



Faculty of Health Sciences



Difficult headaches in the ER

Jes Olesen, Professor of Neurology
Danish Headache Center, Dept. of Neurology
The National Hospital Glostrup
University of Copenhagen, Denmark
Jes.olesen@regionh.dk

No disclosures



Glostrup Hospital, the Capital Region of Denmark





Headache: > 300 types!

Secondary?

Primary: Migraine, TTH, Cluster, other



When to be sure it is a primary headache

- The headache fulfills all criteria for migraine or tension-type headache or cluster headache
- The same headache present for more than 2 years and there is no initiating disease or trauma
- Normal somatic and neurological examination



Reasons to consider neuroimaging

Temporal profile and headache features

1. The “first or worst” headache
2. Subacute headache with increasing frequency or severity
3. A progressive or new daily persistent headache
4. Chronic daily headache
5. Headache always on the same side
6. Headache not responding to treatment

Demographics

7. New-onset headache in patients with cancer and in patients pos. for HIV
8. New-onset headache after age 50
9. Headache and seizures

Associated symptoms and signs

10. Headache associated with fever, stiff neck, nausea, and vomiting
11. Headache with focal signs
12. Headache associated with papilledema, cognitive impairment



CT or MRI scan, imaging or angio/veno-gram?





Causes that can be missed on routine CT

Vascular disease

- Saccular aneurysms
- AVM (posterior fossa)
- Carotid or vertebral artery dissection
- Cerebral venous thrombosis
- Vasculitis
- Posterior circulation infarction



Neoplastic diseases

- Fossa posterior neoplasms
- Pituitary tumor and stroke
- Meningeal carcinomatosis

Cervicomedullary lesions

- Chiari malformations
- Foramen magnum tumors

Infections

- Meningitis
- Encephalitis



The secondary headaches

5. Headache attributed to trauma or injury to the head and/or neck
6. Headache attributed to cranial or cervical vascular disorder
7. Headache attributed to non-vascular intracranial disorder
8. Headache attributed to a substance or its withdrawal
9. Headache attributed to infection
10. Headache attributed to disorder of homoeostasis



Lovrenčić-Huzjan A. **The role of ultrasound in diagnosing nonatherosclerotic vasculopathies of the nervous system.**

Acta clin Croat 1998; 37 (supl 1): 68-72.

VASCULITIS

Temporal arteritis

Affection of external carotid artery,
defining of the localisation of biopsy,
monitoring of therapy

- Dark halo: oedema
- Increase of echogenicity:
fibrous healing





Lovrenčić-Huzjan A, Bosnar-Puretić M, Vuković V, Demarin V.
Sonographic features of craniocervical artery dissection. Acta clin
 Croat 2002;41:307-312

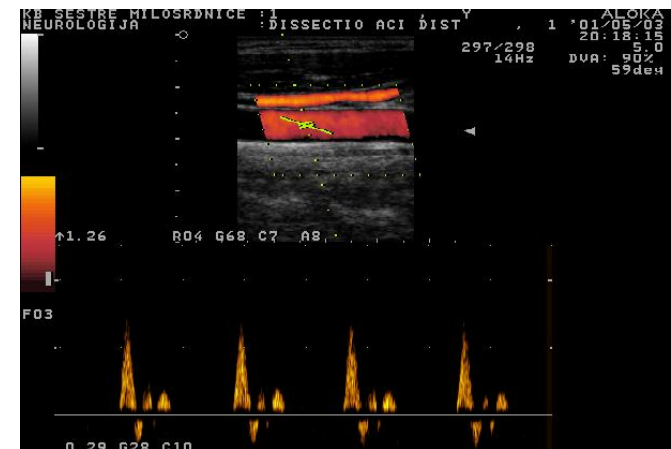
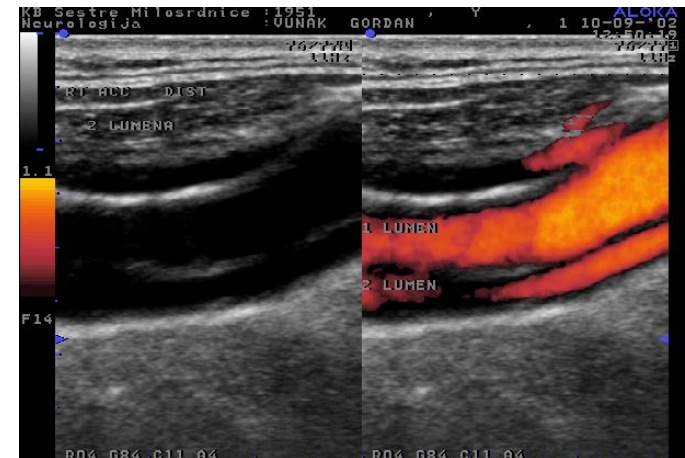
Dissections – SE 80-96%.

Direct signs:

- echolucent intramural hematoma, string sign
- double lumen
- stenosis and/or occlusion of an arterial segment

Indirect signs:

- increased or decreased PI upstream or downstream of the suspected lesion
- >50% difference in BFV compared to the unaffected side
- detection of intracranial collateral flow





Cerebral venous thrombosis

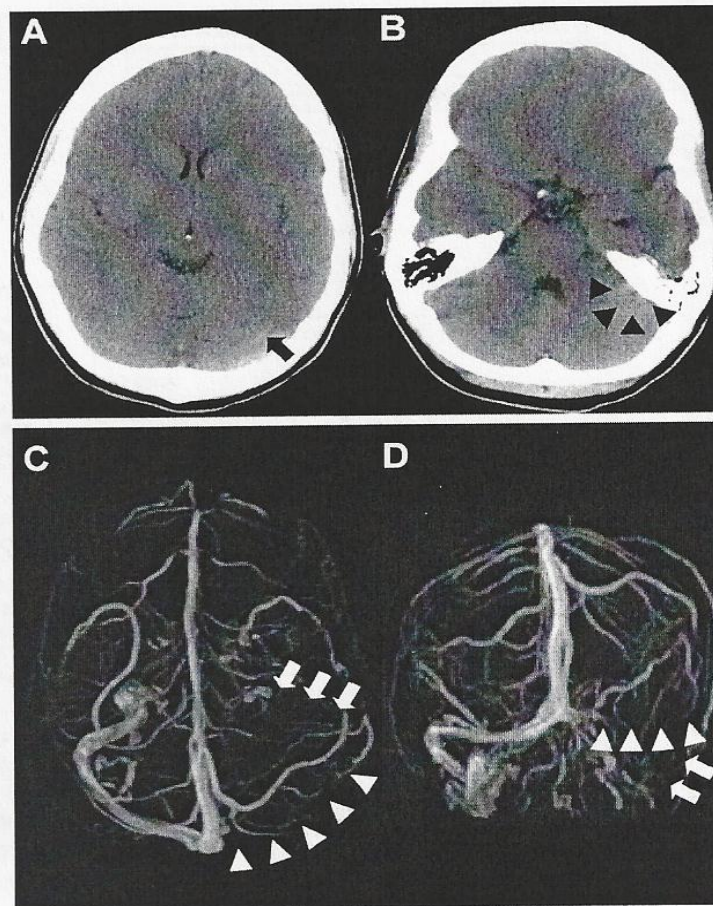


Figure 1. Computed tomogram (CT) of the head without intravenous contrast demonstrating hyperdensities along the left tentorium (arrows, **A**) and involving the left sigmoid sinus (arrowheads, **B**) that were concerning for cerebral venous thrombosis. Magnetic resonance (MR) venography demonstrating thrombosis of the left transverse (arrowheads) and sigmoid sinus and proximal jugular vein (arrows) in the axial (**C**) and coronal (**D**) planes.



Case

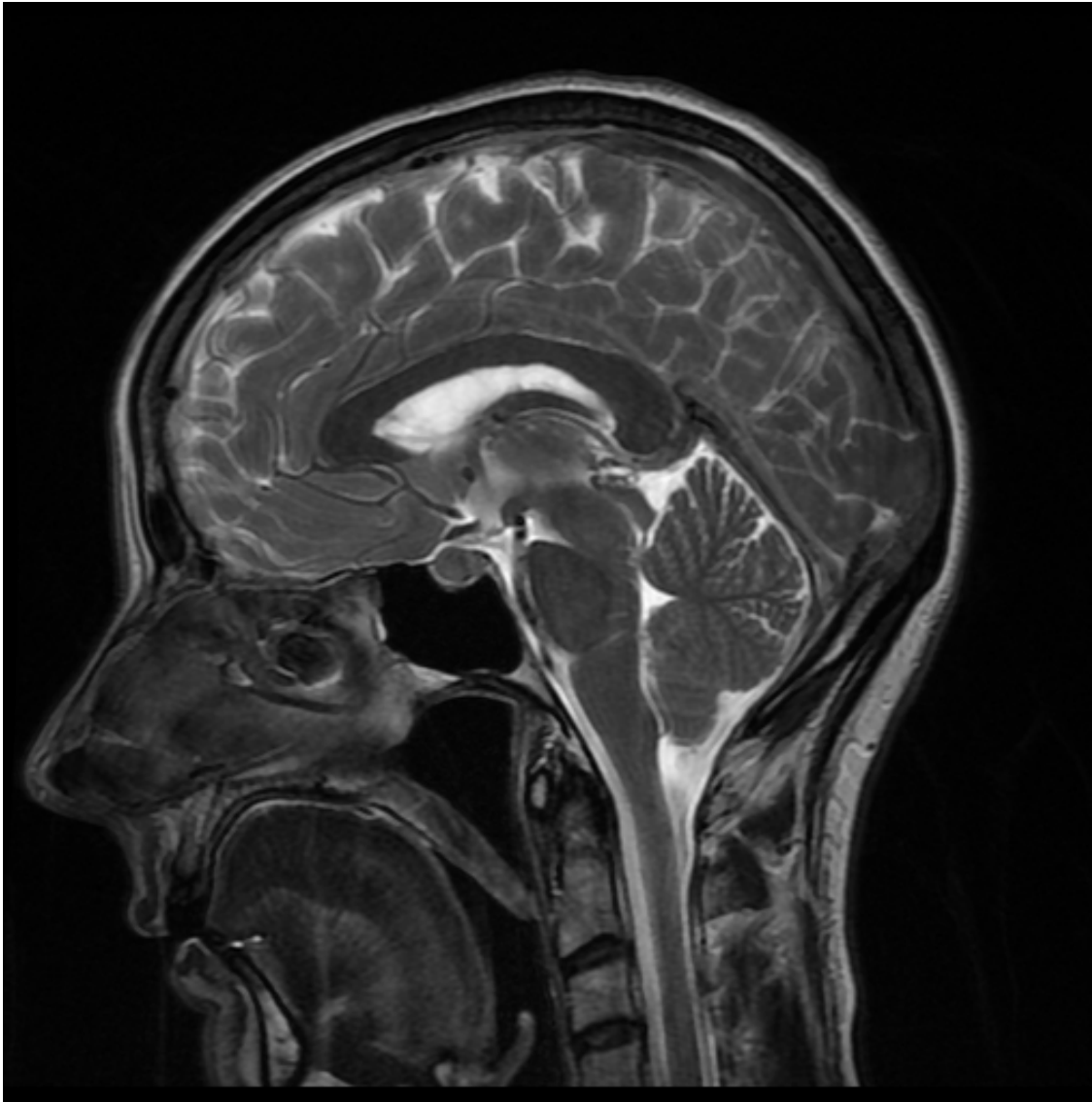
- 37-year old woman, previously infrequent migraine without aura, otherwise healthy
- On April 12th 2011 she experienced a buzzing sound in right ear. Five days later she developed subacute severe constant headache behind both eyes and in the parietal region. First days disappearance when lying down, worsening when she got up. Accompanying photophobia, nausea, stiffness in neck and dizziness
- Admitted to hospital April 19th
- Objectively: Decreased hearing on right side, tenderness in neck muscles.



Case

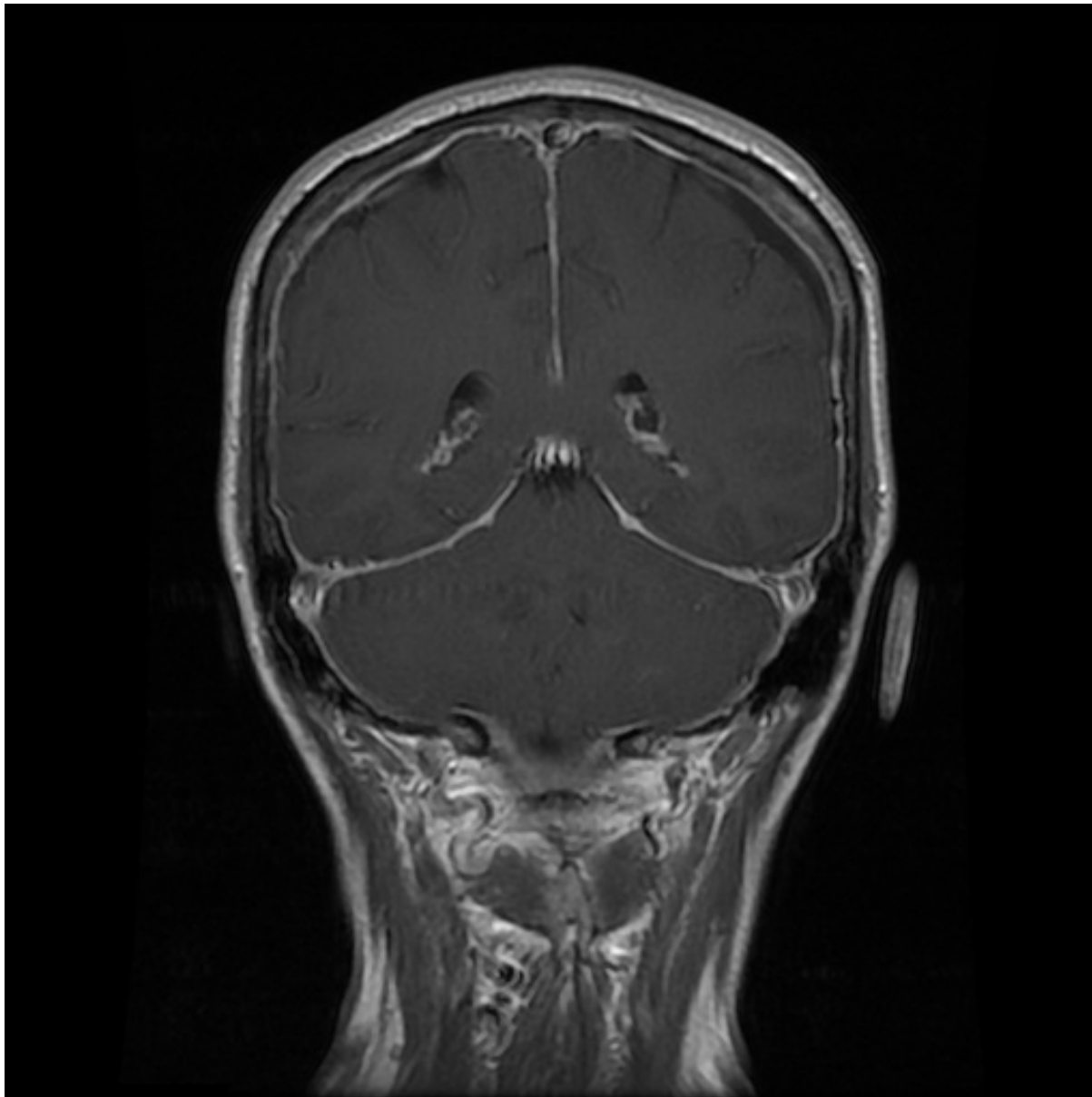
- Receiving physician: Neuroinfection, sinus thrombosis, SAH, tumour
- Ct-scan with venous sequences normal
- Lumbar puncture, 3 leukocytes, protein 0.57, glucose 2.9, bilirubin 0, oxyhemoglobin 2.2, pressure 3.5 cm water
- Diagnosis? What to do?
- Ordering MR with contrast

MRI, T2, sagittal



Pituitary
hyperemia

MRI, T1 with contrast, coronal

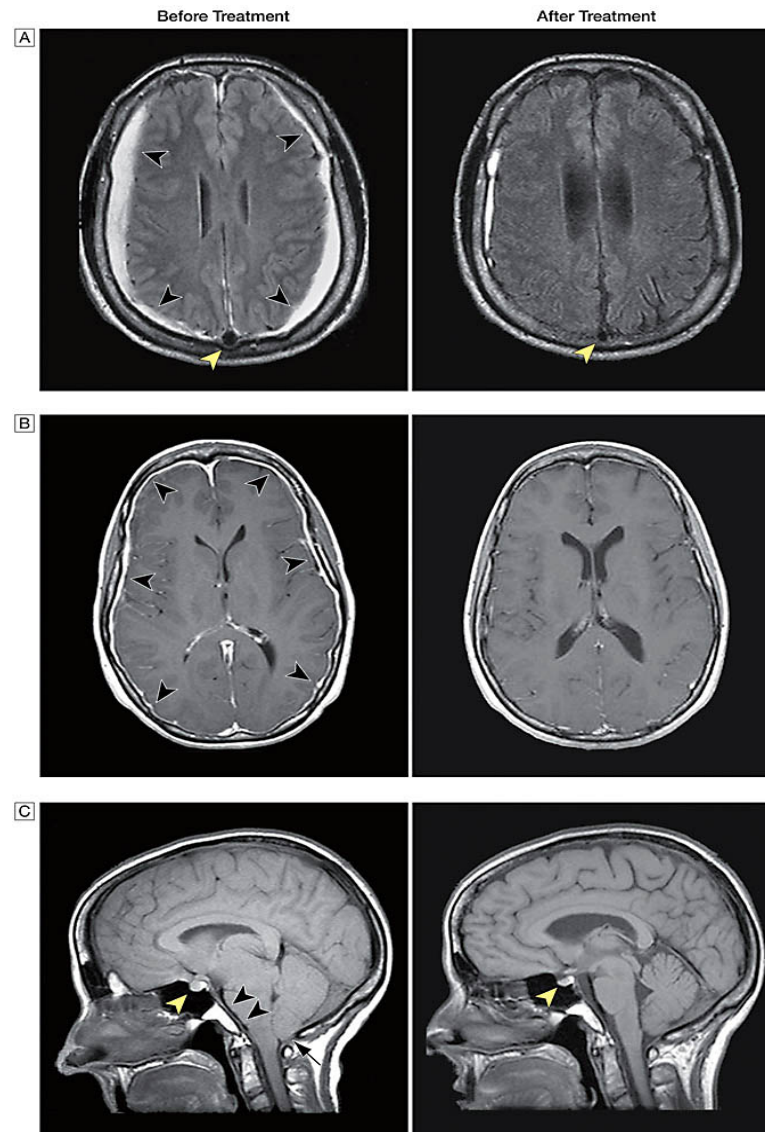


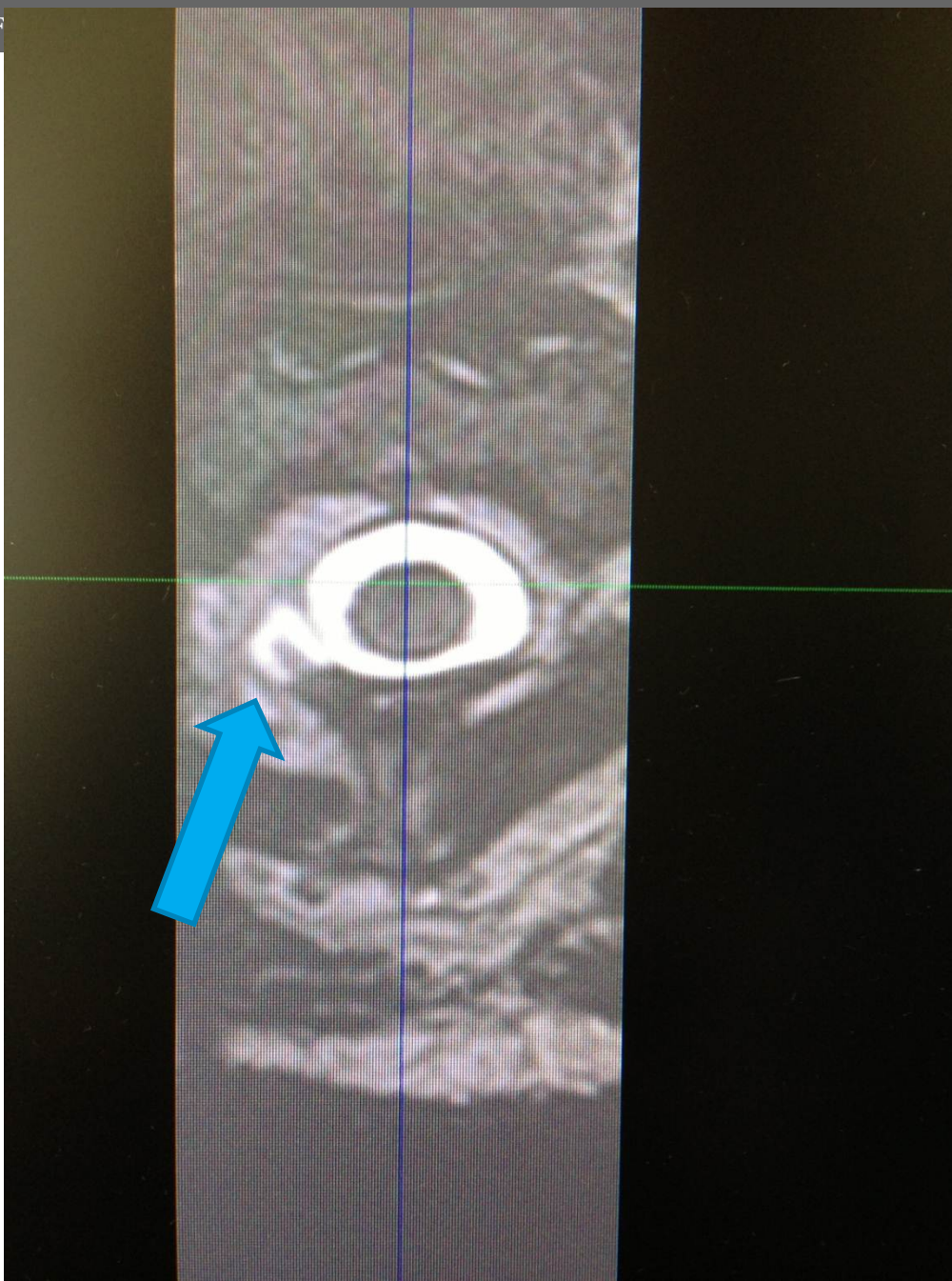
Pachymeningeal
enhancement

Pretreatment and Posttreatment Magnetic Resonance Imaging



Subdural hygroma
Pachymeningeal
enhancement
Engorged veins
Pituitary hyperemia
Sagging of the brain





Spontaneous low pressure headache



- Can be seen after increase in intracranial pressure (e.g. coughing) but also occurs spontaneously
- Headache worsens within 15 min after sitting or standing
- Accompanied by neck stiffness, tinnitus, hypoacusis, photophobia and nausea
- Other symptoms: vertigo, diplopia and cranial nerve palsies, most often abducens
- MRI: pachymeningeal enhancement
- The clinical picture will often be less typical over time
- Treat with blood-patch



Cerebral venous thrombosis

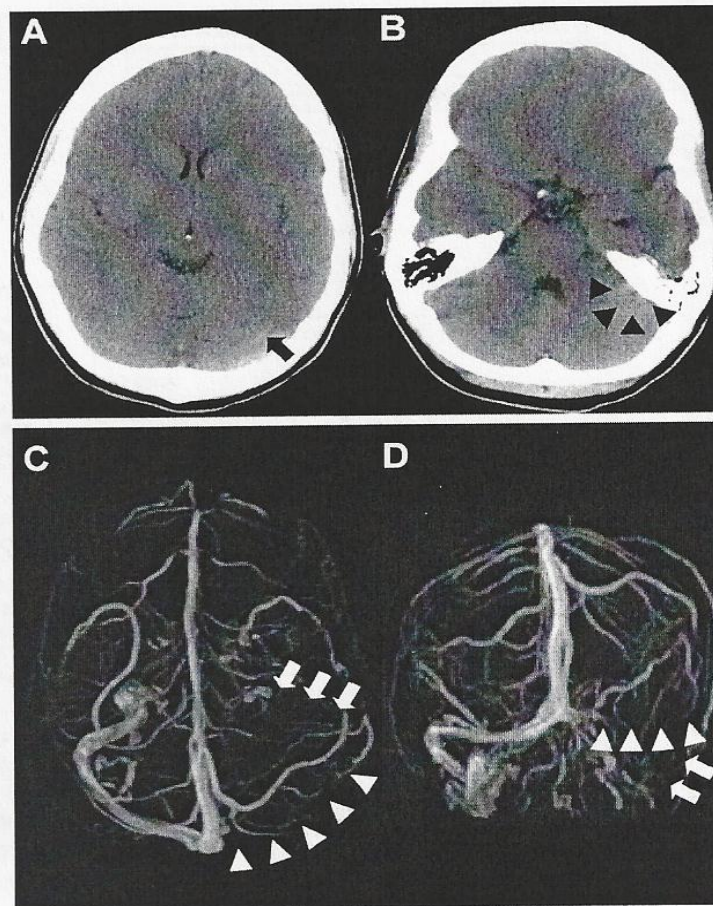
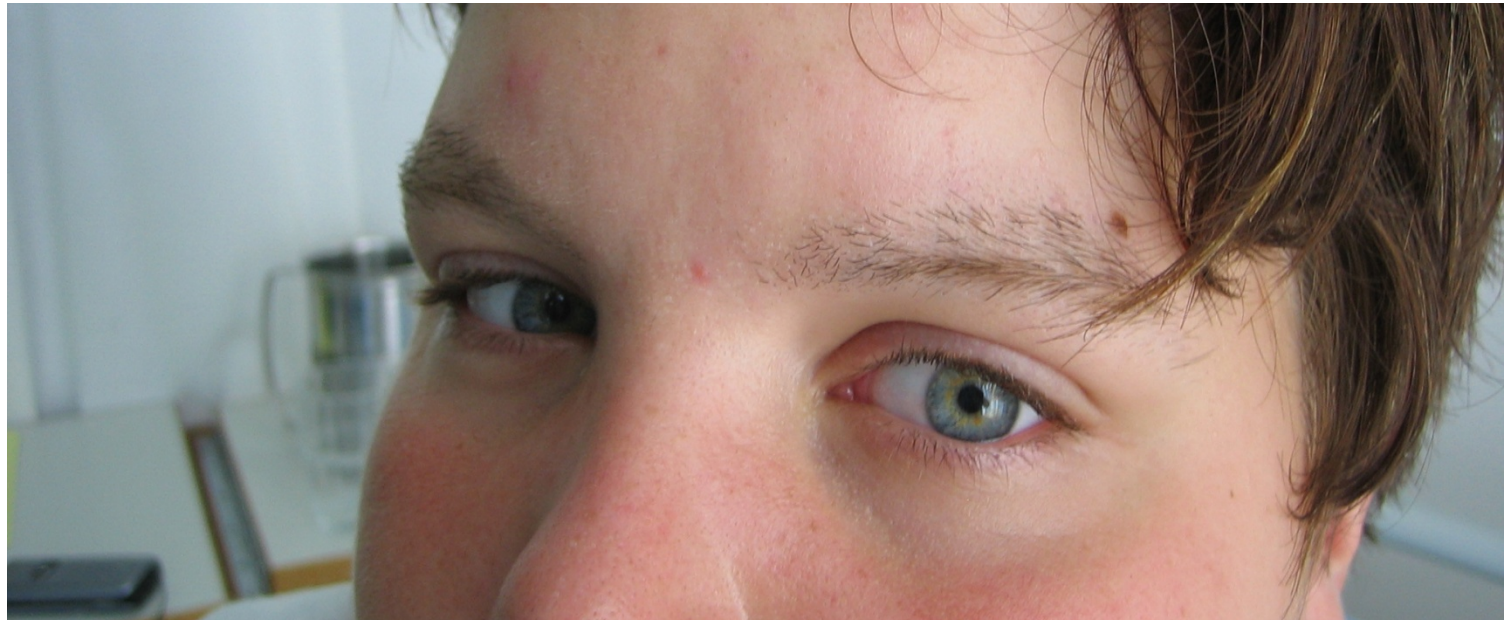


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Case: history

- 17-year old girl with mild episodic posttraumatic headaches for 6 months presents in ER with subacute, severe holocranial headache for 2 days
- Double vision, no other symptoms
- No family history of headaches
- No exposition to hormonal therapy, no medications, no endocrine diseases



Coronal



Horse shoe
formed
empty sella

Case



Increased
subarachnoidal
space at optic
nerve

Case



Papillary
impression



Case

- Lumbar puncture, 2 leukocytes, protein 0.39, glucose 3.0, pressure 44 cm water
- Blood tests normal

Idiopathic intracranial hypertension



- Obese woman of childbearing age
- Subacute / chronic headache
- Accompanying symptoms
 - Pulsatile tinnitus, transient visual obscurations, diplopia
- Findings
 - Papilloedema, enlarged blind spot, visual field defects, sixth nerve palsy
- MRI may be abnormal
- Increased CSF pressure (>200 mm H₂O in the non-obese, >250 mm H₂O in the obese)
- Acetazolamide and weight loss, in severe cases VP shunt
- Manage by neurologist and ophthalmologist

Reversible cerebral vasoconstrictor syndrome



Fig. 1 Conventional cerebral angiogram (lateral projection) showing typical angiographic features consisting of alternating areas of arterial constriction and dilatation (*arrows*) in multiple vascular beds. (Image provided courtesy of Brett L Cucchiara, Department of Neurology, School of Medicine, University of Pennsylvania)





Reversible cerebral vasoconstrictor syndrome

- Characterized by severe headaches, with or without other symptoms, and segmental constriction of cerebral arteries that resolves within 3 months
 - Recurrent thunderclap headaches, typically for 1-2 weeks
 - Non-aneurysmal subarachnoid haemorrhage
 - Strokes, ischemic and haemorrhagic
 - Seizures
- Segmental constriction of cerebral arteries may not be seen within first week, maximum after 16 days
- Occurrence peaks at 42 years, more common in women
- Mechanisms: Transient failure of regulation of cerebral arterial tone with sympathetic over-activity



Reversible cerebral vasoconstrictor syndrome

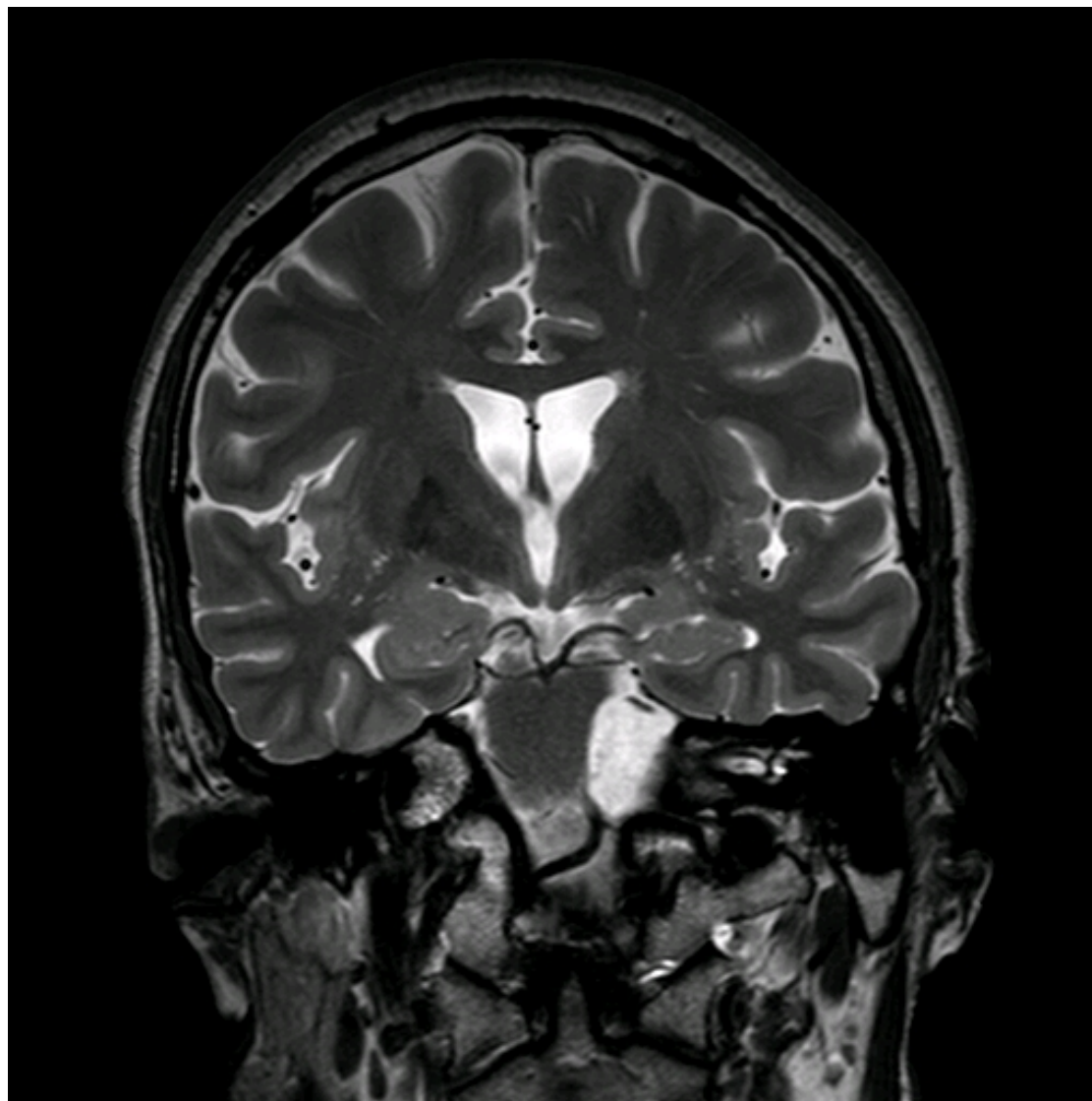
- Clinical features
 - Acute and self-limiting symptoms within 1 month
 - Thunderclap headaches, sometimes the only symptom
 - Usually short-lived (1-3 h) compared with SAH
 - Mean of 4 attacks during 1-4 weeks
 - Often moderate headache between attacks
 - Typical triggers are sexual activity, defecation, coughing
- Incidence?
- Precipitants: Post partum, vasoactive drugs



Case 1

- 64-year old woman with purely paroxysmal trigeminal neuralgia in right 2nd and 3rd branch for 17 years

T2





Axial T2





Conclusions

- Most primary headaches can be diagnosed by history alone
- Atypical, unresponsive or progressing cases may need imaging
- Secondary headaches usually need imaging
- Angio- and/or venograms are used too little: Dissection, sinus thrombosis and RCVS are not infrequently dominated by headache
- Trigeminal neuralgia needs special MR imaging protocol at 3 T