Cerebral perfusion monitoring the brain and control of embolic foci absence by CT perfusion and MRI in endovascular treatment of patients with multifocal stenotic and occlusive lesions of the cerebral arteries

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Ukraine, DNIPRO
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Disclosure

Speaker name: Cherednychenko Yurii

I have the following potential conflicts of interest to report:

- [ ] Consulting
- [ ] Employment in industry
- [ ] Stockholder of a healthcare company
- [ ] Owner of a healthcare company
- [ ] Other(s)

- [x] I do not have any potential conflict of interest
Materials and methods

• **125 patients** with multifocal stenotic and occlusion lesions of cerebral arteries were operated by endovascular methods with dynamic CT-perfusion and MRI control.

• CT-perfusiography and MRI of the brain (FLAIR and DWI) were performed before endovascular treatment and after each endovascular session.
Materials and methods

• The choice of sequence, staging and capacity of endovascular treatment of this group of patients depend on changes in cerebral perfusion discovered by CT perfusiography.

• Presence or absence of ischemic embolic foci evaluated based on MRI DWI and thus the effectiveness of intraoperative antiembolic protection were evaluated.
Case 1: woman, 59 y.o.

- Smoker for 40 years
- Diabetes II type
- Arterial hypertension
- Systolic AP on the right radial artery is 40 mmHg lower than on the left one
- Ischemia III of the left lower extremity
- Drop attacks
- Coordination disorder
- Memory disorder
Subtractional angiography of cerebral arteries of terminal part of aorta and lower extremities

- Occlusion of the right internal carotid artery, right subclavian artery, steal-syndrom
- Stenosis with exulcerosis of left subclavian artery, occlusion of left vertebral artery, steal-syndrom
- Stenosis of left iliac and common femoral arteries
- Left carotid artery occlusion
CT-perfusiography of brain (12.08.14)

cbf – cerebral blood flow
cbv - cerebral blood volume
MTT - mean transit time
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Endovascular treatment
First session (15.08.14)

Stenting of the stenosis of left iliac and common femoral arteries

Stenting of the stenosis of left subclavian artery

Recanalisation and stenting of the right subclavian artery occlusion
Angiography series after operation
second CT-perfusigraphy of brain 26.08.14
VS
first CT-perfusigraphy of brain 12.08.14

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After treatment

- Regression of the coordination and memory disorders
- Regression of the symptoms of lower extremity ischemia
- No more drop attacks
- Parameters of CBF significantly increased in ROIs, where they were critically low before operation

Endovascular treatment in first session volume is effective and sufficient
Case 2:  man , 52 y.o.

- Smoker for 37 years
- Arterial hypertension
- 1 month after ischemic stroke in the left carotid basin
MRI DWI Isotropic (before surgery)
Carotid stenting (Carotid Wallstent) with combination of proximal and distal cerebral protection (Cello 9F +SpiderFX)
And direct stenting with anchor technique of ostium stenosis of the right VA (in one session)
MRI DWI Isotropic
(in 2 days after first session of endovascular treatment)
Second endovascular session: Carotid stenting with distal cerebral protection SpiderFX
(21 day after first endovascular session)
Stenting in C4 segment of the right ICA without cerebral protection (stent Wingspan)
MRI DWI Isotropic
(in 2 days after second session of endovascular treatment)

«Fresh» embolic microfoci
(without any clinical manifestations)
Results and discussion

• The degree of perfusion deficit has been decreased by 1 - 2 grades at the end of the endovascular treatment in all cases.

• Subclinical microembolic ischemia (from 1 to 3 foci) was verified in 4.8% of cases (further estimating of characteristics of plaques and anatomical features in these cases allowed to optimize the selection of cerebral protection method)

• Good functional outcomes were in 90.4% cases

• The postoperative mortality level — 0%.
Conclusions

The usage of dynamic CT-brain perfusion control and MRI DWI control make endovascular treatment of patients with multifocal stenotic and occlusive lesions of the cerebaral artery more controlled and safe.
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