

Belgian Stroke Council

Patent foramen ovale and procoagulant factors associated with deep venous thrombosis. N. CALS¹, P. LALOIX¹, J. C. OSSELAER² (¹Service de Neurologie et ²Laboratoire d'Hématologie, Hôpital Universitaire de Mont-Godinne, Belgium).

Introduction : Mutation of factor V Leiden (FVL) and the prothrombin (PT) gene are common genetic defects leading to an increased risk for deep venous thrombosis (DVT). Recently, high factor VIII levels were also recognized as risk factor. The purpose of this study was to determine whether the prothrombotic factors associated with DVT are increased in ischemic stroke presumed to be only due to a patent foramen ovale (PFO) without an identified site of DVT.

Methods and results : We studied 29 patients (10 men and 19 women ; mean age : 58.2 years). Investigations included a specific diagnosis test for mutation of FVL in 29, mutation of PT in 26 and plasma level of factor VIII in 14. Although increased factor VIII levels persist over time and are not attributable to an acute phase reaction, fibrinogen levels were also measured. Only 1 patients of 29 (3.4%) was heterozygous for FVL mutation and only 1 of 26 (3.8%) was heterozygous for PT mutation, which corresponds to the prevalence in the general population (4-6% and 1-3.2%, respectively). On the other hand, the level of factor VIII was increased in all of the 14 patients (100%) whereas this abnormality has been reported in the literature in about 25% of unselected patients with DVT. Only 4 of our 14 patients had a fibrinogen concentration exceeding 450 mg/dl.

Conclusion : Our findings emphasize that the prevalence of FVL and PT mutation is not increased in ischemic stroke due to a PFO without recognized DVT and as a result these tests are of little value in the assessment of these patients. However, a high plasma level of factor VIII was associated with stroke but our study was based on a small number of patients. Further studies should be performed to confirm this association and its therapeutic prospects.

A remarkable case of recurrent ischemic stroke. Dr. K. VERHOEVEN, Dr. G. VANHOOREN (Eenheid voor Beroertezorg, Dienst neurologie, AZ Brugge av).

The unusual case of a 74-year-old man with a patent foramen ovale associated with an atrial septum aneurysm and rapidly recurrent strokes will be discussed. Clinically there were three clearly different strokes following each other with an interval of less than 1-month time. Apart from essential arterial hypertension we found no other risk factors associated with ischemic stroke after carrying out a classical cerebrovascular investigation. At the time of the second stroke, treatment was changed from acetylsalicylic acid to oral anticoagulation in the light of the patent foramen ovale. Despite treatment with anticoagulation with an international normalized ratio (INR) between 2 and 3, the patient developed a deep venous thrombosis and pulmonary embolism. The case took an unexpected turn when the results of the prothrombotic factors came in. A circulating anticoagulant was found, although there was neither previous history of venous thrombosis nor a family history of recurrent venous thrombosis. A diagnostic investigation was subsequently done which led us to the final diagnosis. A discussion will follow treating the necessity of the search for defects of the atrial septum and abnormalities of the laboratory tests of blood coagulation in elderly patients with (recurrent) stroke. The importance of the anomalies of these tests will be highlighted in the setting of an elderly person with (recurrent) stroke. The treatment options, closure of the patent foramen ovale, either percutaneously or by open surgery, oral anticoagulation or antiplatelet therapy, will be discussed with reference to recent literature on the treatment of patent foramen ovale with or without an atrial septum aneurysm.

Long term follow-up with positron emission tomography in a patient with extracranial internal carotid artery dissection. B. SIAU, J. DE REUCK, D. DECOO, K. STRYCKMANS, I. LEMAHIEU (Ghent University Hospital).

Long term prognosis after internal carotid artery dissection is believed to be good and stroke recurrence to be rare.

We present the case of a 48 year-old man who developed a moderate left-sided hemiparesis together with right hemi-cranial headache. Conventional angiography revealed dissection of the cervical part of the right internal carotid artery

with total occlusion. There was no recanalisation of the occluded vessel and the patient remained stable for three years. After an epileptic seizure there was a temporary increase of his pre-existing neurological deficit.

Positron emission tomography (PET) had been performed 2, 14, 26 and 38 months after initial stroke. Initially PET showed low regional blood flow (rCBF) and diminished metabolic rate for oxygen (rCMRO₂) especially in the infarcted area but also in the remainder of the right hemisphere and, to a lesser degree, in the contralateral hemisphere.

In the infarcted area rCBF and rCMRO₂ remained low and even decreased after the epileptic seizure. In the other regions there was a progressive increase of rCBF and rCMRO₂ not influenced by the seizure.

These serial PET findings might demonstrate the development of collateral circulation in the peri-infarct areas. The increase of rCBF and rCMRO₂ in the contralateral hemisphere probably reflects the dissolution of transhemispheric diaschisis. The present case might also illustrate that a post-apoplectic seizure could be the clinical expression of a new stroke.

An unusual cause of stroke with right sensorimotor hemisyndrome. M. DE CLERCK¹, K. PAEMELEIRE¹, J. DE BLEECKER¹, E. ACHTEN², P. VAN LANGENHOVEN², J. DE REUCK¹ (¹Department of Neurology, Ghent University Hospital, ²Department of Radiology, Ghent University Hospital).

A 45 year-old woman, with a prior history of cigarette smoking and supraventricular extrasystoles, treated with bisoprolol was admitted with complaints of paresthesias and weakness in the right hand of leg. The sensorimotor syndrome increased within 24 hours with temporary nausea and somnolence.

The neurological examination revealed a moderate paresis of the right arm and leg, without clear facial involvement or speech disturbances. Hypoesthesia was present on the right hemisoma, including the face. Tendonreflexes were weak and symmetrical with right Babinski sign. No other abnormalities were found.

A CT-scan of the brain showed no abnormalities. On MRI, only a non-specific high signal area around the lateral horn of the left ventricle was observed on T2 weighed images. MRI, with selective slides through lower brainstem and upper cervical spine, showed a small hyperintense left anterior paramedian signal in the upper medulla oblongata. Extensive cardiac investigations were unremarkable. From the evoked potentials, only the MEP's showed evidence for a left corticospinal tract involvement. The routine laboratory investigations, including rare hemostatic, auto-immune factors and serology were all negative. A lumbar puncture showed normal results, including agarose electroforese. A panarteriography revealed an occlusion of the left vertebral artery at its origin up to the V3 segment, with an unusual collateral flow through a costocervical trunk, issued from a deep cervical artery.

The patient recovered almost completely within three months.

The present case report shows an unusual presentation of a left vertebral artery occlusion, with a small anterior medullar lesion. The outcome was excellent due to the collateral circulation by an anatomical variant of the vertebral arterial system.

Evidence of endothelial dysfunction in patients with non traumatic cervical-artery dissection. A case-control study. C. LUCAS¹, J. L. DECROART², C. GAUTIER², X. LECLERC³, G. DEKLUNDER², D. LEYS¹ (Departments of Neurology¹, Physiology² and Neuroradiology³, Hopital Salengro, CHRU Lille, France).

Background and purpose : Cervical-artery dissection accounts for a 10 to 20% of causes of ischemic strokes in young adults. Cervical trauma and primary diseases of the arterial wall are the main predisposing factors. However, most dissections are considered as "spontaneous". We hypothesized that these cases could originate in a general vascular disease that could be assessed by the flow-mediated dilation of an artery in response to a transient hypoxia.

Methods : We included 56 consecutive patients with spontaneous cervical artery dissection. Twenty five patients had carotid artery dissection (CAD) (mean-age 42), 31 patients vertebral artery dissection (VAD) (mean-age 45). Were excluded patients with vascular risks factors. We included 22 controls (mean-age 43), with ischemic stroke due to another cause than dissection. Patients and controls gave an informed consent. The study was conducted during a 7-months period. Using high-resolution ultrasonography, brachial artery diameter was measured at rest, during post-ischemic hyperemia (endothelium-dependent dilation), and after sublingual glyceryl trinitrate (GTN) spray (endothelium-independent dilation). Flow-mediated dilation was assessed by the ratio of the dilation observed during hyperemia to the dilation observed after GTN administration. Patients and controls with ischemic stroke were studied at least 6 months after the ischemic event and the contralateral superior limb in case of hemiplegia.

Results : Endothelium dependent vasodilation was 65% of the pharmacological vasodilation in controls and 20% in patients (p < .0005). There was no difference between CAD and VAD groups.

Conclusions : These results give evidence for a dysfunction of the endothelium-dependent dilation and argue in favor of an underlying functional vasculopathy in patients with spontaneous cervical artery dissection.

Urgent carotid endarterectomy : a prospective nonrandomised study of 30 cases. Ph. DESFONTAINES, N. SAKALIHASSAN (C.H. Saint-Joseph, Espérance, Liège, Belgium).

The NASCET and ECST studies have shown that carotid endarterectomy (CE) is more effective in stroke prevention than medical treatment alone in patient with TIA and stroke. The exact timing of surgery is still unclear. In order to show the feasibility of performing urgent CE in TIA and progressing stroke, we prospectively developed a protocol of CE in emergency.

Method : From September 1995 to October 2000, 30 consecutive patients underwent urgent CE for TIA (n = 12) and for progressing stroke (n = 18) according to the following criterias : TIA or neurological deficit progressing over at least 24 hours : no impairment of consciousness ; no cerebral infarction larger than a lacunar infarct on CT scan and carotid artery stenosis of 70% or more on echo duplex and/or angiography on the appropriate side.

Results : The mean time of surgery after the onset of the symptoms was $-19.4 \sim 11.5$ hours. The mean European Stroke Scale (ESS) at admission was 77.9 ± 25.2 and 95.8 ± 4.6 at discharge. The mean Barthel's index value at discharge was 95.8 ± 4.6 . The mean time of follow-up is 3.4 ± 1.2 years. 8/18 patients with progressive stroke experienced no improvement of their ESS, but non of them worsened after the operation. 9/18 patients with progressive stroke improved significantly their ESS. One patients developed a fatal ischemic stroke 24 hours after surgery. No patient with TIA worsened after the CE.

Conclusion : Our series of 30 consecutive cases shows the feasibility and the safety of performing urgent CE in TIA or progressing stroke following precise criteria. This procedure seems to us justified by the fact that a symptomatic carotid stenosis is an unstable lesion, and waiting for the operation may lead to the development of another stroke, more disabling for the patient.

Prevalence of peripheral arterial disease in ischemic stroke patients in a stroke unit. Ch. LUCAS, N. VAZ, M.-A. MACKOWIAK, D. DEPLANQUE, H. HENON, D. LEYS (Université de Lille 2, France).

Double localization of atherosclerosis could modify medical management and is a factor of bad prognosis if endarterectomy is necessary. To our knowledge, there is no prospective study of prevalence of peripheral arterial disease (PAD) in ischemic stroke.

Aim : The aim of the study was to evaluate the prevalence of PAD in consecutive ischemic stroke and TIA patients in a stroke unit.

Methodes : This study was conducted prospectively during 4 months. One hundred and forty eight patients, mean-age 67.2, were included. One hundred and eight patients had ischemic stroke (79.7%) and 30 (20.3%) had a TIA. We systematically clinically searched PAD signs, symptomatic or not, in these patients.

Results : Thirty fore patients (23%) had PAD signs. Eight patients ignored to have PAD. PAD was 2 times more frequent in patients with ischemic stroke presumed to be of atherosclerosis origin than in lacunar patients. Carotid stenosis $\geq 70\%$ was found in 17 patients (11.5%).

Discussion : This study shows that a quarter of patients with ischemic stroke patients in a stroke unit has PAD signs based on clinical data. PAD is probably underestimated in such patients.

Stroke in the young : the emergence of a new sub-population, the inter-gender. Difference and the pre-eminence of arteriopathies. S. BLECIC M.D., S. JEANGETTE M.D., A. DE WINDT M.D., B. LEGROS M.D., J.-Chr. BIER M.D., A. DUNAC M.D., J. HILDEBRAND M.D., Ph.D.

Background : Stroke frequency in young people is intimately linked to the upper age limit, that remains still unsettled. The aim of this study was to settle the upper age limit, based on stroke determinants and etiologies among different age categories.

Methods : From 1992 to 2000, 532 patients under 50 years old were prospectively studied. They were distributed into 3 groups according to age : under 35, from 35-44 and between 45 and 49 years old. Men and women were studied separately. They were compared to the 2547 patients aged over 50.

Results : A female predominance was observed before 45. Women frequently had venous stroke possibly due to the association of hormonal contraception and smoking while men had arterial stroke mostly due to drugs and traumatism. Dissections – traumatic in men and spontaneous in women – were the major findings before 45, atherosclerosis emerging thereafter. Coagulation anomalies were the second cause of stroke. Cardiac emboli were rare before 49, contrasting with the 27% frequency observed thereafter. A fatality rate of 4.7% was observed in the young, while 7.9% of our patients aged over 50 died within the first month.

Conclusions : The inter-gender differences observed, justifies analyzing men and women apart. The most frequent cause of stroke was arteriopathies. Although, stroke in the young ought to be restricted to patients of less than 35 years

old, patients up to 45 also belong to the young, the 45-49 population constituting by its characteristics a new sub-population different from both young and old patients.

Clinical outcome in 311 consecutive young adults (15-45 years) with ischemic stroke. D. LEYS, L. BANDU, H. HÉNON, C. LUCAS, F. MOUNIER-VEHIER, O. GODEFROY (Department of Neurology, Stroke Department, University of Lille, EA2691, Roger Salengro Hospital, F-59037 Lille, France. E-mail : dleys@chru-lille.fr).

Background : Information about the long-term outcome in young adults with ischemic stroke remains limited.

Aim of the study : We followed-up 311 consecutive young adults (15 to 45 years) with ischemic stroke admitted between 1992 and 1996.

Setting : Stroke Department of the Lille University Hospital.

Methods : Follow-up assessments were performed by means of clinical examinations, telephone interviews, review of medical records, and reports from relatives and general practitioners. Data about risk factors, associated disorders, causes of stroke, treatments, stroke recurrence, myocardial infarction, seizures, and deaths were collected, and the outcomes were classified with the modified Rankin scale (mRS).

Results : After a mean follow-up of 3 years, we found : (i) an annual mortality rate of 5.1% during the first year, then 1.8% ; (ii) a stroke recurrence rate of 3.2%, 40% of recurrences occurring during the first year ; (iii) a 0.3% annual rate of myocardial infarcts ; (iv) independency (mRS score = 0-2) in 86.2% of patients ; (v) that 5.3% of patients lost their work after stroke despite an apparent good recovery (mRS score = 0-1) ; and (vi) that 7.4% of patients reported divorce or separation.

Conclusions : This study, which included the largest cohort of young adults with ischemic stroke followed-up in a single center, suggests that ischemic strokes occurring in young patients have a good outcome in term of stroke recurrence, myocardial infarction and dependency. However, social and familial impairments are frequent event in patients without any handicap. The relationship between disability and return to work remains unclear and further research on the quality of life is necessary. Subtle neuropsychological and behavioral changes should be more systematically addressed to understand the reasons of such difficulties and to prevent them when possible.

Atrial electrophysiological study in unexplained cerebral ischemia. G. PICARD, S. CHEVALIER, P. JACQUERYE, M. DUPUIS.

Etiology of some strokes can not clearly identified despite extensive diagnostic procedures. Among them, silent atrial fibrillation remains probably significant cause of cerebral embolic event. Previous data indicate that some patients with unexplained cerebral ischemia (UCI) have atrial hypervulnerability. These studies showed abnormal electrophysiological parameters in a group of patients with AF and also in the group with unexplained ischemic stroke compared to a control group. In our population of unexplained strokes since november 98, a total of 52 consecutive patients with UCI (mean age 63 ± 12 years) underwent right atrial electrophysiological study, at least one month after stroke. Atrial were measured. APRE/A2 ratio < 2.5 is considered as a index of atrial hypervulnerability. We performed sequential atrial stimulation in order to induce AF. We compared APRE/A2 ratio to FA inducibility. APRE/A2 ratio was significantly lower in patients with unducible AF compared to non inducible due to shorter AERP et longer A2.

Conclusion : In a population of patients with UCI, atrial electrophysiological study shows parameters of atrial hypervulnerability correlated to inducible AF. The atrial electrophysiological exploration seems promising to identify subgroups of patients at low and high risk of silent paroxysmal AF. These findings could have implications for stroke prevention with antioagulopathy in the future.
