Stroke in children
Presentation and clinical aspects

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Cerebro-vascular diseases
Presentation and clinical aspects

• Stroke in childhood
• Hypertensive encephalopathy
Stroke in childhood

- Incidence: 2.52 per 100,000. Approximately ½ the incidence of brain tumors
- 50% haemorrhagic - 50% ischemic
- Ischemic cascade
- Plasminogen activator (rt-PA)

Stroke – clinical presentation

- Intracerebral haemorrhage may be clinically indistinguishable from ischemic stroke
- Hypertension commonly is a prominent finding
- Clinical manifestation - depending on the territory of the cerebral artery involved
  - Hemiplegia, aphasia, hemianopsia, dysarthria
  - Posterior circulation - brain stem symptoms and ataxia
Stroke

Focal neurologic deficits

- Symptoms abrupt onset
  - hemiparesis, monoparesis, or quadriparesis;
  - monocular or binocular visual loss;
  - visual field deficits;
  - diplopia
  - dysarthria
  - ataxia
  - vertigo
  - aphasia
  - sudden ↓ in consciousness
  - neglect (non-dominant)

- Hemorrhagic stroke:
  - nausea
  - vomiting
  - headache
  - ↓ in consciousness
  - above are more common in hemorrhagic strokes.

Brain stem and Cerebellum

- Gait or limb ataxia
- Vertigo or tinnitus
- Nausea and vomiting
- Hemiparesis or quadriparesis
- Hemisensory loss or sensory loss of all 4 limbs
- Eye movement abnormalities: diplopia or nystagmus
- Oropharyngeal weakness or dysphagia
- Crossed signs (ipsilateral face and contralateral body)

- Cerebellum
  - high risk of herniation and brainstem compression
  - rapid ↓ in consciousness
  - Apnea and death

- Rare seizures

- Four territories
  - Anterior cerebral a
  - Middle cerebral a
  - Posterior cerebral a
  - Vertebrobasilar a
Stroke in childhood

Main causes (work-up)

- Cardiac diseases
- Inflammatory vascular diseases
  - Panarteritis nodosa
  - SLE
  - Takayasu
  - Kawasaki
  - Henoch-Schönlein
  - Hemolytic-uremic syndrome
- Vascular dysplasia
  - Moya-moya
  - NF1
  - Fibromuscular dysplasia
  - Williams syndrome
  - Dissecting aneurysm
- Connective tissue disorders
  - Pseudoxantoma elasticum
  - Ehler-Danlos (type IV), defect collagen III, Marfan syndrome
- Other vascular diseases
  - Arterial hypertension
  - Fabry disease
  - Phospholipid syndrome
- Hematological disorders
  - Haemoglobinopathies
  - Coagulopathies
- Metabolic diseases
  - MELAS
  - Dyslipoproteinemia
  - Homocysteinuria
  - CDG
  - Fabry
- Infectious diseases
  - Lyme disease
- Tumours
- Migraine

Stroke in childhood

Case presentation A.J.

- 7½ year old boy
- Fall from chair-pale-vertigo. Duration 4 hrs.
- 1 month later - repeated attack during 4 days
- Quadrant anopsia up right. Nystagmus
- CT scan: Ischemic area L occipital and cerebellar hem
- Angiography ⇒
- Treatment: Warfarin 2 months.
Stroke in childhood

Case presentation LA

- 2½ year old girl. Fam.Hist epilepsy. 10 d before: 3 days high fever
- 9 d before headtrauma. Suddenly repeated fits (½-3 min): L hemiparesis, consiousness
- Coagulopathy: APC-resistance. Treatment: aspirin 3 months

Stroke in childhood

Case presentation MR

- Repeated anticardiolipin antibodies †.
- No lupus anticoagulant.

Anti-phospholipid syndrome.
Life-long aspirin treatment.
Stroke in childhood

Case presentation ManS

Age

2 10/12 Paroxysmal ischemic periods: Vertigo paresis consciousness

2 11/12 Not resolving

MRI + angiography

- ASA + nimodipin + dipyridamol

Bilateral Strokes

Stroke in childhood

Bilat strokes

Moya-moya

- ASA + nimodipin + dipyridamol

3 0/12 Endovasc dilatation R car

3 1/12 Endovasc dilatation basil

3 3/12 Angio: no occlusion

3 9/12 Angio: occlusion car bilat + narrowing basil

3 9/12 Prednison + azathioprim

10 Paroxysmal headache
10 year old Boy

Pres Hist 8 m episodic L-sided weakness + seiz. EEG slowing + ep-activity. Treated AED. Initial MRI: "encephalitis" 1-2/month when irritated:
- loses strength L arm, leg and face
- afasia
- consciousness
- duration 1-2 min.

Acute Longer episode Not regain function Referred

10 year old Boy

Angiography
10 year old Boy

Repeated stroke-like episodes
1 month after diagnosis Moya-moya

Another disabling stroke
- lost vision hemianopsia
- right sided motor symptoms

Surgery encephalo-duro-arterio
synangiosis (EDAS) 7 months
after diagnosis
Moya-moya disease

- Repeated stroke-like episodes
- ..when developing after anxiety and hyperventilation
- ..angiography mandatory
- Moya-moya is often successfully surgically treated - don’t wait!

Disorders associated with moya-moya disease

- NF1
- Down syndrome
- Sickle cell disease
- Radiation therapy
- Glycogen storage disease
- Spherocytosis
- Tuberculous meningitis
Cerebral venous trombosis

- Sinus trombosis
  - Pseudotumor
- Cortical vein trombosis
  - Convulsions
  - Focal neurological signs

Cerebro-vascular diseases
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- Stroke in childhood
- Hypertensive encephalopathy
Hypertensive encephalopathy

- Multiple arteriolar dilatations
  - disturbance blood-brain barrier
  - brain oedema - occipital cortex

- Symptoms
  - headache, focal seizures, consciousness \( \downarrow \), cortical blindness

Girl, 12 years of age, Glomerulonephritis, hypertension, dialysis.