核心課程編號：B4

Headache

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學習目標

一年期醫師畢業後一般醫學訓練(PGY)	畢業前一般醫學訓練(UGY)
知識 1. 腦部基本影像及電生理學檢查的判讀 2. IICP的診斷及處置 3. CSF檢查的判讀 技能 1. 腰椎穿刺（optional）	知識 1. 頭痛的病理生理機制 2. 頭痛的診斷流程 3. 頭痛的初步處置 技能 1. 頭痛相關的病史詢問 2. 頭痛相關的身體檢查病史

In-Training Exam-頭痛

- 林先生、40歲卡車司機、無內外科病史。夜裡常突然頭痛醒來、左邊太陽穴最痛、痛到鼻塞、流眼淚，一小時才會緩解。
- 簡述頭痛的原因（原發性頭痛至少三項、續發性頭痛至少五項） [20分]？
- 病史詢問、身體檢查（含神經學檢查）實驗室檢查幫助頭痛鑑別診斷
  [20分]？
- 神經電生理及CT of brain檢查時機及判讀原則 [20分]？
- 顱內壓升高IICP 如何診斷及處置 [20分]？
- 腰椎穿刺的適應症及禁忌症 [20分]？

IICP 的診斷及處置

- What is cerebral perfusion?
- Steady cerebral perfusion can be maintained if arterial systolic pressure is 50 – 150 mmHg and ICP is below 40 mm Hg.
- CPP = MAP – ICP
- Normal CPP is 70 – 100 mm Hg

IICP 的診斷及處置

Pathophysiology:

- Acute neurologic condition alters the equilibrium of components within the cranial vault.
- **Causes**
  - Primary
  - Secondary
- Regardless of cause, ↑ ICP decreases cerebral perfusion, stimulates further swelling, and may cause herniation

Decreasing Cerebral blood flow

causes

ischemia

leads to

Cushing's Response

causes

vasomotor center response

triggers

increase in arterial pressure

results in

causes

sympathetically mediated response

results in

increase in SBP, widening pulse pressure; decreased HR

results in

Ineffective autoregulation

leads to

decompensation (ischemia & infarction)

manifested by

significant change in vital signs

manifested by

Cushing's Triad: bradycardia hypertension bradypnea

grave sign; leads to

leading to

herniation of brain stem occlusion of cerebral blood flow

causes

Death without immediate interventions

IICP 的診斷及處置

- Early Indicators:
  - Subtle changes in LOC
  - Pupillary changes
  - Weakness of one extremity or one side
  - Constant headache increasing in intensity
- Late Indicators:
  - Continuing decrease in LOC progressing to coma
  - Bradypnea, bradycardia, hypertension and fever
  - Hemiplegia, decorticate or decerebrate posturing
  - Loss of brain stem reflexes

Diagnostic Tests

- CT
- MRI
- PET
- SPECT
- Transcranial Doppler
- Electrophysiologic monitoring
- Evoked potential monitoring

Complications

- Brain stem herniation
- Diabetes insipidus
- Syndrome of Inappropriate ADH (SIDAH)

Medical Management

- Increased ICP is a true medical emergency
- Treatment must be promptly initiated
  - Invasive monitoring of ICP
  - Manipulating one or more cranial vault component
  - Controlling fever
  - Maintaining oxygenation
  - Reducing metabolic demands

CEREBRAL BLOOD FLOW

- CBF affects cerebral volume, oxygen consumption and removal of waste products.
- Brain receives 15-20 % of cardiac output. Gray > white matter.
- Receives blood via carotid arteries (80%) and vertebrobasilar arteries (20%) from Circle of Willis.

Pain sensitive structures of the head

- The skin
- Its blood supple
- Appendages:

  muscles of the head and neck

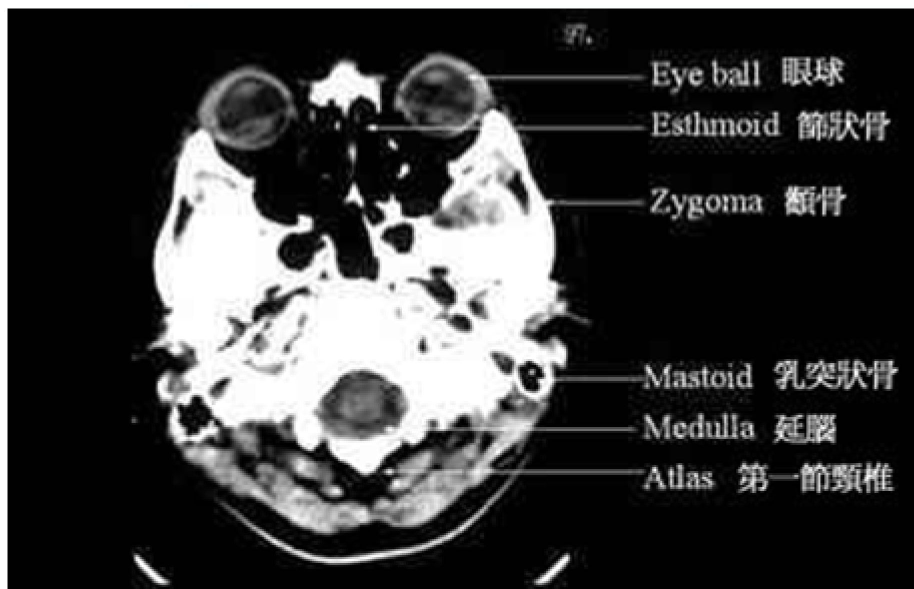
  great venous sinuses and their tributaries

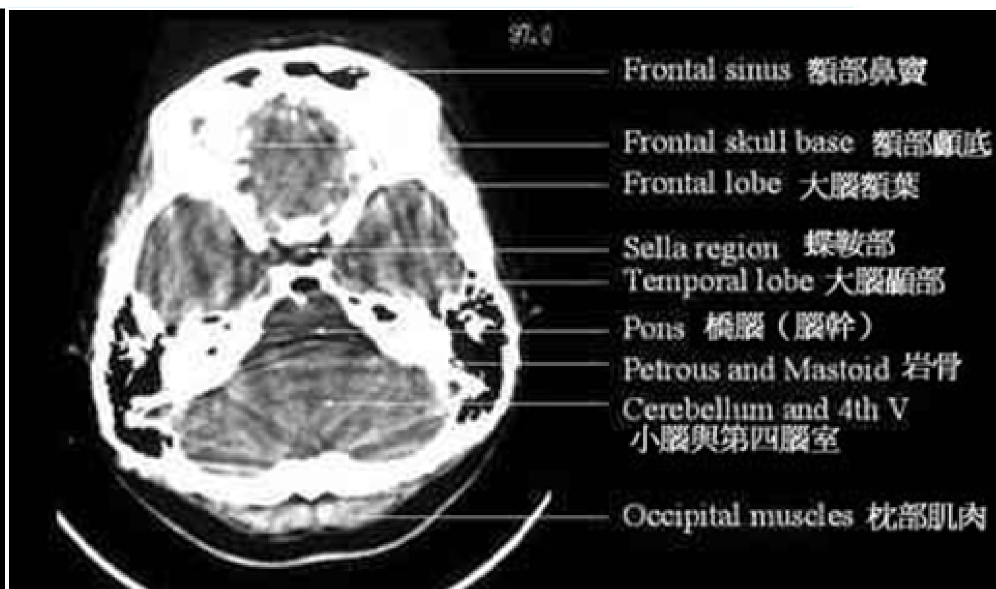
  portion of dural mater (base of brain);

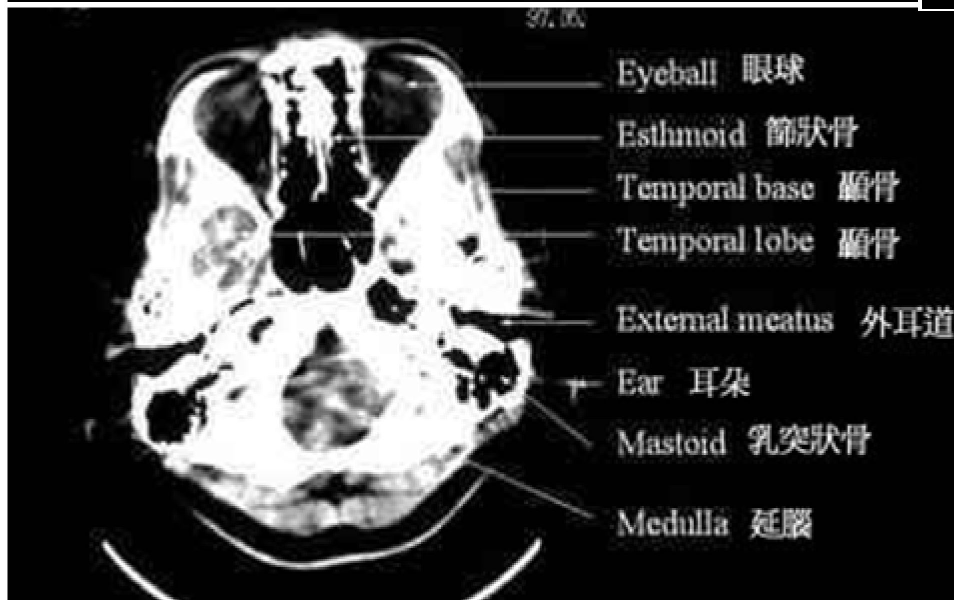
  dural arteries; intracerebral arteries;

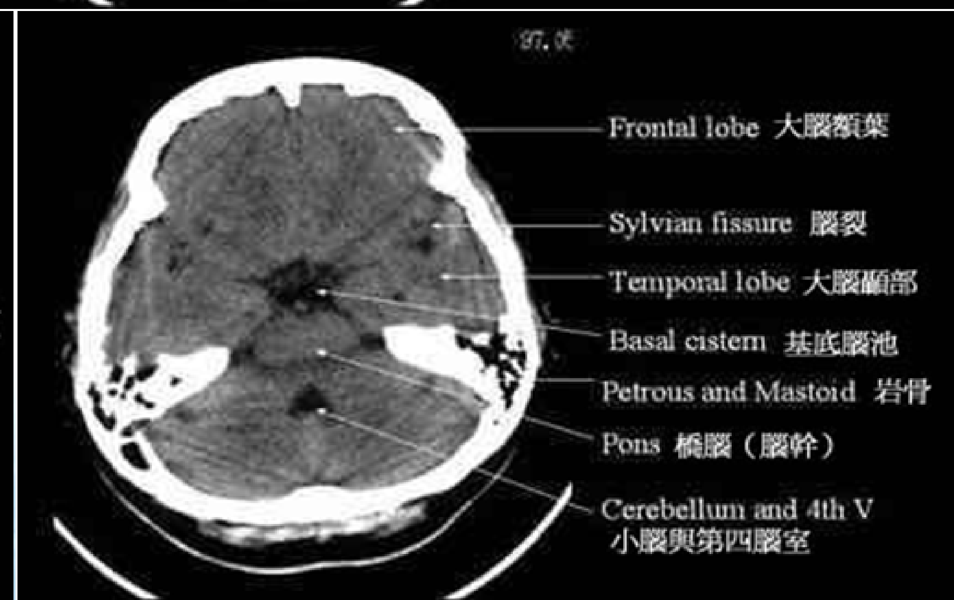
  cervical nerves

腦部基本影像檢查的判讀

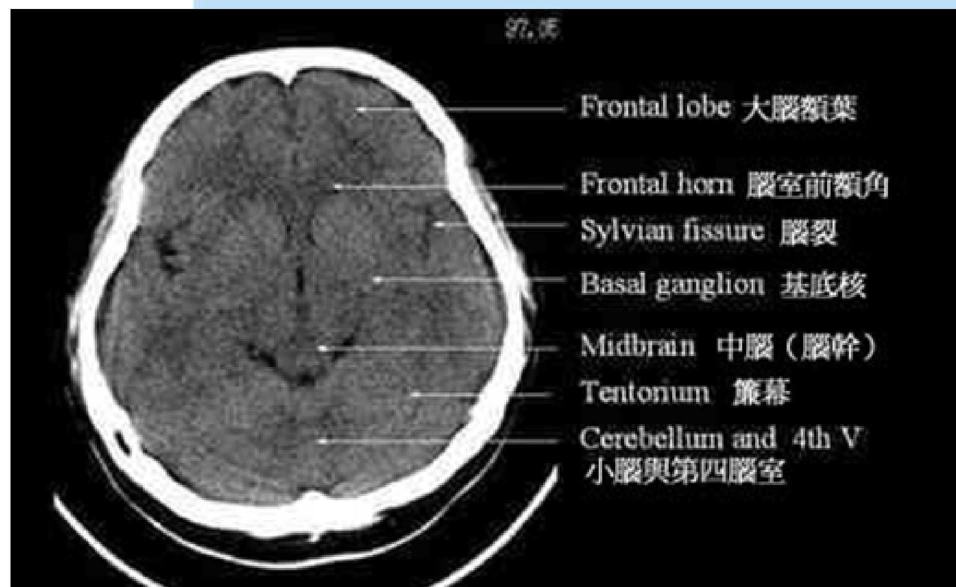


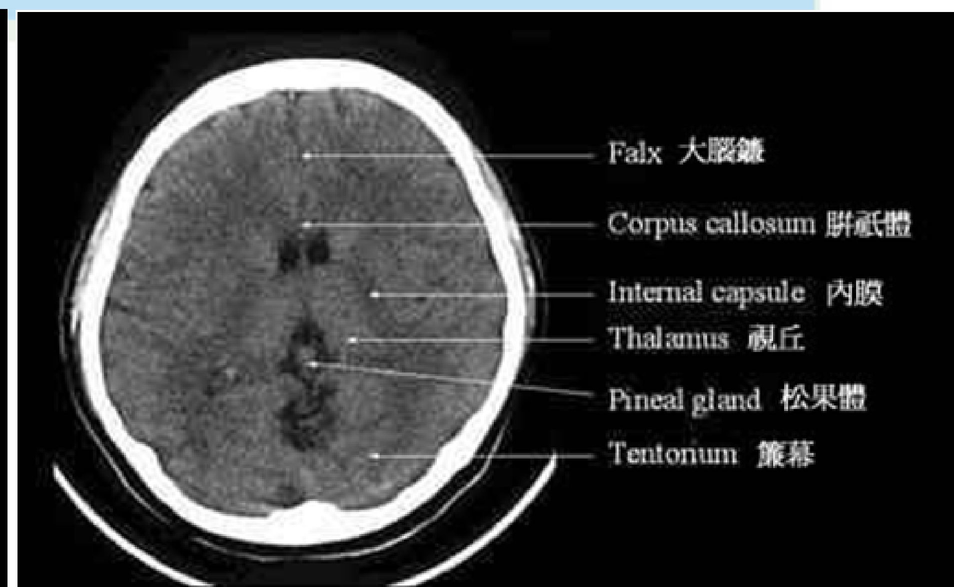


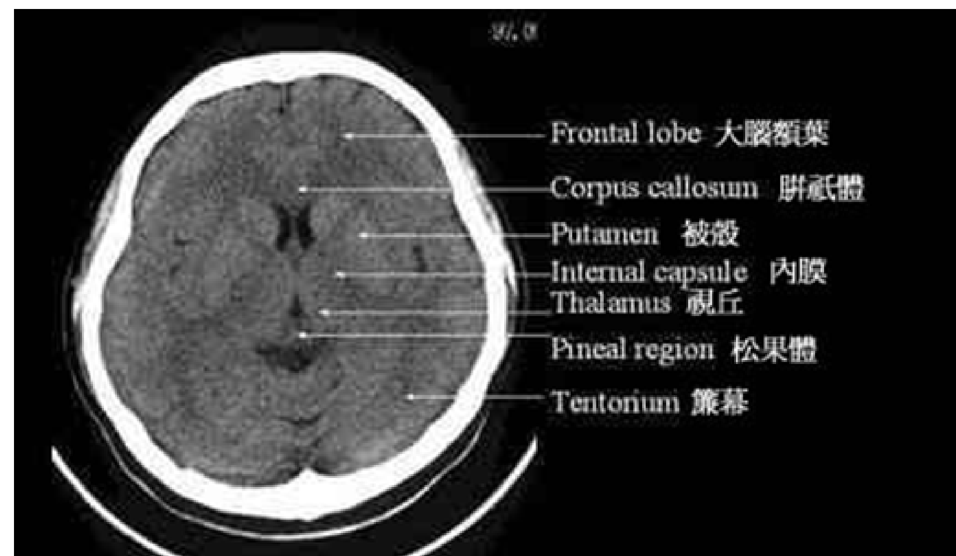


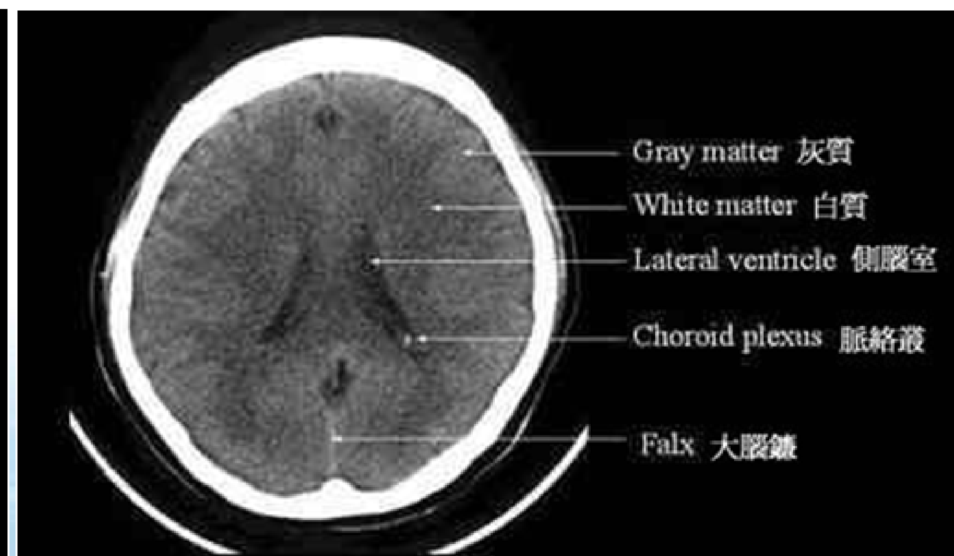


腦部基本影像檢查的判讀









腦部電生理學檢查的判讀

- 伴隨大腦活動所產生的微弱電位差，可以從頭皮的表面檢測出來，將腦電波放大約一百萬倍並繪製成圖，即稱為腦波圖。其檢查方法為，將八~十二個探針固定於頭皮上，用腦電波計測量並記錄兩個特定探針間的電位差；可用來記錄睡眠中、光刺激時，以及服藥後的電位差變化，藉以鑑別診斷腦病變。精神科醫師則利用腦波檢查來診斷睡眠障礙。

- 並不是所有的腦部疾病都會呈現不正常的腦電波圖形。因此，腦波檢查主要用於診斷會發生異常放電的腦部疾病，如腦外傷或癲癇等。同時，腦波檢查亦有助於病灶的定位及判定大腦損傷的程度。腦電波的變化因人而異，無所謂的正常圖形，只能檢視前後腦電波的變動情形，來判定是否異常。汽車駕駛員或劇烈運動(柔道、橄欖球等)者之腦電波均有增大的現象。另外，腦電波檢查對老年性癡呆(腦血管障礙型)的早期發現十分有用

頭痛的病理生理機制

Location of a headache

- Unilateral: cluster headache, migraine
- Ocular or retro-ocular: glaucoma, acute iritis, optic neuritis, Tolosa-Hunt syndrome, migraine or cluster headache
- Paranasal: sinusitis
- Occipital: tension or occipital headache, cervical arthritis

Location of a headache

- 1st division of trigeminal nerve : post-herpetic neuralgia
- 2nd and 3rd division of trigeminal nerve : classical trigeminal neuralgia
- Pharynx and external auditory meatus : glossopharygeal neuralgia

Acute onset

- Common cause :

  CVA, meningitis or encephalitis, acute glaucoma or iritis

- Less common cause :

  Seizure (post-ictal headache), lumbar puncture, hypertensive encephalopathy

Subacute onset

- Giant cell arteritis
- Intracranial mass (tumor, subdural hematoma, abscess)
- benign intracranial hypertension
- Trigeminal neuralgia
- Glossopharyngeal neuralgia
- Postherpetic neuralgia
- Hypertension (pheochromocytoma)
- Atypical facial pain

Chronic onset

- Tension headache
- Migraine
- Cluster headache
- Cervical arthritis
- Sinusitis
- Dental disease

Tension headache

- The most common variety of headache
- Muscle contraction headache
- Pattern: nonthrobbing (pressure), band-like , tightness
- Bilateral of forehead, temples, back of the head or neck
- Associated with sleep disorder, fatigue, anxiety, depression, emotional conflicts.
- More frequent in women, ages of 20-40 years.
- Treatment : NSAID, antianxious agent and sedative.

Migraine

- Classification:

  Migraine without aura: common migraine

  Migraine with aura: classic, (ophthalmic, hemiplegic, hemiparesthetic, aphasic, complicated migraine)
- The ratio of common to classic migraine is 5 : 1
- Recurrent attack with variable in intensity, frequency, and duration
- Pain is commonly unilateral
- Accompanied by anorexia, nausea, vomiting
- Age onset: first episode from age 5-40, women more and earlier in men.
- 75% of patients had family history.
- If first episode after age 40, CT and MRI scans are needed to rule out organic disease.

Migraine (Trigger Factors)

- Emotional stress
- Family history
- Hormone fluctuations: 70% in women before menstrual cycle (drop in estrogen) and cease after menopause, or episode during estrogen therapy
- Missing a meal or fasting, oversleeping, physical stimuli (bright sunlight or poor ventilation), and smoking
- Vasoactive substances in food: chocolate, cheese(have tyramine) ,red wine

頭痛的診斷流程

正確的診斷

- 國際頭痛學會 (International Headache Society) 頒訂國際頭痛疾病分類 (International classification of headache disorders, ICHD)
- 第一版
  - 1988 年出版
  - 中文版洪祖培等翻譯，1993年
- 第二版 (ICHD-II)
  - 2004 年一月正式出版
  - 中文版王署君等翻譯，2004 年八月

國際頭痛學會偏頭痛分類

- 1.1無預兆偏頭痛(migraine without aura)
  - 舊稱 尋常性偏頭痛 (common migraine)
- 1.2預兆偏頭痛(migraine with aura)
  - 舊稱 典型偏頭痛 (classical migraine)
- 1.3可能為偏頭痛前驅或相關症狀之孩童週期性症候群
- 1.4視網膜偏頭痛(retinal migraine)
- 1.5偏頭痛之併發症(complications of migraine)
- 1.6 可能偏頭痛(probable migraine)

國際頭痛學會偏頭痛分類

- 無預兆偏頭痛 (ICHD-II code 1.1)
(migraine without aura)- common migraine

- 有預兆偏頭痛 (ICHD-II code 1.2)
(migraine with aura)- classical migraine

10:1 to 3: 1

無預兆偏頭痛

- A、至少有 5次能符合B－D項的發作。
- B、頭痛發作持續 4－72小時。
- C、頭痛至少具下列二項特徵：PUMA
  1. 單側 (Unilateral)
  2. 搏動性 (Pulsating)
  3. 程度中等或重度(Moderate)
  4. 日常身體活動加劇頭痛或導致避免此類活動如走路或爬樓梯(Physical Activities)
- D、當頭痛發作時至少有下列一情形：
  1. 噁心或嘔吐
  2. 畏光及怕吵

ABCD 四項皆有：偏頭痛

有其中三項：可能偏頭痛

預兆偏頭痛

A 至少有二次能符合B-D項的發作。

B 至少有下列三項特徵中之一項:

1. 完全恢復的視覺症狀，包括正向（即閃爍光，光點，與線）與／或負向（即視覺喪失）症狀.
2. 完全恢復的感覺症狀，包括正向（即針刺感）與／或負向（即麻木） 症狀.
3. 完全恢復的失語症症狀.

C 至少有下列三項特徵中之兩項:

1. 單側視覺與／或單側感覺症狀.
2. 至少一種預兆症狀≥5分鐘以上逐漸產生，或是二種以上症狀相繼發生。
3. 每一預兆症狀持續≥5分鐘且≤60分鐘。

D .偏頭痛在預兆後60分鐘內發生。

ID Migraine ™ Screener

快速診斷偏頭痛

- 下列三項症狀有其中兩項或以上
  - 頭痛伴隨嘔心
  - 頭痛時覺得光線刺眼
  - 頭痛造成失能（須休息）
- 敏感性 81%, 特異性 75%
- 陽性預測率=93.3% (開業醫療)

頭痛的初步處置

- NSAID (ibuprofen, naproxen, aspirin)
- Ergotamine (cafergot, seglor)
- Sumatriptan (imigran 英明格)
- Metoclopramide, prochlorperazine
- Prophylaxis: Propranolol, amitriptyline, verapamil, valproate

Cluster headache

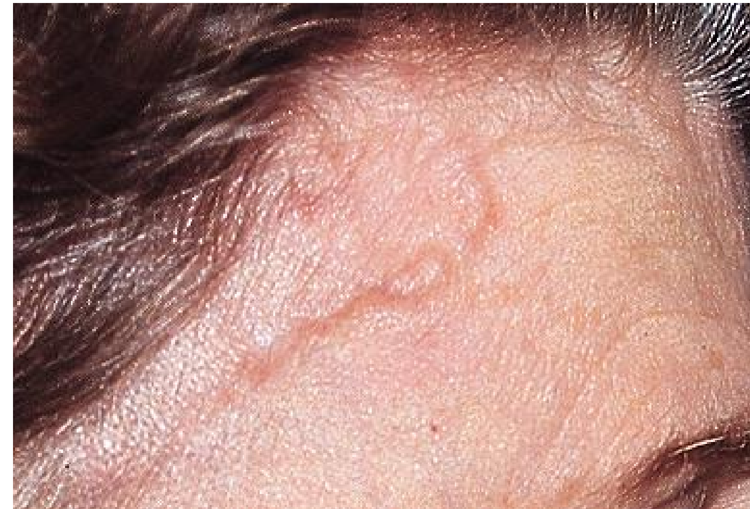
- Paroxysmal nocturnal cephalalgia, histamine cephalalgia
- Occurs predominantly in young adult men (range 20 to 50 years; M:F : 5:1)
- Recur nightly, between 1 and 2 h after onset of sleep or several times during the night and day
- Duration: 15 minutes to 3 hours
- Occurs daily for 2 weeks to 3 months
- Blocked nostril, rhinorrhea, injected conjunctivum, lacrimation, miosis, flush and edema of the cheek

Treatment

- Ergotamine 3mg po qN
- Inhalation of 100% oxygen at 7-10 L/min for 10 to 15 min at the onset
- Intranasal lidocaine (4% 1 ml)
- Triptans: 5HT1 B/D receptor agonists

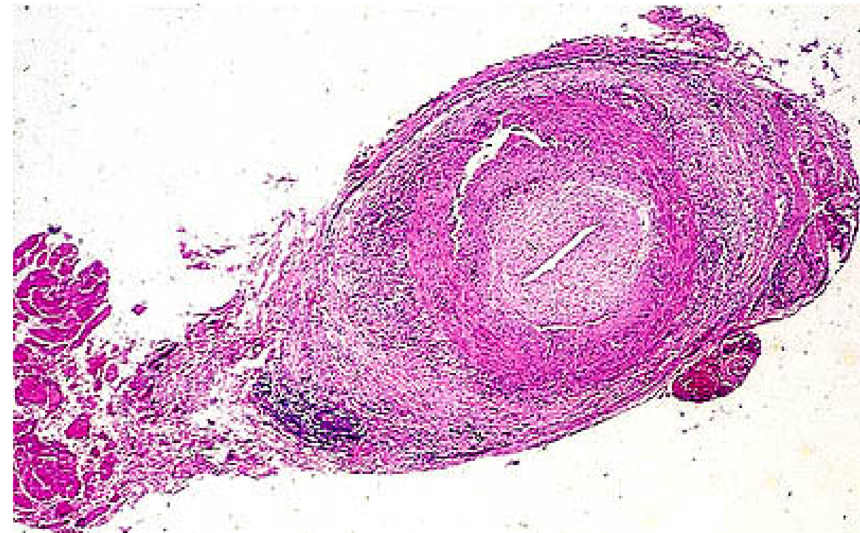
Giant cell arteritis

- Temporal arteritis(F>M)
- Elderly persons(>50y/o)
- 70% have headache
- Superficial temporal and other scalp arteries: thickened and tender and without pulsation
- Malaise, myalgia, weight loss, arthralgia, and fever (polymyalgia rheumatica)



Diagnostic criteria

- Age> 50 years at onset
- New onset of localized headache
- Temporal artery tenderness or decreased temporal artery pulse
- Elevated ESR > 50mm/hr
- Elevated CRP
- Biopsy showing necrotizing arteritis



Giant cell arteritis

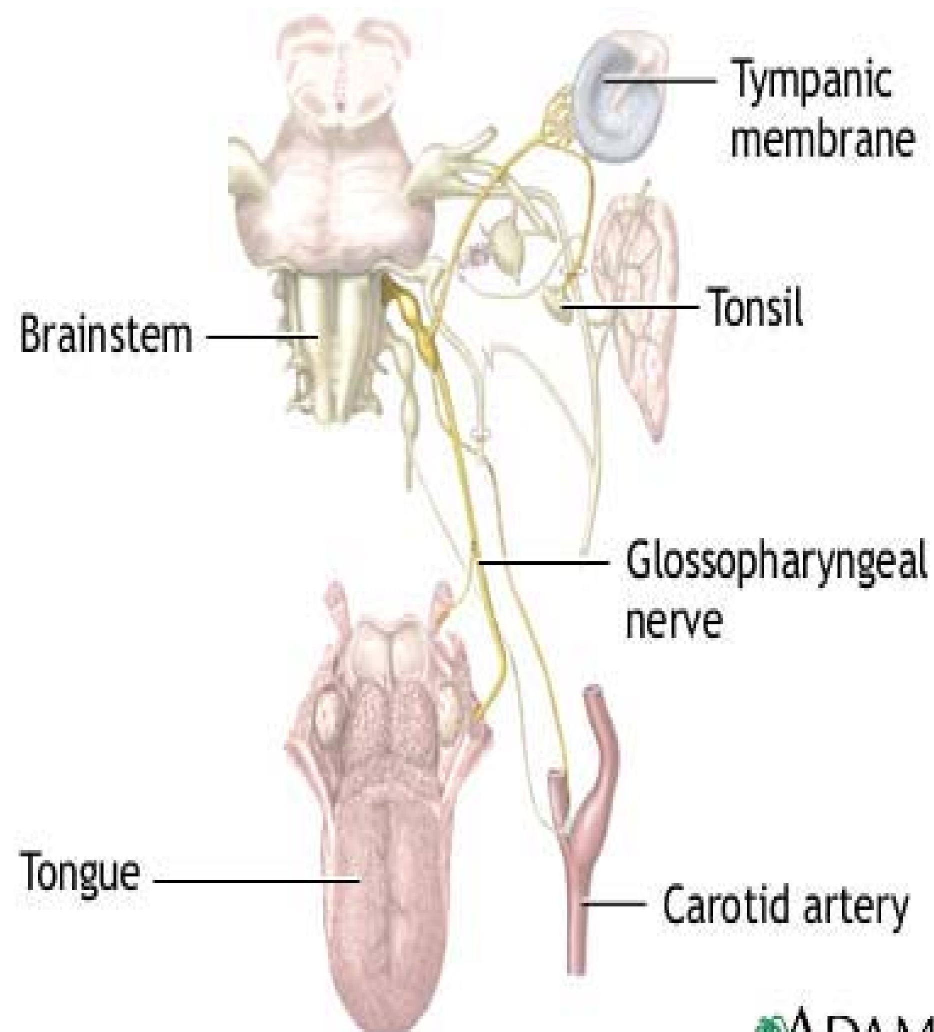
- The major risk: blindness due to anterior ischaemic optic neuropathy
- There are also risks of cerebral ischemic events and dementia
- Treatment:
  - Steroid
  - Recovery of visual loss is low

Trigeminal neuralgia

- Tic douloureux
- Female:Male:1:3
- Age:>50 y/o
- Trigeminal V2,V3 most common
- Activities such as toothbrushing, shaving or eating
- DDx: neoplasm, multiple sclerosis ,
  vascular compression of the nerve
- Treatment: carbamazepine, gabapentin,
  phenytoin

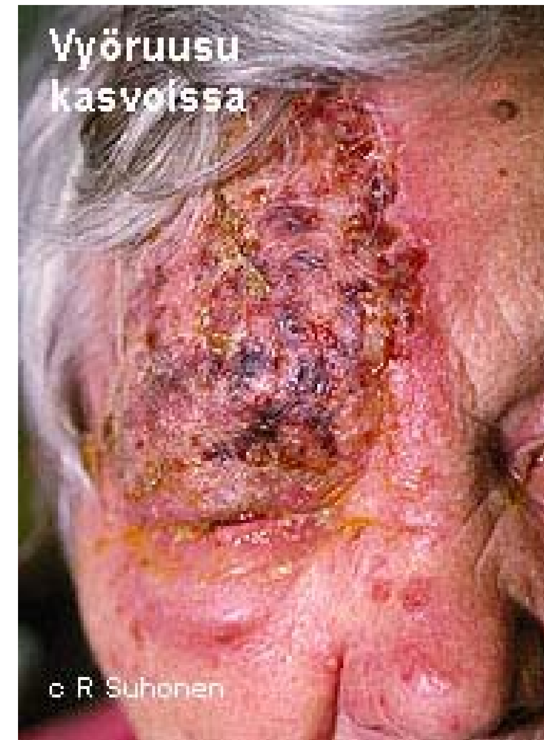
Glossopharyngeal neuralgia

- Pain in oropharynx that radiate to the ear
- Provoked most commonly by swallowing, talking, chewing, yawning, laughing
- Glossopharyngeal syncope



Post-herpetic neuralgia

- Facial pain persisting or recurring ≥3 months after the onset of herpes zoster
- Trigeminal nerve V1 division (80%)

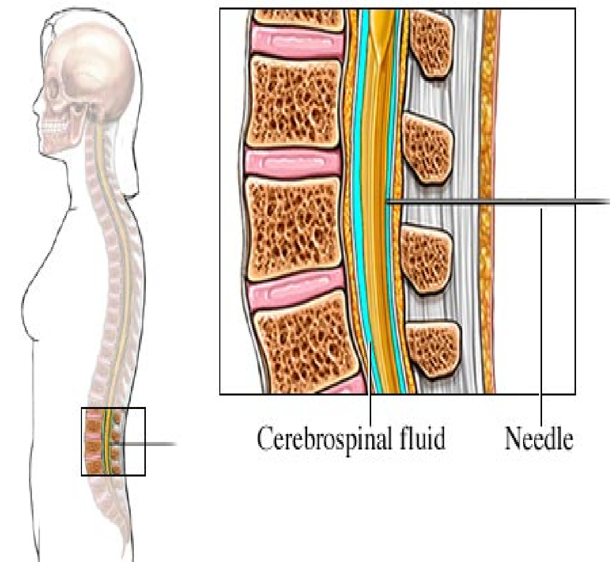


Idiopathic intracranial hypertension

- ICP in the absence of an intracranial mass lesion or hydrocephalus (>200mm H_2O in the non-obese, >250mm H_2O in the obese)
- Triad: headache, papilledema and increased ICP
- Visual loss due to optic nerve damage, six nerve palsy

Post-lumbar puncture headache

- Headache that worsens within 15 minutes after sitting or standing and improves within 15 minutes after lying
- Neck stiffness, tinnitus, hearing impairment, photophobia, nausea



腰椎穿刺的臨床意義

- 1. 診斷價值：（1）測定腦壓高低；（2）有無蛛網膜下腔出血及顱內感染；（3）腰穿注氣行氣腦造影，注射造影劑行椎管造影；（4）奎氏試驗檢查椎管是否梗阻。
- 2 .治療價值：（1）放出腦脊液治療高顱壓、注入生理鹽水治療低顱壓；（2）放出血性腦脊液，注入5-10毫升氧氣，可減少血的刺激、促進血的吸收，又可防止蛛網膜下腔粘連和交通性腦積水的發生；（3）對有中樞神經係統感染者可腰穿注入有效的抗生素予以治療；（4）腰麻注藥。

腰椎穿刺適應症

- 1.確定腦脊液性質，協助診斷中樞神經係統炎症或出血性疾病（PS：個人理解是“腦出血”）。
- 2.測定腦脊液壓力，借以了解顱內壓高低及蛛網膜下腔通暢情況。
- 3.對顱內（或脊髓）蛛網膜下腔出血、炎症，預防蛛網膜下腔粘連或腦積水。
- 4.進行腰椎麻醉或稍內注射藥物。
- 5.注入氧氣治療粘連性蛛網膜炎。
- 6.通過腰椎穿刺行其他檢查，如椎管造影、氣腦造影、腦室腦池放射性核素掃描等。
- 7.中樞神經係統炎症性疾病的診斷與鑒別診斷：包括化膿性腦膜炎、結核性腦膜炎、病毒性腦膜炎、黴菌性腦膜炎、乙型腦炎等。
- 8.腦血管意外的診斷與鑒別診斷：包括腦溢血、腦梗死、蛛網膜下腔出血等。
- 9.腫瘤性疾病的診斷與治療：用於診斷腦膜白血病，並通過腰椎穿刺鞘內注射化療藥物治療腦膜白血病。

腰椎穿刺禁忌症

- 1.後顱凹占位性病變，特別是顱內壓明顯增高，或疑有早期腦疝者，應慎重用或禁用。
- 2.穿刺部位皮膚或皮下組織有感染病灶者。
- 3.脊椎結核及其他脊椎炎症者。
- 4.休克、敗血症、全身性感染等危重患者，衰竭或瀕危病人。
- 5.腰椎穿刺的並發症包括心肺功能受損和出血，所以，心肺功能不全及有出血傾向的患者，慎用。
- 6.局部皮膚（穿刺點附近）有炎症者。

CSF analysis

	Glucose (mg/dL)	
	<10[*]	10-45[•]
More common	Bacterial meningitis	Bacterial meningitis
Less common	TB meningitis Fungal meningitis	Neurosyphilis Some viral infections (such as mumps and LCMV)

Protein (mg/dL)	
>250[Δ]	50-250[◊]
Bacterial meningitis	Viral meningitis Lyme disease Neurosyphilis
TB meningitis	

Total white blood cell count (cells/microL)		
>1000	100-1000	5-100
Bacterial meningitis	Bacterial or viral meningitis TB meningitis	Early bacterial meningitis Viral meningitis Neurosyphilis TB meningitis
Some cases of mumps and LCMV	Encephalitis	Encephalitis

Subarachnoid Hemorrhage

- Sudden onset(88%) and incapacitating severity.
- Generalized headache→ occipital area and spread to neck → rigidity and to the back and lower limbs.
- Cause: aneurysm>AVM
- Excruciating pain usually lasts a few hours, but may persistent for several days.
- Associated symptoms: severe photophobia, painful eye movements, and some mental confusion.
- Mildly elevate temperature, pulse, and blood pressure, stiff neck, and kernig sign.

Headache related to medical disease

- Malignant hypertension
- Cervical arthritis, rheumatoid arthritis
- Carbon monoxide exposure
- Chronic lung disease with hypercapnia
- Hypothyoidism, cushing disease, withdrawal from corticosteroid medication, hypoglycemia
- Use of pill
- Acute anemia with hemoglobin below 10

Obtain a CT scan

- Acute, extremely severe headache (thunderclap headache)
- Headache with progressive onset over days to weeks that is not similar to previous headaches
- Altered mental status
- Focal neurologic signs
- Papilledema

Headache
Clinical warning criteria (CWC)

- 1.increase (>50%) in the intensity and frequency of current headaches compared with previous headaches;
- 2.abrupt onset of headache;
- 3.persistence of headache despite analgesics;
- 4 alteration of the characteristics of headache in patients with previous primary headaches;
- 5.presence of focal neurological symptoms or findings

Treatment

- ABC
- Maintenance of cerebral perfusion may require invasive haemodynamic monitoring +/- ICP monitoring
- Adequate oxygenation
- Ventilation to hypocarbia or normocarbia (aggressive hyperventilation can cause vasoconstriction).

Treatment

- Maintenances of MAP to maintain CPP
- Head elevation
- Prevention of venous obstruction – keep head neutral
- Adequate sedation or paralysis to prevent coughing

SPECIFIC MEASURES

- Surgical intervention
- Mannitol – reduces CSF formation, lowers blood viscosity and reduces brain vol.
- Frusemide to give rapid diuresis
- Steroids to reduce vasogenic oedema around masses
- Other cerebroprotective agents – thiopentone
- Mild to moderate hypothermia to reduce metabolic rate
- Tight glycaemic control
- Seizure control