cholesterol levels were defined as <5 mmol/L and LDL-cholesterol levels as <3 mmol/L and were examined among patients with cerebral infarction (n = 126).

Results: At follow-up 16 months after stroke, 13 (9%) persons were underweight vs. 24 (17%) at ten years (p = 0.019), but there was no significant difference in proportion of patients with overweight, 73 (50%) vs. 68 (47%). All with underweight were ≥70 years (mean age 84 years) at ten years. At 10 years after stroke, 74 (59%) of the 126 patients with cerebral infarction were on treatment with statins and 59 (80%) of these had satisfactory total-cholesterol as well as LDL-cholesterol levels. However, among the 52 (41%) not on statin treatment, 28 (54%) patients had total-cholesterol ≥5 mmol/L and 31 (60%) LDL-cholesterol ≥3 mmol/L at ten years.

Conclusion: Nutritional status may change over time in stroke patients and particularly elderly are at risk of underweight. There is a clear potential to improve treatment of cholesterol levels among long-term stroke survivors.

AS16-084

RISK FACTORS FOR STROKE

SIDEDNESS OF CAROTID ARTERY STENOSIS AND BRAIN VOLUME LOSS IN THE LEFT AND RIGHT HEMISPHERE: THE SMART-MR STUDY

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Background and Aims: Previous studies found an association between carotid stenosis degree and progression of brain atrophy, however no study reported on the relationship between sidedness of carotid stenosis and brain volume (BV) in the left and right hemispheres. We assessed the association between carotid stenosis side and changes in cerebral hemispheric volumes in patients with vascular disease.

Method: Within the SMART-MR study 1.5 tesla MRI was performed in 1232 patients at baseline (mean age 58 ± 10 years) and 663 after 4 years of follow-up. Carotid artery stenosis duplex measurements were performed at baseline and stenosis was defined at the cutpoint of 70%. Using ANCOVA mean volume at baseline and mean change in volume between baseline and follow-up of the left and right hemisphere was estimated across 4 groups: no stenosis; left-sided stenosis only; right-sided stenosis only; bilateral stenosis adjusting for age and sex.

Results: Cross-sectionally, participants with left-sided stenosis had a significantly smaller volume of the left, but not the right hemisphere compared to participants without stenosis. Right-sided stenosis was associated with smaller volumes of both hemispheres (Figure 1).

Longitudinally, a significant decrease in volume of both hemispheres was found in participants with right-sided stenosis, but not in participants with left-sided stenosis (Figure 2).

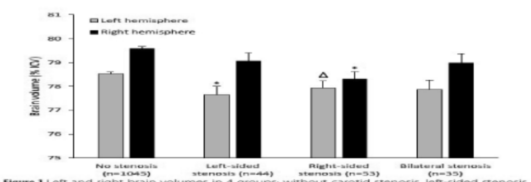

Figure 1 Left and right brain volumes in 4 groups: without carotid stenosis, left-sided stenosis, right-sided stenosis and bilateral stenosis. Bars represent mean (standard error) BV as % ICV. * p < 0.05 for difference in BV compared to corresponding hemisphere of the group without carotid stenosis (mean difference left hemisphere in left-sided stenosis -0.86 %ICV; 95% CI -1.55 to -0.17, right hemisphere in right-sided stenosis -1.28 %ICV; 95% CI -1.90 to -0.67). Δp = 0.06 for difference in BV compared to the left hemisphere of the group without carotid stenosis (mean difference -0.60 %ICV; 95% CI -1.22 to 0.03). ICV = intracranial volume.

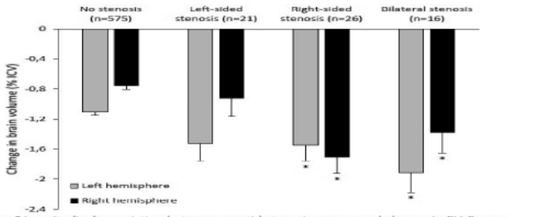

Figure 2 Longitudinal association between carotid stenosis groups and change in BV. Bars represent mean (standard error) change in BV as % ICV after a mean 3.9 years of follow-up. * p < 0.05 for decrease in BV compared to corresponding hemisphere of the group without carotid stenosis (mean difference left hemisphere in right-sided stenosis -0.45 %ICV; 95% CI -0.86 to -0.03, right hemisphere in right-sided stenosis -0.95 %ICV; 95% CI -1.37 to -0.53, left hemisphere in bilateral stenosis -0.81 %ICV; 95% CI -1.36 to -0.29, right hemisphere in bilateral stenosis -0.62 %ICV; 95% CI -1.16 to -0.09). ICV = intracranial volume.

Conclusion: Right-sided stenosis, as opposed to left-sided stenosis, resulted in a smaller BV in both hemispheres and a faster decrease in BV of both hemispheres. Future studies should investigate whether other factors may explain this association or whether brain hemispheres have a different vulnerability to the effects of aging.

AS16-085

RISK FACTORS FOR STROKE

PRELIMINARY RESULTS OF STROKE RISK FACTORS SURVEY BASED ON STROKE RISKOMETER APP IN RUSSIA

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Background and Aims: Stroke Riskometer App is a new tool for stroke risk calculation. Additionally there is a feature which allows anyone to participate in epidemiological survey.

Method: Stroke Riskometer was presented for the first time on national health related TV show. After this It was downloaded from the app stores about 30.000 times and 3210 users decided to participate the survey. Using the App they answered 20 questions, accepted Participant Consent Form and sent their data to research database

Results: The data of 1478 men and 1732 women mean age 42 were obtained and analized.

Table 1

	Men n, % (95% CI)	Women % (95% CI)
Smoking	433, 29 (27-32)	328, 19 (17-21)
Alcohol abuse	252, 18 (16-20)	125, 7 (6-8)
Low fruit and veg. diet	1178, 80 (78-82)	1377, 79 (77-81)
Low phys. activity	772, 52 (50-55)	1095, 63 (61-65)
Psychoemotional stress	923, 63 (60-65)	1245, 72 (70-74)
BMI > 30	562, 38 (36-40)	476, 27 (25-30)
Cardiovascular dis. family history	395, 27 (25-29)	516, 30 (28-32)

Table 2

	Men % (95% CI)	Women % (95% CI)

(continued)

Continued

	Men % (95% CI)	Women % (95% CI)
Arterial hypertension (SBP > 140)	271, 18 (16-20)	156, 9 (8-10)
Diabetes	95, 6 (5-8)	77, 4 (3-6)
Coronary heart disease	149, 10 (9-12)	119, 7 (6-8)
Left ventricular hypertrophy	233, 16 (14-18)	201, 12 (10-13)
Dementia	26, 2 (1-3)	31, 2 (1-3)
History of stroke or TIA	67, 4 (3-6)	63, 4 (3-7)

Conclusion: Smartphone based technology is a new feasible method for epidemiological surveys.

AS27-001

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

SERUM CADMIUM LEVEL IS POSITIVELY ASSOCIATED WITH INTRACRANIAL NONRUPTURED ANEURYSM INCIDENCE

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Background and Aims: Cadmium and arsenic are toxic elements abundant in cigarette smoking, drinking water and contaminated food. They are known to be associated with cerebrovascular diseases, although little is known if they contribute to the occurrence of cerebral aneurysm. Observational studies have revealed smoking is related to atherosclerosis and aneurysmal ruputures. We hypothesized cadmium and arsenic positively correlated intracranial cerebral aneurysm formation.
Method: We retrospectively analyzed medical records of patients who head headache and underwent brain magnetic resonance angiography (MRA) or computed tomography angiography (CTA) in our center between March 2014 and August 2016. Patient group was defined as aneurismal dilatation. We used whole blood for cadmium and random urine for arsenic respectively. Student's t-test was used to compare mean cadmium and arsenic level between patient and control group. Multivariate logistic regression analysis was used to identify risk factors of intracranial unruptured aneurysm incidence.
Results: Total number of enrolled patient was 415. Two hundred and two persons were patients and the other 213 persons were control. There was statistically significant difference in smoking between patient and control groups. (Table 1) Cadmium only showed statistically significant difference between patient and control groups. (Cadmium, patient 1.85 ± 0.12, control 0.87 ± 0.21 $p = 0.031$; Arsenic, patient 67.4 ± 23.5, control 62.2 ± 18.3 $p = 0.271$) (Table 2). Multivariate regression analysis showed that smoking (odds ratio [OR], 1.48; 95% confidence interval [CI], 1.06–2.33) and cadmium (OR, 1.39; 95% CI, 1.15–1.84) were independently associated with intracranial unruptured aneurysm incidence. (Table not shown)

Table 1. Patient Characteristics

Non ruptured cerebral aneurysm (number)	Patient (202)	Control (213)	P value
Sex (M:F)	57:145	68:145	0.104
Age (mean±STD)	65.01±11.13	63.47±12.81	0.853
Smoker:never smoker (ratio)	**153:49 (3.12)**	**121:92 (1.31)**	**0.041**
Hypertension	138:64	143:70	0.436
Diabets Mellitus	82:120	92:121	0.138
LDL cholesterol	145.38± 28.17	148.24±30.02	0.822
HDL cholesterol	45.74± 8.75	49.16± 9.92	0.623

Table 2. Cadmium and Arsenic levels between patient and control groups

	Aneurysm(+)	Aneurysm (-)	P value
Cadmium (ug/L)	**1.85±0.12**	0.87±0.21	0.031
Arsenic (ug/L)	**67.4±23.5**	62.2±18.3	0.271

Conclusion: The present study showed cadmium level is positively associated with cerebral aneurysm incidence.

AS27-003

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

15-YEAR EXPERIENCE OF BYPASS SURGERY FOR COMPLEX INTRACRANIAL ANEURYSMS AT A SINGLE INSTITUTION

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Background and Aims: Bypass surgery is a treatment option for complex intracranial aneurysms. We aimed to determine the utility of bypass surgery for the treatment of complex intracranial aneurysms.
Method: Sixty-two patients with a mean age of 46.7 ± 14.8 years (range, 18–77 years) were included in this retrospective study. Unruptured aneurysms were dominant ($n = 50$, 80.6%), and the internal carotid artery was the most common location of the aneurysm (35 patients; 56.4%), followed by the middle cerebral artery (12 patients; 19.4%). The mean maximal diameter of the aneurysms was 20.5 ± 11.4 mm (range, 2–40 mm). The clinical and angiographic status was evaluated preoperatively, immediately after surgery (within 3 days) and at the last follow-up. The mean angiographic and clinical follow-up durations were 34.2 ± 38.9 months (range, 1–151 months) and 46.5 ± 42.5 months (range, 1–161 months), respectively.
Results: Sixty-one patients (98.3%) underwent extracranial-intracranial bypass, and 1 underwent intracranial-intracranial bypass. At the last follow-up angiography, 58 aneurysms (93.5%) were completely obliterated and 4 were incompletely obliterated, with a graft patency of 90.3% ($n = 56$). Surgical mortality was zero, and morbidity was 14.5% ($n = 9$) including permanent morbidity of 8.1% ($n = 5$). A good clinical outcome (Karnofsky Performance Scale ≥ 70 and modified Rankin Scale score ≤ 2) was achieved in 91.9% of patients ($n = 57$).
Conclusion: With a proper selection of bypass type,bypass-associated treatment can be a good alternative for patients with complex intracranial aneurysms when conventional microsurgical clipping or endovascular intervention is not feasible.