **complex set of examinations:**

– a complete blood count, biochemical profile, coagulation profile, lipid profile (total lipids, cholesterol, triglycerides, high-density and low-density lipoproteins), VDRL test, erythrocyte sedimentation rate, rheumatologic profile (rheumatoid factor, antinuclear antibodies, C-reactive protein),

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– CT cerebral scan,
– electrocardiography and chest X-ray,
– Doppler studies of cervico-cerebral arteries,
– transtoracic and/or transesophgeal echocardiography,
– holter monitoring of blood pressure and cardiac rhythm,
– four vessel angiography – in cases suspicious of spontaneous arterial dissection fibromuscular displasia, moyamoya syndrome,
– in selected cases – antiphopholipid antibodies and natural anticoagulants (protein C, protein S, antithrombin III),
– Serum homocysteinemia.

RESULTS

During 1 year, we investigated the relationship between coagulopathies and stroke in young patients.

We found 8 young patients with ischemic stroke caused by coagulation abnormalities:

- 4 patients had protein S deficiencies;
- 2 patients had protein C deficiencies;
- 1 patient had protein C and antithrombin III deficiencies;
- 2 patients had with resistance to the activate protein C (or factor V Leiden mutation).

From our 8 patients, 4 patients were females and 4 patients were males, their age was between 16-45 years old, with the medium age of 38 years.

6 patients had ischemic stroke involving the territory of carotid artery and its branches and 2 patients had ischemic stroke involving vertebro-basilar arterial system.

4 patients (2 males, 2 females) had recurrent ischemic strokes, although they where previously treated with Aspirin (2 patients), Acenocumarol (1 patient) or association of Acenocumarol and Aspirin (1 patient).

6 patients had also associated other risk factors for ischemic stroke:

- 3 patients with dislipidemia,
- 1 patient with high level of anticardiolipin antibodies,
- 1 patient with patent foramen ovale,
- 1 patient with diabetes mellitus,
- 3 patients with immunological abnormalities.

DISCUSSION

The presence of antiphospholipid or anticardiolipin antibodies (lupus anticoagulant) could explain some cases of stroke in young adults. Also, the prothrombotic clotting defects (antithrombin II, protein C and S deficiencies or resistetance to activated protein – factor V Leiden mutation) and hyperhomocysteinemia could be hematological causes of stroke in young patients.

Antiphospholipid antibody syndrome

Lupus anticoagulants are immunoglobulins that are associated with thrombosis. These antibodies form part of a larger group of antibodies against phospholipids, such as cardiolipin. Autoantibodies have been associated with stroke, particularly in young adults.

Protein C, protein S, antithrombin III deficiencies

Antithrombin III (ATIII) is a plasma glycoprotein that binds to endogenous heparan on the surface of endothelial cells or to exogenous heparin and it is required for the anticoagulant action of heparin. Deficiency of ATIII is inherited or acquired and could lead to venous thrombosis, but also arterial thrombosis (special in carotid artery) have been described.

Protein C is a glycoprotein protease and an important inhibitor of plasma coagulation. Its synthesis by the liver depends on vitamin K. Protein C is activated when clotting is initiated at the endothelial surface.

Protein S is a vitamin K-dependent plasma protein that is synthesized in the liver. By itself, protein S has no enzymatic activity, but it facilitates the binding of protein C to the platelet membrane; it acts as a cofactor for anticoagulant activity of protein C. The proteinC-protein S complex inhibits the clotting cascade.

Protein C and protein S deficiencies could be inherited or acquired and both cerebral venous and arterial thrombosis could occur.

CONCLUSION

Stroke in young patients raises the problem of ethiopathogeny. Even a rare cause of ischemic stroke, the coagulation abnormalities must be considered in young patients in order to prevent the stroke recurrence.

Also it must be searched another associated risk factor for ischemic stroke.

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