Periprocedural neurologic complications: How to manage?

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Neurologic complications during CAS: What to do?

- **Neurologic evaluation** of kind (coma, side ecc.) and severity (NIHSS) of symptoms.
- Try to find **cause of symptoms** (vessel occlusion, embolization, hypotension, hemorrhage).
- Have a **close look** to the carotid angiography and perform intracranial angiography.
- **Control** blood pressure, ACT, ECG, etc.
- If angio normal complete procedure and perform directly CT scan.
Be humble!
Call Neurologist!
Call local stroke team or neuroradiologist!
Causes of neurologic complications during CAS:

- Vessel occlusion
- Embolization
- Hemorrhage
- Hyperperfusion
Causes of neurologic complications during CAS:

- Vessel occlusion: dissection, thrombosis
- Embolization
- Hemorrhage
- Hyperperfusion
Dissections

- Linear
- RCCA
- LCCA
- Spiral
- LCCA
- CCA
- ICA
Treatment of iatrogenic dissection of the LCCA with stenting
Filter occlusion

- Aspirate (using a catheter) before filter removal
Acute stent Thrombosis

1. Aspiration
2. Intra-arterial rtPA
3. Surgical removal

Prevention: Prepare patients with double antiplatelet treatment
Acute stent Thrombosis

Courtesy C. Setacci
Neurologic complications during CAS:

- Vessel occlusion
- Embolization
- Hemorrhage
- Hyperperfusion
Plaque prolapse, fibrous cap rupture or cheese grater effect

To prevent embolization from plaque prolapse:
- Have a close look at final angio. If you detect prolaps evaluate second stent
- Use mesh stents
Large Vessel Embolization
M1/M2

ICA
ECA
CCA
Cardioembolic Stroke

Occlusion of left, middle cerebral artery,

TIME to needle: 0 minutes

Following reopening
Build the tower of power

Long sheath. Evaluate advancement into ICC through stent; evaluate exchange to NeuroMax (6F 0.88” 105 or 125 cm) without losing wire.
‘Tower of Power’

Aspiration catheter (5 Max ACE 0.68-64”).

Long sheath
‘Tower of Power’

Micro catheter (150-160cm 2.95-2.6 F) to support wires and allow contrast check or use retrieval devices.

Aspiration catheter

Long sheath
‘Tower of Power’

0.014” neuro - wire
To cross occlusion and seek distal vessel.

Micro catheter

Reperfusion catheter
(5 Max ACE 0.68-64”)

Long sheath
(Neuron Max 6F 0.88”
105 or 125 cm)
Endovascular treatment

Neuron MAX 088 long sheath,
5MAX ACE 64 reperfusion catheter,
Velocity microcatheter
Transend EX 0.014 guidewire

After thrombus aspiraton
Neurologic complications during CAS:

- Vessel occlusion
- Embolization
- **Hemorrhage**
- Hyperperfusion
Intracranial Hemorrhage

Vessel perforation from distal wire.
Reverse heparin. Control BP. Perform CT
Neurologic complications during CAS:

- Vessel occlusion
- Embolization
- Hemorrhage
- Hyperperfusion
Hyperperfusion Syndrome

Clinical symptoms: confusion, headache, seizures

Predictors:

• Elderly
• Blood pressure control
• History of stroke
• Severe hemodynamically significant stenosis
• Severe stenosis with contralateral occlusion
• String-sign
Hyperperfusion Syndrome

Clinical symptoms: confusion, headache, seizures

Treatment

• Low BP control !!!!!
• ACT<200sec after procedure
• Corticosteroids
• Antiepileptic drugs
• Surgery (Haematoma)

Cerebral edema and hemorrhage
Conclusions

- complications occur .... and during CAS the end-organ is the head !!!

- analyze origin, site & severity

- try to manage without overdoing
  (you may worsen situation)

- Call all peoples of the hospital involved in stroke
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