

diastolic (ED) velocity (EDV, v2), and ED time (EDT, t2). Using these parameters the following were calculated: the systolic upstroke acceleration;  $SA = (PSV-EDV)/(PST-EDT)$ , mean flow velocity;  $MFV = (PSV-EDV)/3+EDV$ , and the Gosling index of pulsatility;  $PI = (PSV-EDV)/MFV$ . Dynamic vascular analysis (DVA™) provided the Dynamic Compliance Index ( $DCI^{TM} = \ln SA/MFV$ ) was calculated for all carotid segments. Linear regression was used to test for the association between total  $DCI^{TM}$  and total IMT as well as for segmental  $DCI^{TM}$  and IMT at each corresponding CCA and ICA segment.

**Results:** The mean  $DCI^{TM}$  was  $0.20 \pm 0.05$  (range: 0.13-0.330).  $DCI^{TM}$  in the left CCA was  $0.18 \pm 0.05$ , in the right  $0.20 \pm 0.06$ , in the left ICA  $0.18 \pm 0.04$ , and in the right ICA  $0.19 \pm 0.063$ .  $DCI^{TM}$  was significantly associated with age (parameter estimate, p.e per each year: 0.03,  $P < 0.01$ ) and cholesterol (p.e. per each cholesterol unit: -0.001,  $P < 0.05$ ). The associations with other traditional risk factors were not substantial, most likely due to the smaller sample size. Mean total carotid IMT was  $0.83 \pm 0.14$  mm (mean total IMT in CCA was  $1.22 \pm 0.16$  mm, and in ICA  $1.44 \pm 0.22$  mm). A considerable positive association between the total  $DCI^{TM}$  and total IMT was observed (parameter estimate, p.e. per each unit of IMT: 1.03,  $p < 0.05$ ). In a stratified analysis by age, this association was statistically significant among those older than 70 years (p.e. age adjusted: -0.02,  $P < 0.05$ ) and non significant among those younger than 70 years (p.e. age adjusted: 0.01, ns). The strongest association between  $DCI^{TM}$  and IMT was observed in the right CCA (p.e.: 1.11,  $P < 0.05$ ), and between  $DCI^{TM}$  in the right CCA and the total IMT (p.e.: 1.07,  $p < 0.05$ ). A considerable correlation between  $DCI^{TM}$  and Young's Elastic Modulus E was observed (Pearson  $r = 0.26$  ( $p < 0.05$ )).

**Discussion and Conclusion:** In this cohort, functional ( $DCI^{TM}$ ) and structural arterial wall properties (IMT) are correlated. Greater associations are observed in the CCA and among older individuals. The association of greater IMT with increasing  $DCI^{TM}$  in subjects under the age of 70 suggests increasing compliance with increased thickness. The inverse association between  $DCI^{TM}$  with IMT among those over the age of 70 suggests stiffening with age. The findings in this cohort suggest an increasing IMT with more elastic components that are replaced with less elastic components with age. A strong positive correlation between  $DCI^{TM}$  and Young's Elastic Modulus also suggests that  $DCI^{TM}$  may be a useful and simple measure of arterial compliance. Comprehensive carotid imaging studies should include an estimation of IMT as well as  $DCI^{TM}$ . The combination offers additional physiological information and may prove to be a better indicator of the global vascular risk.

### 018

#### The intracerebral venous system: a neurosonological study with TCCD

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The approach with TCCD-method of the intracerebral venous system is surely a recent application of the neurosonological study of the venous pathology. In fact using the B-mode imaging we can see the vessels with certainty and we can position the sample volume under ecographic control: in this way we have assured documentations of the patency of the venous vessels. The most frequently detectable venous structures are: Deep middle cerebral vein, Vein of Rosenthal, Vein of Galen, Sfenoparietal sinus, Straight sinus, Transvers sinus, Superior petrosal sinus, Inferior petrosal sinus, Sigmoid sinus. The visualization of the venous system is correlated to the age of the patients. Baumgartner (1) and Stolz (2) bring a good percentage of insonation. In more elderly patients the use of ultrasound contrast agents (Sonovue) allows us to be able to easily overcome the obstacle of the cranial bone. The frequent detection of venous vessels with pulsated flows (sonological pattern "arterial-like"), haven't previously to be considered as pathological because it constitutes instead an physiological element particularly in the zones of vascular crossroad (Torcular of Herophilus etc.). The insonation of the Basilar vein of Rosenthal is easy and the presence of inverted flow in P2 segment is a very important element for the diagnosis of straight sinus thrombosis. In the study of the posterior circle it is always necessary to consider the principals points of repere (protuberantia occipitalis interna etc.). In the study of the straight sinus it is also necessary to use an insonation's plan among the protuberantia occipitalis interna and the free edge of the tentorium. Valsalva Manoeuvre can clarify the venous origin of the vessels, and can give us indirect information of possible present obstacles. The posterior (occipital) approach is surely to prefer in case of insonation of the inferior petrosal sinus: in this case we can see the flow of the basilar artery and a venous flow directed toward the probe. The insonation of the sigmoid sinus is important in case of pseudotumor cerebri ("Idiopathic Intracranial Hypertension") and chronic daily headache (3-4).

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## 019

### Prognostic relevance of carotid disease in cardiopulmonary bypass surgery and the importance of an exhausted cerebrovascular reserve capacity

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**Background:** Carotid stenosis in cardiopulmonary bypass surgery (CPBS) is linked to an increased stroke risk. We aimed to assess this risk in relation to the degree of stenosis and whether stenosis related haemodynamic compromise predicts perioperative stroke.

**Methods:** 2809 of 7120 (39.5%) patients (pts) who underwent CPBS between Jan 1996 and Oct 2005 had carotid duplex before surgery (73.3% coronary artery bypass graft, 14.1% valve repair, 12.6% both). Transcranial Doppler with carbon dioxide testing for cerebrovascular reserve capacity was performed in all pts with high-grade stenosis ( $\geq$  80% local diameter reduction) and occlusion. 12 pts underwent synchronous carotid endarterectomy and were excluded from further analyses.

**Results:** 2.2% of pts had (bilateral) occlusion, 4% high-grade (0.6% bilaterally or with contralateral occlusion), 12.6% medium-grade (0.9% with contralateral occlusion), 81.1% low-grade/no stenosis. Reserve capacity was found exhausted in 11 (0.4%) pts distal to 9 occlusions and 2 high-grade stenoses. 2.4% of pts suffered an ischemic stroke. Stroke occurred distal to an occluded, high-grade, medium-grade and low-grade/not stenosed artery in 5.7, 0.8, 1.3, and 0.9%, respectively. When arteries with exhausted reserve capacity were considered as a separate category, corresponding percentages were 27.3, 1.3 (occlusion), 0 (high-grade), 1.3 (medium-grade), and 0.9 (low-grade/no stenosis). An exhausted reserve capacity was the strongest of all selected predictors for an ischemic stroke (adjusted hazard ratio 20.6, 95% CI 4.7-90.8;  $p < 0.001$ ; adjusted for sex, age, prior cardiac surgery, prior (ipsilateral) stroke, peripheral arterial disease, and atrial fibrillation).

**Conclusion:** An exhausted reserve capacity distal to high-grade carotid stenosis/occlusion is infrequent in pts undergoing CPBS. Doppler carbon dioxide testing can be used to identify pts, who have an increased stroke risk at CPBS from carotid stenosis/occlusion.

## 020

### Imaging in Parkinson's Disease

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Advances in neuroimaging have greatly contributed to diagnose early Parkinson's disease. While MRI is most useful to detect signal changes

or outside substantia nigra that identify related degenerative disorders such as multiple system atrophy or progressive supranuclear palsy, nuclear medicine techniques such as Positron-Emission-Tomography (PET) or Single Photon Emission Computed Tomography (SPECT) have enabled to quantify molecules specifically expressed on dopaminergic nerve terminals reflecting the number of dopaminergic neurons. In vivo imaging data correlate well with post mortem stereological cell counts in normal and Parkinsonian non-human primates. In addition, imaging of dopaminergic nerve terminals correlates well with the severity of disease measured by Hoehn and Yahr stage or duration of disease. Current research has shifted to determine the role of related neurotransmitter systems in the pathophysiology of Parkinson's disease.

## 021

### Efficacy of sonothrombolysis versus sonothrombolysis in recanalization of intracranial arteries

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**Objective:** Transcranial Doppler (TCD) monitoring has a potential effect on acceleration of intracranial arteries recanalization in combination with tPA (sonothrombolysis, S-lysis) or alone (sonothrombolysis, S-tripsy). The aim was to compare an efficacy of S-lysis and S-tripsy in recanalization of middle cerebral artery (MCA) occlusions in acute stroke patients.

**Methods:** The set consists of 88 patients with acute M1- or M2-MCA occlusion admitted to 3 hospitals in the years 2002-2005. Subgroup 1 patients (24 patients, 5 males, mean age 58.7 $\pm$ 12.9 years, median NIHSS 17 $\pm$ 5.1, 18 M1-MCA occlusions) were treated using S-lysis within 3 hours after stroke onset. Subgroup 2 patients (62 patients, 41 males, mean age 62.9 $\pm$ 12.5 years, median NIHSS 14 $\pm$ 5.7, 44 M1-MCA occlusions) were treated using TCD S-tripsy alone within 10 hours after stroke onset. Diagnostic TCD was performed at admission, 1 hour after therapy start, 6 (optional) and 24 hours after stroke onset. TCD results were evaluated as occluded artery, partial or complete recanalization.

**Results:** Complete/partial recanalizations 1 hour after therapy start were detected in 42%/25% of Subgroup 1 patients and 26%/56% of Subgroup 2 patients ( $p > 0.05$ ). Six, resp. 24 hours after stroke onset, complete recanalization was detected in 61%, resp. 71% of Subgroup 1 patients and in 52%, resp. 65% of Subgroup 2 patients ( $p > 0.05$ ). Symptomatic intracerebral haemorrhage occurred in 1 patient (4%) in Subgroup 1 and 1 patient (2%) in subgroup 2. 50% patients in Subgroup 1 and 44% patients in Subgroup 2 were independent (mRS 0-2) at day 90 ( $p > 0.05$ ). Recanalization was not dependent on age, time to therapy or echocontrast use (ANOVA test).

**Conclusions:** Patients treated by S-lysis had non-significantly higher