MOSSAKOWSKI M.J.

Postischemic encephalopathy – selected pathogenetic aspects.

Department of Neuropathology, Medical Research Centre, Polish Academy of Sciences, Warszawa, Poland

Postresuscitation encephalopathy, resulting from global cerebral ischemia due to cardiac arrest is known, first of all, from the anesthesiological literature. Despite of relatively rich bibliography of the subject, the pathogenetic mechanism(s) of this progressive pathological process remains unclear. To elucidate, at least, some of its aspects, a series of studies was undertaken on the model of experimental cardiac arrest in rats.

The morphological observations revealed, that individually variable structural tissue changes were of selective and progressing nature, and greatly evolving in histological pattern during postischemic observation period, ranging from several minutes to one year. Widespread nonspecific neuronal degeneration and neuronal loss, at first localized in selectively vulnerable brain regions, and than involving other cerebral areas, considered as ischemia-resistant, were the most striking pathological feature. In 20% of cases, generalized brain atrophy, more severely expressed in the cerebral cortex and subcortical white matter, was found. The appearance of the "antibrain" antibodies in the blood sera of experimental animals may be indicative of autoimmunological mechanism of generalized neuronal loss. This is supported by biphasic blood-brain barrier changes, appearing both immediately after ischemia and than during the first postischemic week.

Deep abnormalities in the morphology of brain microvessel system present both in early and late postischemic stages are clearly pointing out to importance of local vascular factors in the development of the brain damage. The same role, although limited to the early postischemic period, may be attributed to disturbed balance between excitatory and inhibitory neurotransmitter systems.

During the whole observation period a tendency for intravascular thrombocyte aggregation was found. In some cases single platelets were observed in extravascular location. This tendency indicative of permanently disturbed endothelium-thrombocyte relations, may point out to microthrombi formation, operating also in late postischemic period.

NICHTWEISS M.

Etiology in juvenile infarction – the neuroradiological contribution

Department of Neuroradiology, JWG University Frankfurt, Germany

Apart from the ability of imaging procedures to define pathologies mimicking ischemic infarction and to solve topical problems, it is the impact on classification which is of major interest in the young. Obvious reasons for that are the broadness of the etiological spectrum (with the demand of special therapeutic measures in individual cases) and raised life expectancy in this special subgroup of stroke patients.

Personal experience is presented which covers more than 160 patients (<45 y), 95% of them being angiographed either conventionally or by DSA.

In 100 consecutive patients who were followed up, nearly 30% had an embolic infarction as defined by CT/MRI ("territorial" or large ganglionic infarction) despite a source of embolism could not be established after full cardiological and angiographical work up. Detection of the embolus depends strongly on the timing of angiography, being probable only during a few hours after the event. In this group, the recurrence rate was 0. Because embolism was observed as a complication of pneumonia and pulmonary AVM, the search for sources of emboli may include the pulmonary vessels, depending on findings of chest views.

Small, deeply located thalamic infarcts were seen not only together with typical risk factors for small vessel disease (hypertension/diabetes), but were caused also by migraine, embolism and arteritis. Dissection in C1/M1 (3 patients) and circumsript stenosis of M1 represented atypical causes of large ganglionic infarction and were detected angiographically.

In cases of migrainous infarction as identified by CT/MRI (12 patients), hemianopsia and all the motor and sensory deficits, even aphasia could be attributed exclusively to lesions in the supply area of the posterior cerebral artery (cortical, thalamic, capsular). The angiograms, if done early showed either proximal occlusion, or a unique finding, resembling the string of beads pattern with circumsript widenings and constrictions in the proximal course of the vessel.

There were several cases of embolism in whom the source in course of the internal carotid artery could not be detected by ultrasound examination. The etiologies were: dissection, aneurysm (with fibromuscular dysplasia and recurrent tonsillitis, respectively), arteritis (presumed, in C2 and transmitted from the tonsillar niche, respectively).

In four cases, which were not be classified despite numerous diagnostic measures and relapsing course, arteritis could be diagnosed unequivocally based on angiographic findings (widespread constrictions and widenings in middle sized arteries).

Conclusions:

1. Angiography seems to be dispensable only in cases of a. bad condition, b. proven emboligenic heart disease, c. lacunar stroke in the presence of longstanding diabetes and/or hypertension, d. typical migrainous infarction.
2. There are much more embolic infarctions, than well-established sources of emboli.
3. The yield of MR angiography remains unsettled yet, but in some cases lesion characterization is sufficient (in personal experience: 3 D time of flight after administration of Gd-DTPA).

PLUTA R.[1], KIDA E.[1], LOSSINSKY A.S.[2], WIŚNIEWSKI H.M.[2], MOSSAKOWSKI M.J.[1]

Accumulation of Alzheimer's β-amyloid protein precursor in rat brain after cardiac arrest-induced complete cerebral ischemia

[1] Department of Neuropathology, Medical Research Centre, Polish Academy of Sciences, Warszawa, Poland; [2] NYS Institute for Basic Research in Developmental Disabilities, Department of Pathological Neurobiology, Laboratory of Experimental Neuropathology, Staten Island N.Y., USA

Extracellular β-amyloid deposition in the brain is a common feature of the pathological lesions in Alzheimer's disease (AD). We used various antibodies to the ß-amyloid protein precursor (APP) of AD to study changes in the extracellular distribution of APP in experimental ischemic brain injury. Rats underwent 10 min of global cerebral ischemia, with survival time up to 7 days. The APP-immunoreactivity was observed not only intracellularly, within neuronal cells and, less often, glial cells, but also extracellularly, in the perivascular areas. Perivascular APP deposits formed irregular, often asymmetric, well-delineated areas, which were usually located close to the blood vessels, predominantly capillaries. Only rarely did these deposits encircle blood vessels, forming round, perivascular cuffs. Neuropil alterations were more advanced in the rats with concomitant extracellular APP deposits.

Extracellular accumulation of APP occurred frequently in the hippocampus, cerebral and cerebellar cortex, basal ganglia and thalamus and rarely in the brain stem. Localization of deposits close to or around the blood vessels, predominantly capillaries, might suggest their vascular origin, caused by blood-brain barrier (BBB) changes. The BBB which is interposed between blood and brain parenchyma seems to possess the capability to control blood-to-brain transport of APP and/or β-amyloid. Factors (i.e. ischemia) which influence these transport may be critical for the development of AD pathology. The present study implies that the precursor for the β-amyloid in AD can originate from the circulation.

PNIEWSKI J., KWIECIŃSKI H., TORBICKI A., MIESZKOWSKI J.

Ischemic stroke in young adults

Department of Neurology, School of Medicine, Warszawa, Poland

We examined 57 patients aged 18-45 years (mean 37) with the diagnosis of ischemic stroke (n=46) or TIA (n=11) by means of CT, transesophageal echocardiography, Doppler ultrasonography, and angiography in order to establish the cause of ischemic event.

In 16 (28%) patients the pathology (occlusion or stenosis) within carotid arteries, which could be responsible for ischemic event, was shown. That group was classified as stroke of vascular origin. In 5 (9%) patients the abnormalities within the heart (mitral stenosis, bacterial endocarditis and acute myocardial infarction) were found. This group, in whom no evidence for vascular pathology was found, was classified as cardioembolic stroke. In 14 (25%) patients mitral valve prolapse (MVP) and in 13 (23%) patent foramen ovale (PFO) were found. In 23 (40%) patients PFO or MVP was the only detectable abnormality and they were classified as having possible cardioembolic stroke. In 13 (23%) patients no abnormalities that could be responsible for ischemic event were detected and they were diagnosed as stroke of undetermined origin.

We have shown in this study, that potential cardiac sources of ischemic stroke are detectable in 50% of patients. Our data confirm, that cardiogenic embolism is one of the most important mechanisms of stroke in young adults.

RINGELSTEIN E.B., ZUNKER P.

Primary and secondary prevention of ischemic stroke

Department of Neurology, Westfalian Wilhelmus-University, Munster, Germany

Primary prevention refers to prophylaxis of strokes before any event had occurred. A major issue is the intervention against vascular risk factors. The risk of stroke is increased 2.5 – 6.3 fold in hypertension, 1.9 – 3.4 fold by smoking and 1.5 – 2.5 fold by elevated hematocrit, and bodyweight. Another approach is anticoagulation in patients with atrial fibrillation. The risk of stroke per year is 2% in lone atrial fibrillation but up to 17% with concomitant hypertension, congestive cardiac failure, preceding embolism and intracavitary thrombus. The BAATAF study demonstrated a 6-fold reduction of the risk of cerebral embolism with low-dose coumarin therapy.

Secondary prevention refers to attempts to avoid repeated strokes after TIA or stroke. In patients with acute strokes due to cardiac embolism, therapeutic heparinization within the first 2-3 weeks is advisable. In the chronic phase, either surgical removal of the sources of embolism is necessary (carotid endarterectomy, rarely cardiac surgery), or platelet inhibiting agents (ASS, Ticlopidine) are the strategy of choice. With respect to efficacy, Ticlopidine is superior to ASS. However, a 1% risk of leukopenia has to be considered.

The above approaches are powerful tool in fighting ischemic stroke with all its devastating consequences.

ROSNOWSKA M., SOBCZYK W., CENDROWSKI W.

CSF leukotrienes in vascular dementia

Institute of Psychiatry and Neurology, Out-Patients Clinic, Warszawa, Poland

Vascular dementia (VAD) has diverse etiology including atherosclerosis, hypertension, microemboli (multiinfarcts) or inflammatory changes (vasculitis). Alterations of lipid metabolism in VAD show changes in concentrations of serum LDL-cholesterol, HDL-cholesterol, triglycerides and fatty acids. It was thought worthwhile to study two leukotrienes LTB_4 and LTC_4 in the CSF of elderly patients with VAD. Both leukotrienes were examined in CSF by sensitive radioimmunological assay (RIA). Estimations were carried out in 6 patients with VAD and in 6 patients with tension headache. CSF concentrations of LTB_4 and LTC_4 were found to be normal in patients with VAD showing 69.1 ± 2.2 pg/ml and 63.0 ± 2.9 pg/ml. They did not differ significantly from CSF concentration ranging 72.7 ± 2.8 pg/ml and 64.5 ± 8.2 pg/ml in patients with tension headache.

Although concentrations of CSF LTB_4 and LTC_4 in atherosclerotic dementia are in normal ranges, they may increase in dementia originating from cerebral vasculitis.

ROSSA C.

The value of brain electrical activity mapping as a method of investigation of vascular dementia

Hospital of Nervous and Mental Diseases, Cibórz, Poland

The introduction of mapping EEG technique gives us new possibilities of investigation of brain function. Quantitative evaluation is especially helpful when diffuse brain damage is studied and making a map of such events facilitates visual perception. Cerebrovascular diseases belong to the most common causes of dementia. In this report 43 subjects were evaluated as demented using standardized MMSE together with MSQ and SPMSQ. After diagnosis of vascular dementia according to DSM-IIIR requirements the group were divided into three subgroups conformable to progression of disorders. In these subjects and in 26 persons from control group range 60-80 years, mapping EEG was made by means the FFT system using Neuroscan Plus program accessible in Poland. There were assessed individual and group maps of electrical activity in the domain of delta (0.5-3 Hz), theta (3.5-7 Hz), alpha (7.5-13 Hz), beta 1 (13-21 Hz), and beta 2 (21-32 Hz) and parts of these bands as well as indices α/γ), α-ß/δ-γ, $\alpha 2/\alpha 1$, $\gamma 2/\gamma 1$. The mapping EEG showed changes in all bands and indices in succeeding degrees of dementia. The more progression of dementia the more differences between subjects and control group.