

# Headache

David Kernick

Exeter Headache Clinic

Two default diagnoses



< 50 years Migraine



>50 years  
Temporal  
arteritis

Systemically unwell

- Tender artery with allodynia
- CRP better than ESR
- Problem with skip lesions

# History and examination

(Primary care perspective)

Headache is in the history

Examination

In theory:

- For diagnosis
- To reassure the patient
- To keep out of the law courts

# History and examination

(Primary care perspective)

## Examination in reality:

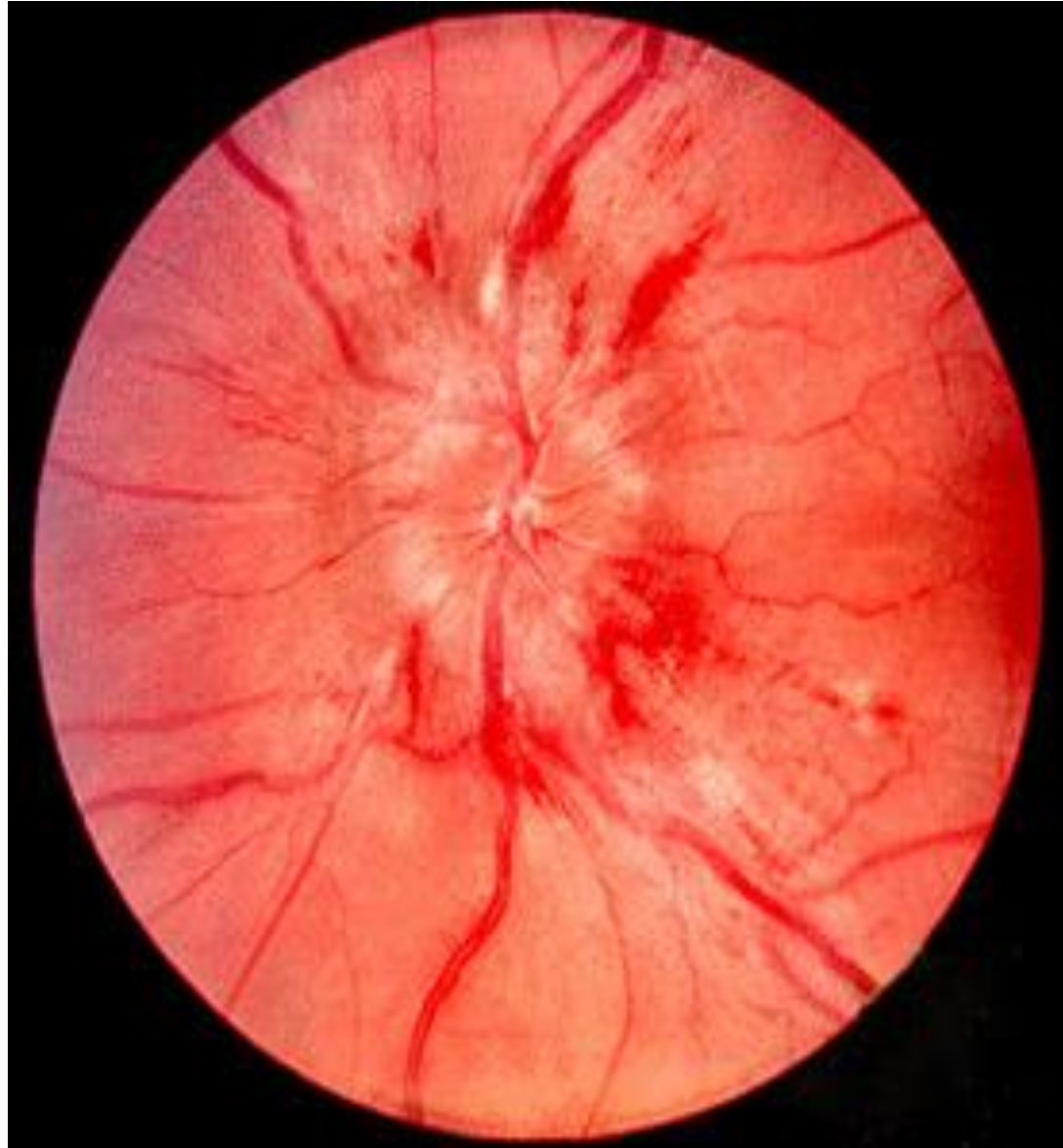
- To keep out of the law courts
- To reassure the patient
- For diagnosis
  
- BP, Fundoscopy
- Giles Elrington 3 minute neurol examination

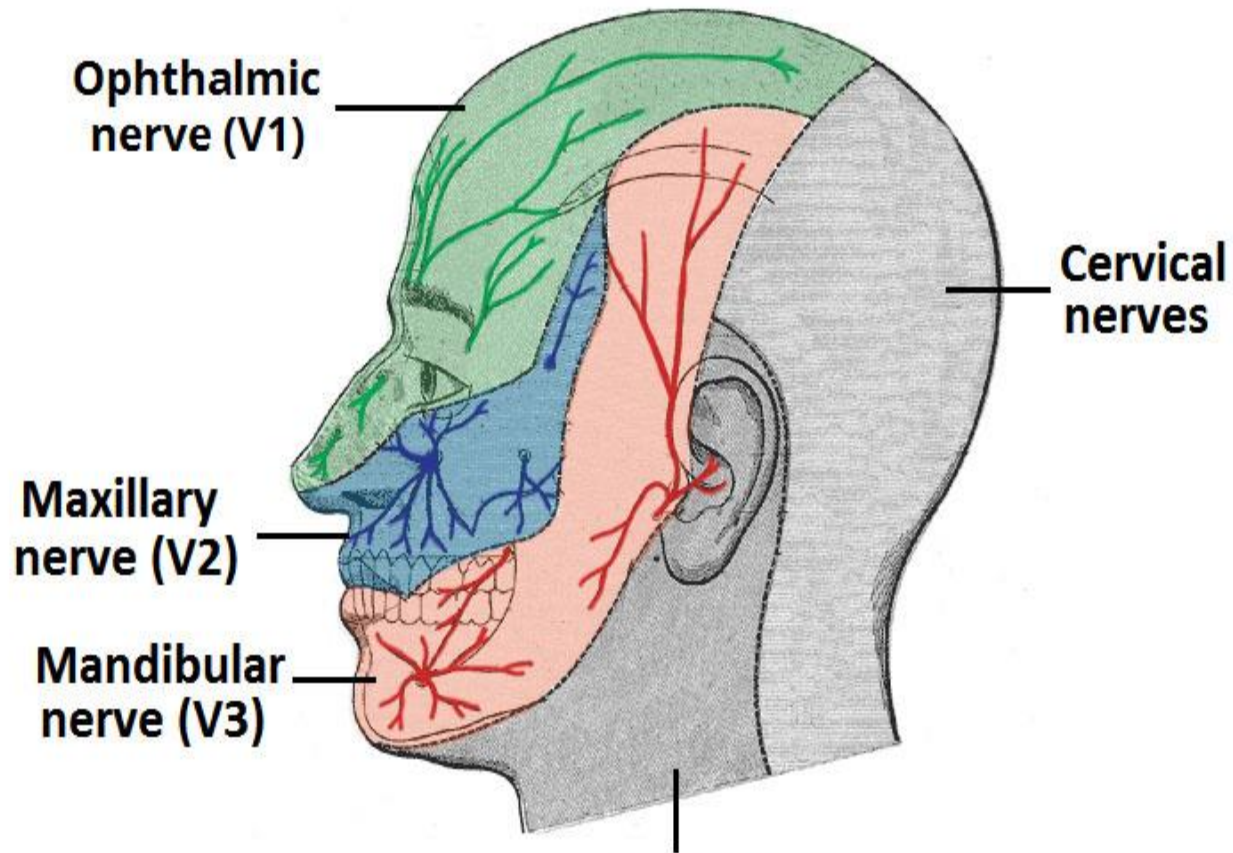


- 6 month non specific headache
- Buzzing in ears



What other ocular test?

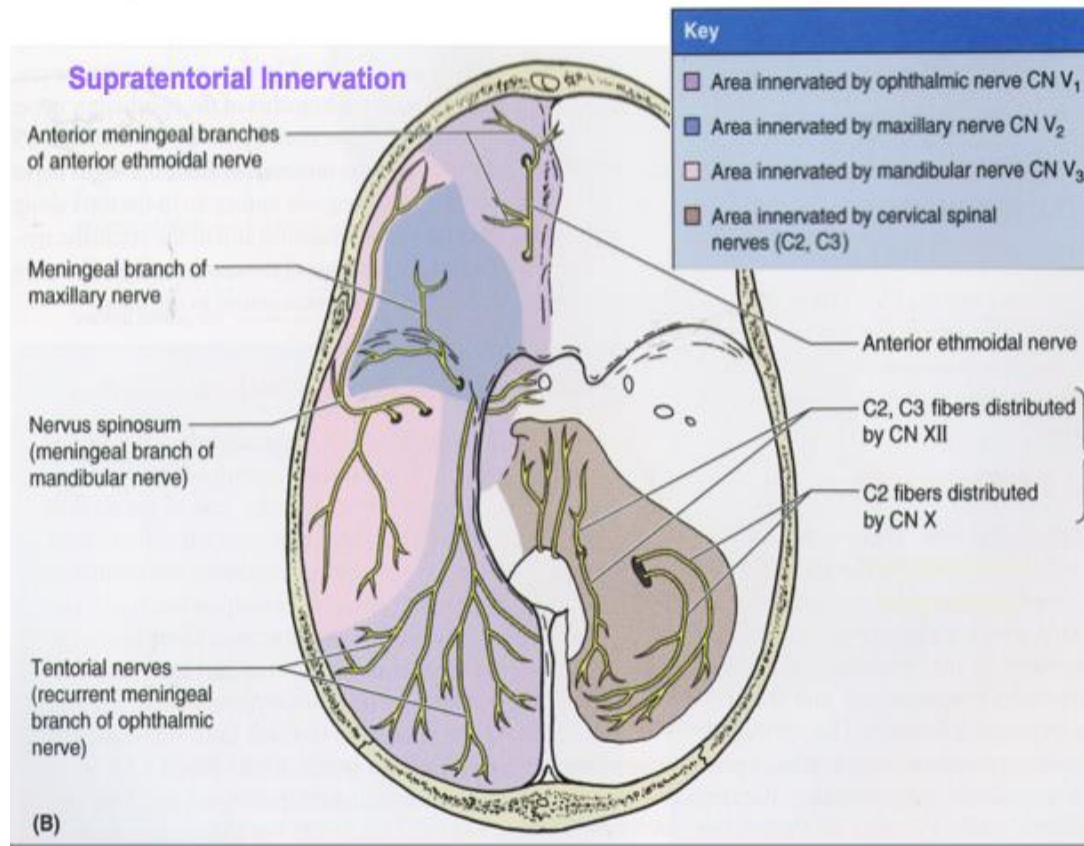




Pain extra-cranial.  
Innervation of head

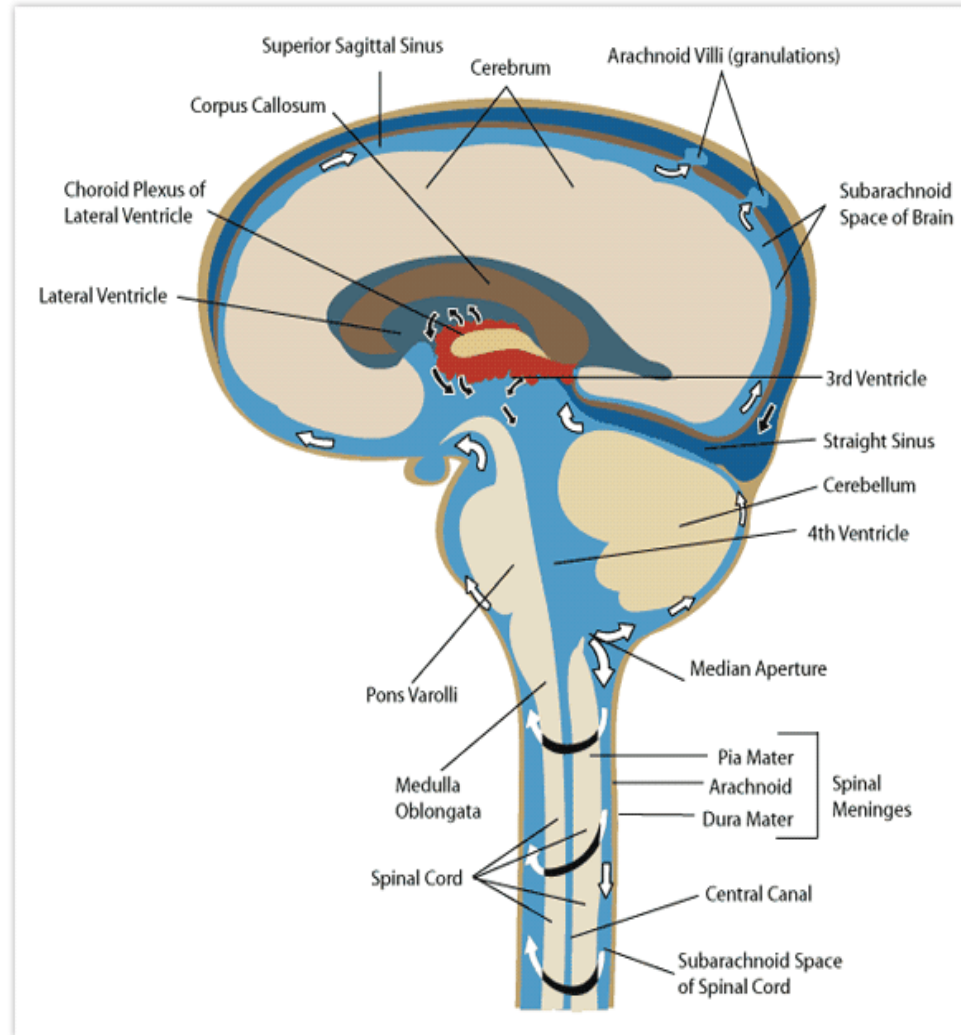


## Specific Innervation of Dura: COA6 Figure 7.34B

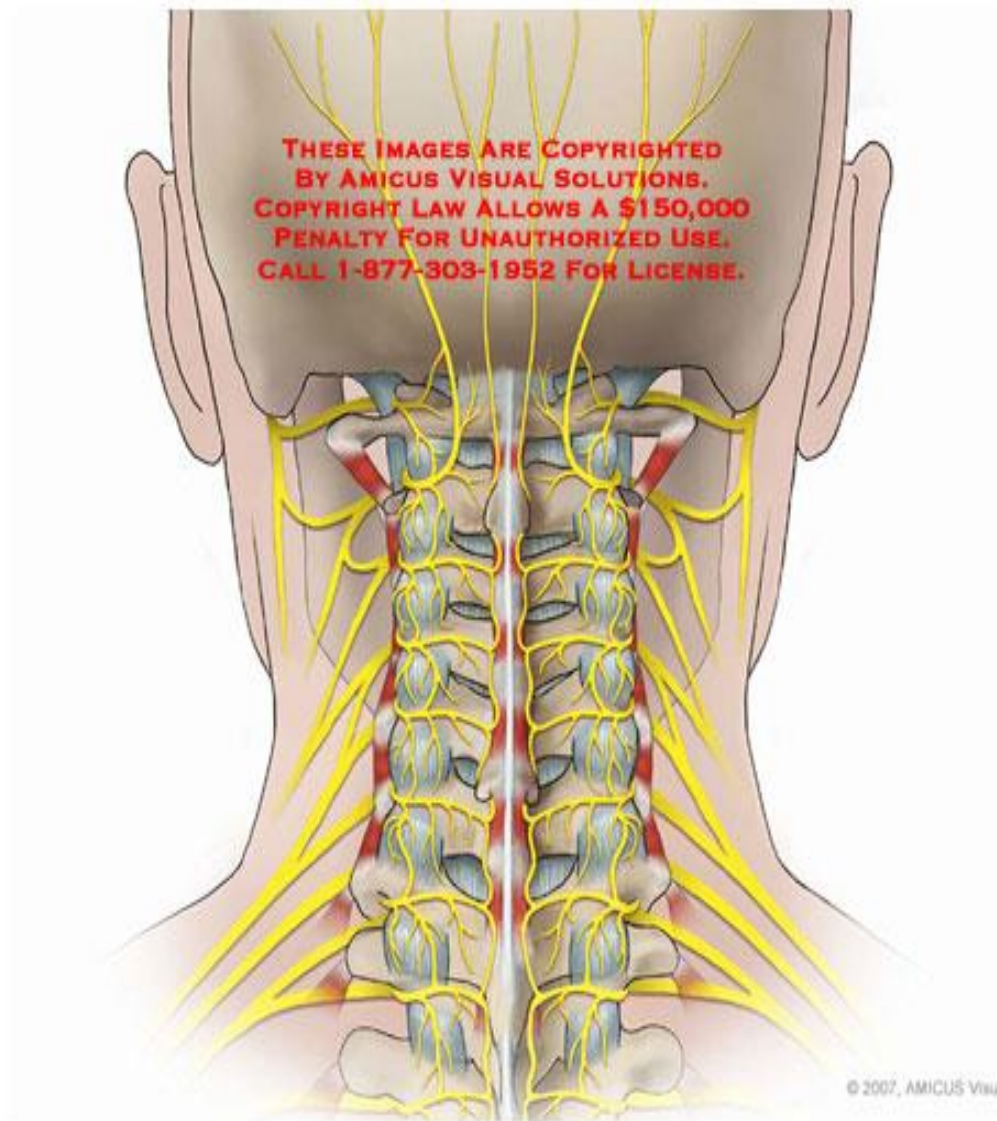


Pain Intracranial - Innervation of dura

## Dura stretched, compressed or inflamed



CSF – 20 mls/hr, 150 mls capacity



Pain - cervicogenic

# 45 year old male

- 3 months continuous background headache generalised
- Not postural
- Featureless
- No medication
- Family history





# IHS Headache classification

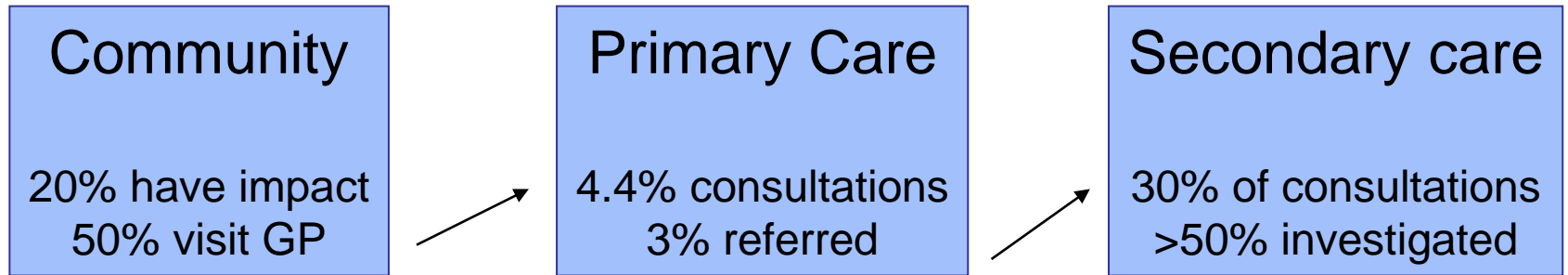
## Primary

- Migraine
- Tension type
- Autonomic cephalalgias (cluster)

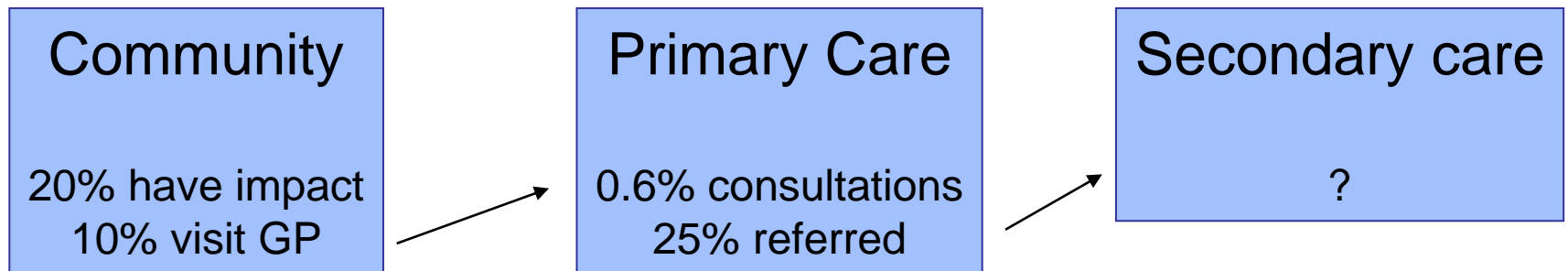
## Secondary

- Traumatic
- Vascular
- Non-vascular (SOL)
- Substance induced
- Infection
- Disturbed homeostasis
- Facial structures

# Headache impact



Adults



Children

# University new entrants Kernick 2002

- 1124 consecutive students
- Headache that impacted on life 21%
- 13% > 15 days of the month
- 45% seen a GP
- <5% prescribed medications for headache

# What do patients have when they present to A and E with headache?

Valade 2000

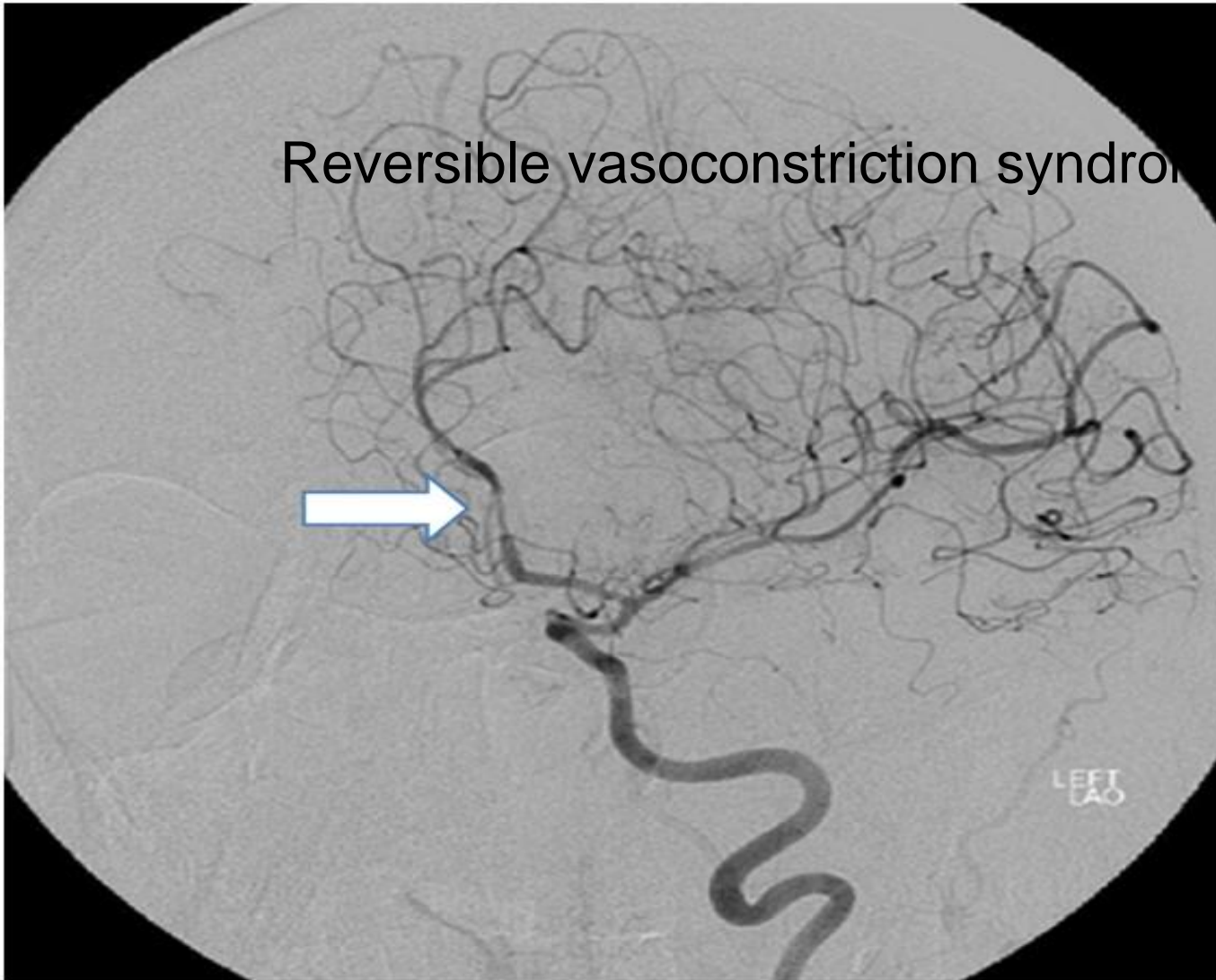
• Migraine	55%	80%
• TTH	25%	
• Cluster	<u>7%</u>	
• Trauma	1.6%	
• Trig Neuralgia	1.6%	
• Sinusitis	1.6%	
• Vascular disorders	<u>1.2%</u>	
• Low Pressure	1.2%	
• Meningitis	0.35%	
• Tumour	<u>0.17%</u>	
• Other Misc	< 5%	

# 29 year old male

- Thunderclap headache
- CT, LP normal
- Headache easing after 3 months
- Has coital headache X 2 in past year
- GP increased sertraline 4 months ago
- Heavy cannabis user



Reversible vasoconstriction syndrome



# Thunderclap Headache

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Subarachnoid hemorrhage

Sentinel headache

Cerebral venous sinus thrombosis

Cervical artery dissection

Spontaneous intracranial hypotension

Pituitary apoplexy

Ischemic stroke

Acute hypertensive crisis

Reversible cerebral vasoconstriction syndrome

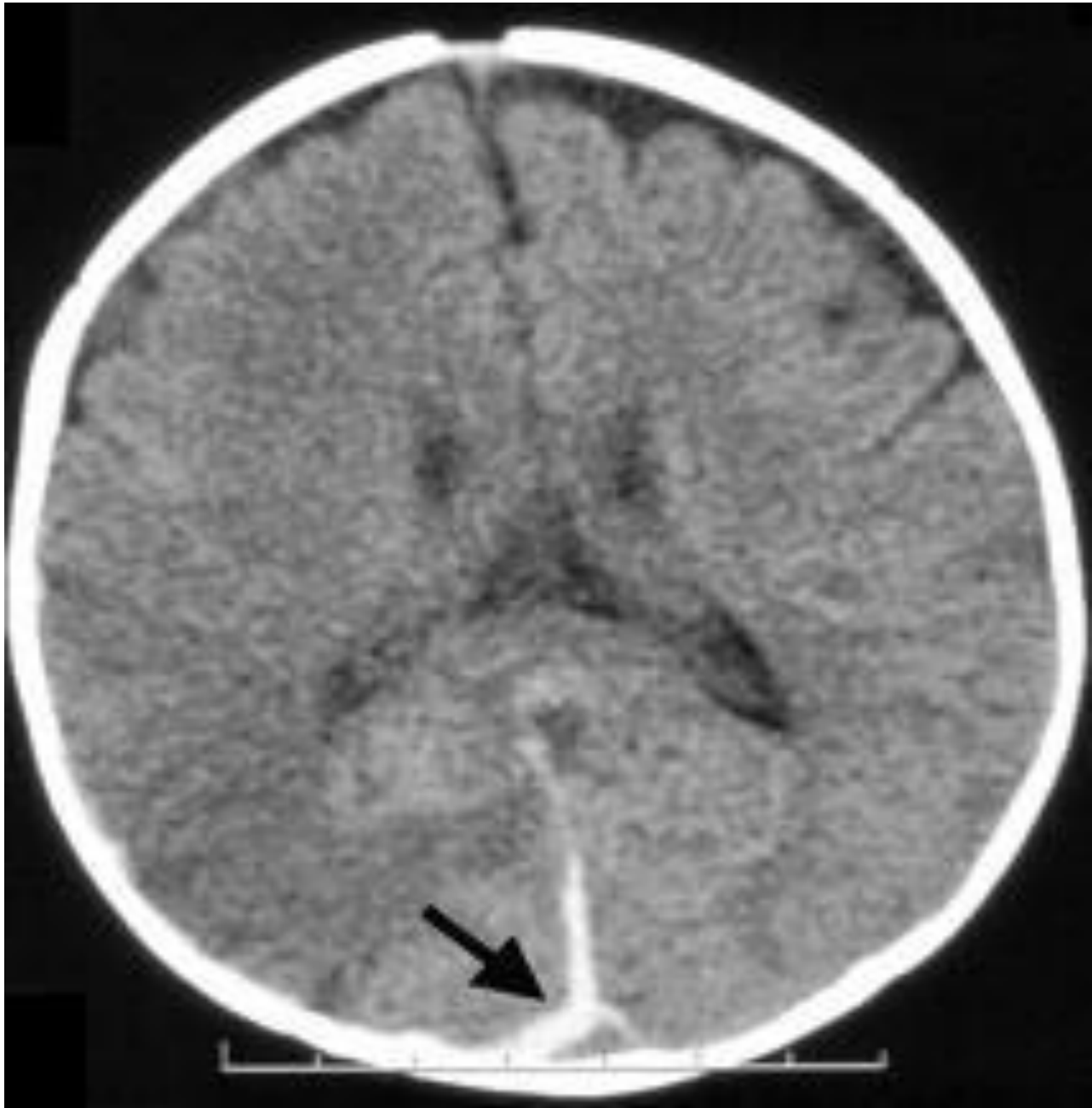
Third ventricle colloid cyst

Intracranial infection

Primary thunderclap headache

Primary cough, sexual and exertional headache

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Cerebral venous sinus thrombosis – any phenotype

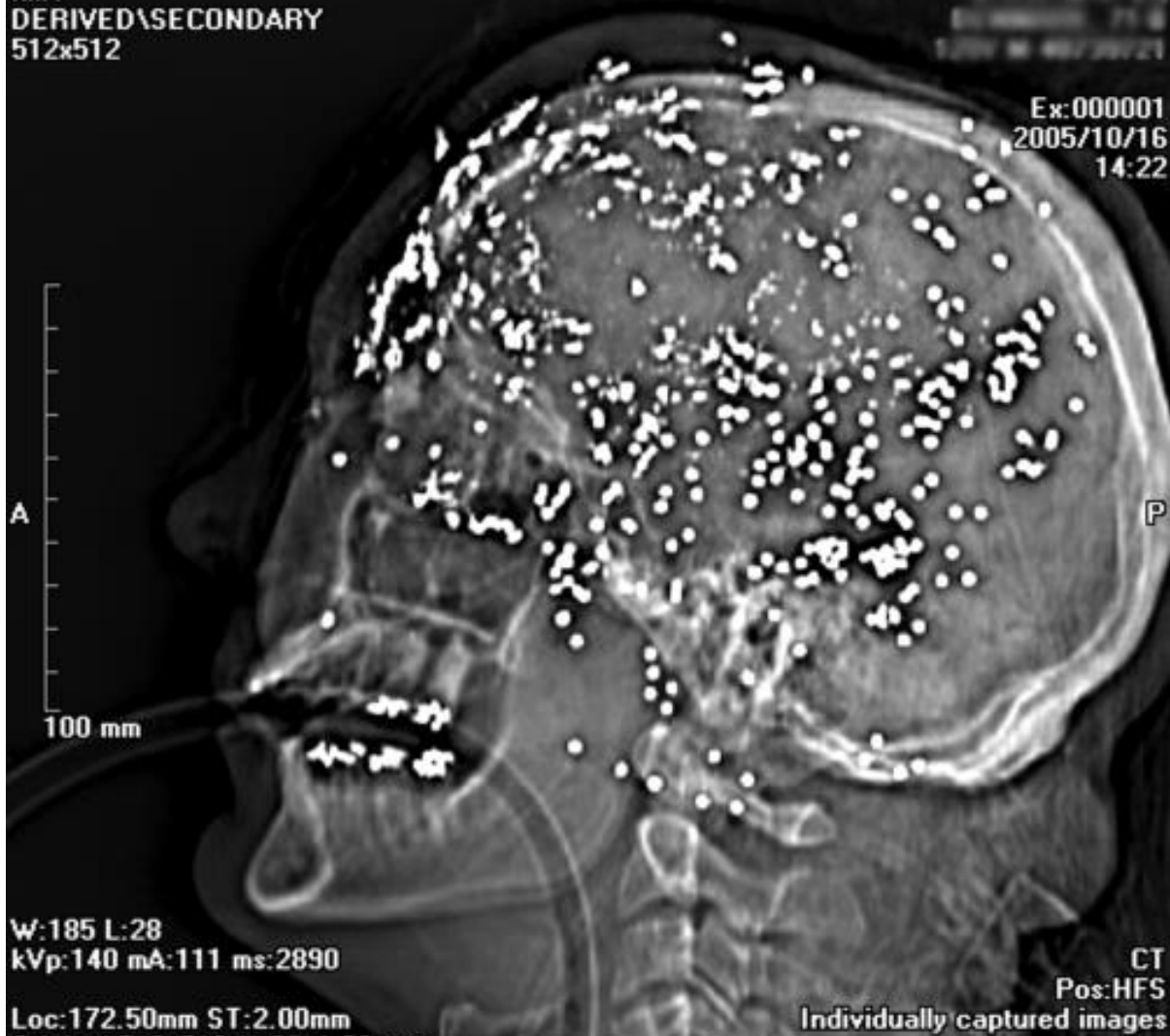
Im:1 (1/1)

Im:1  
DERIVED\SECONDARY  
512x512

S

05.10.05 14:22  
2005/10/16 14:22

Ex:000001  
2005/10/16  
14:22



A

P

100 mm

W:185 L:28  
kVp:140 mA:111 ms:2890

Loc:172.50mm ST:2.00mm  
Original 512x512 (1.00x1.00mm)  
Deriv: DCM\_WEB: PEG lib Lossy\_Quality=80;

CT  
Pos:HFS  
Individually captured images

Voxar 3D

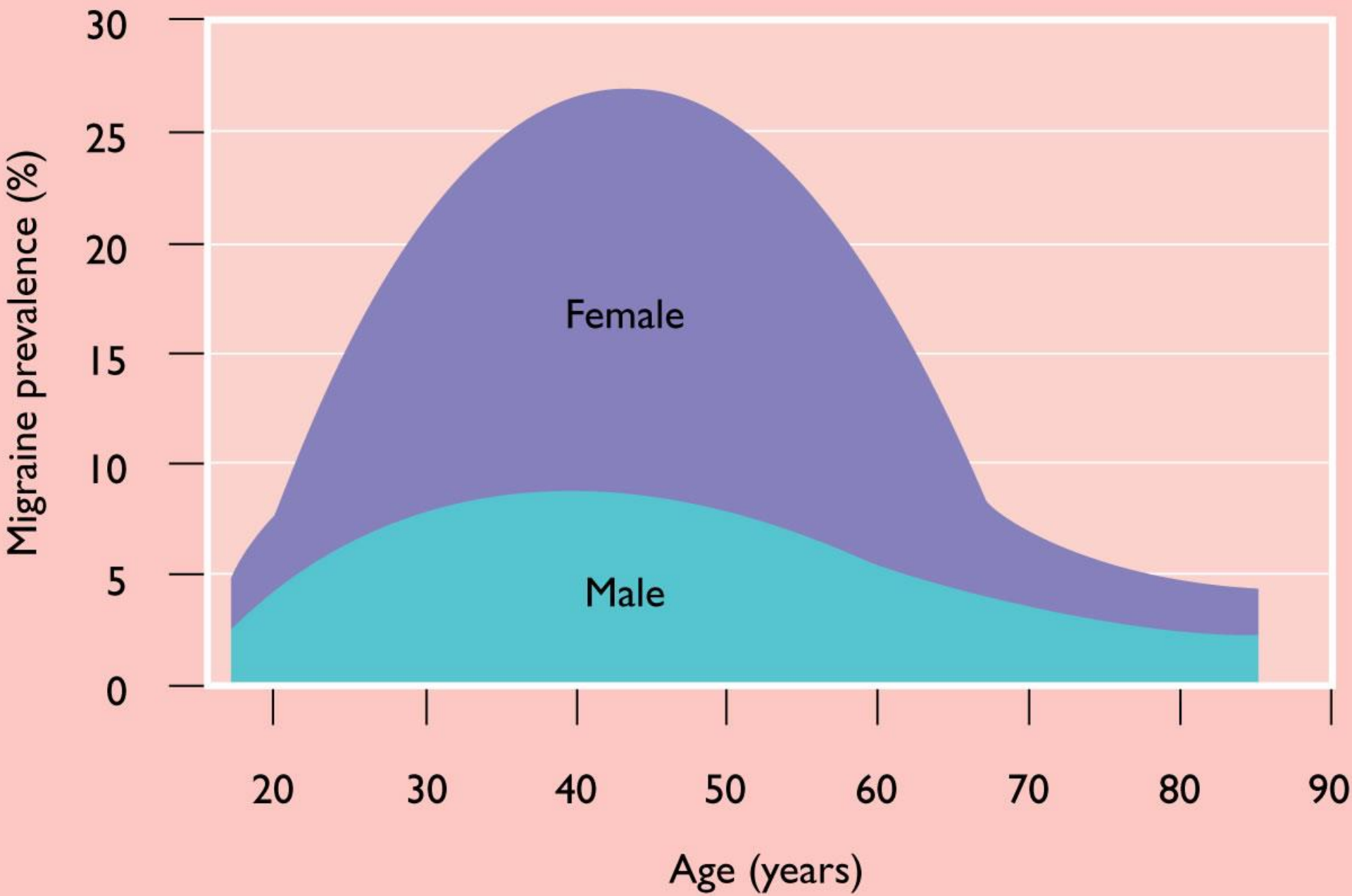
# Cluster treatment

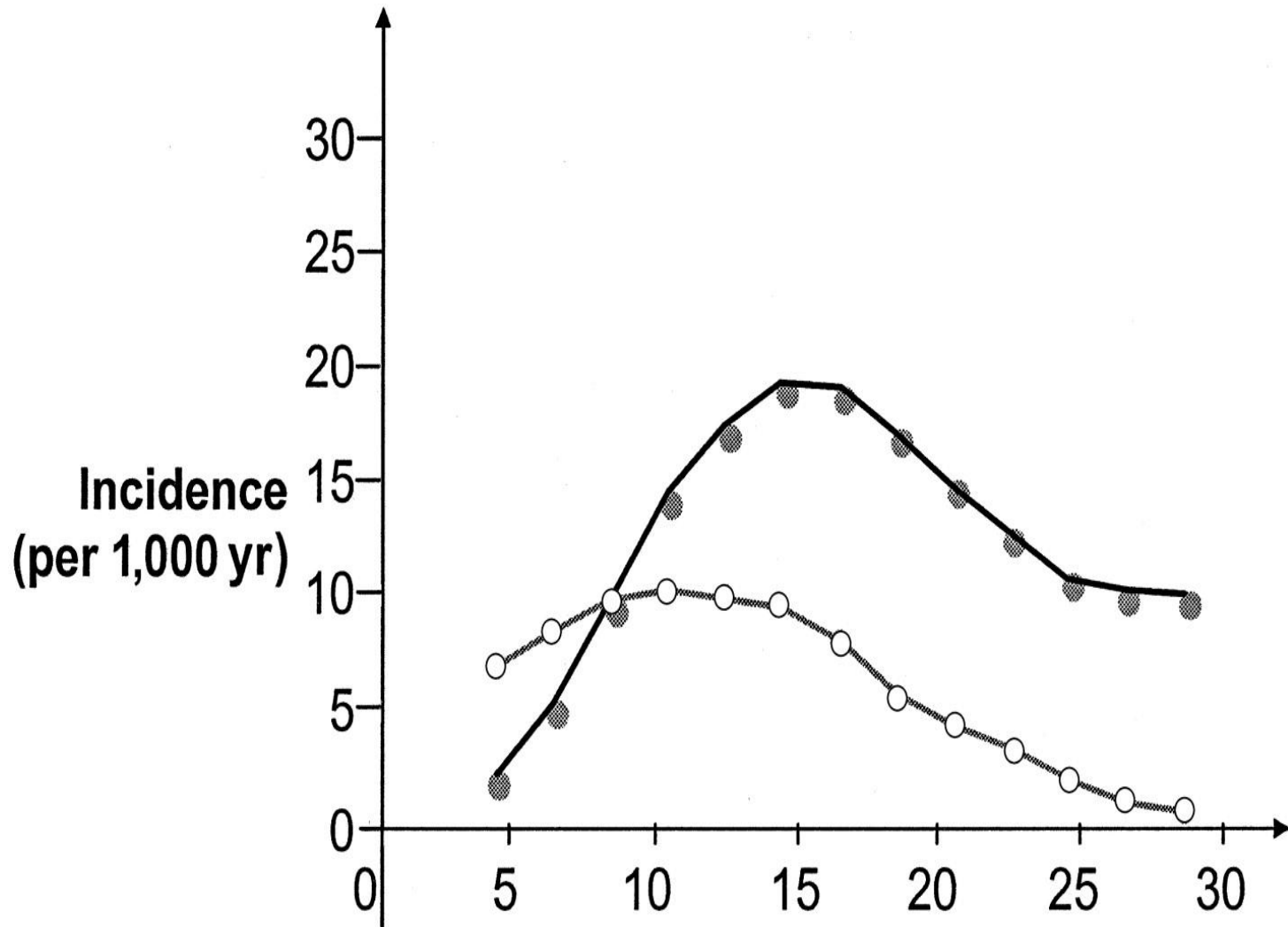
- Injectable Sumatriptan
- Short term steroids
- Oxygen 100%





Cluster	Migraine
Peri-orbital Unilateral.	Any part of head Uni or bi-lateral
Attack 15 minutes- 2 hours.	4-72 hours
Biochronicity	-
Autonomic features	-
-	Central sensitivity (movement, light, sound, touch)
Active ++	Inactive
-	Aura 30%



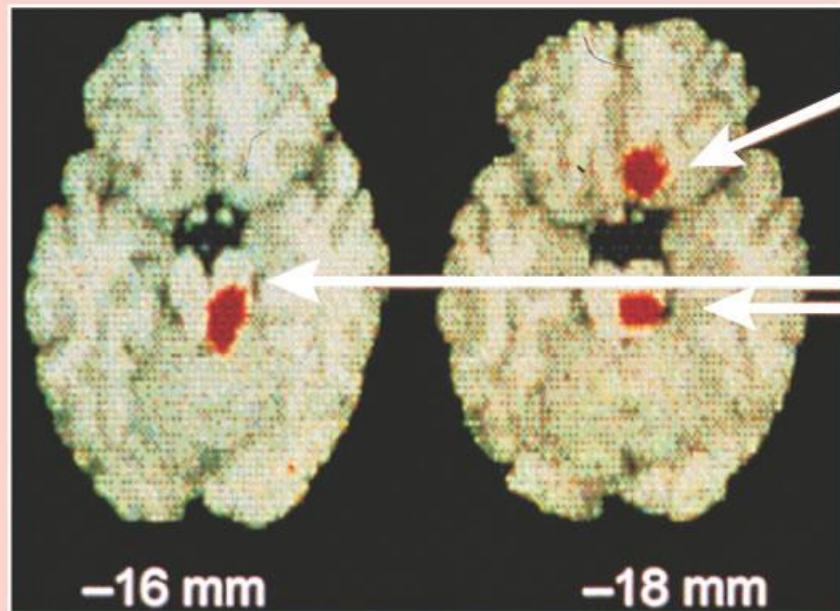


Annual Migraine incidence

# Some problems

- Migraine – a complex biopsychosocial disease
- No clinical markers
- Mechanisms poorly understood
- Doesn't come alone – epilepsy, anxiety, depression, asthma, IBS, fibromyalgia
- Stigmatised

## Dysfunction of brain stem pain and vascular control centers



### Pain perception\*

■ Anterior cingulate cortex

### 'Migraine generator'\*

■ Raphe nuclei

■ Locus coeruleus

■ Periaqueductal gray

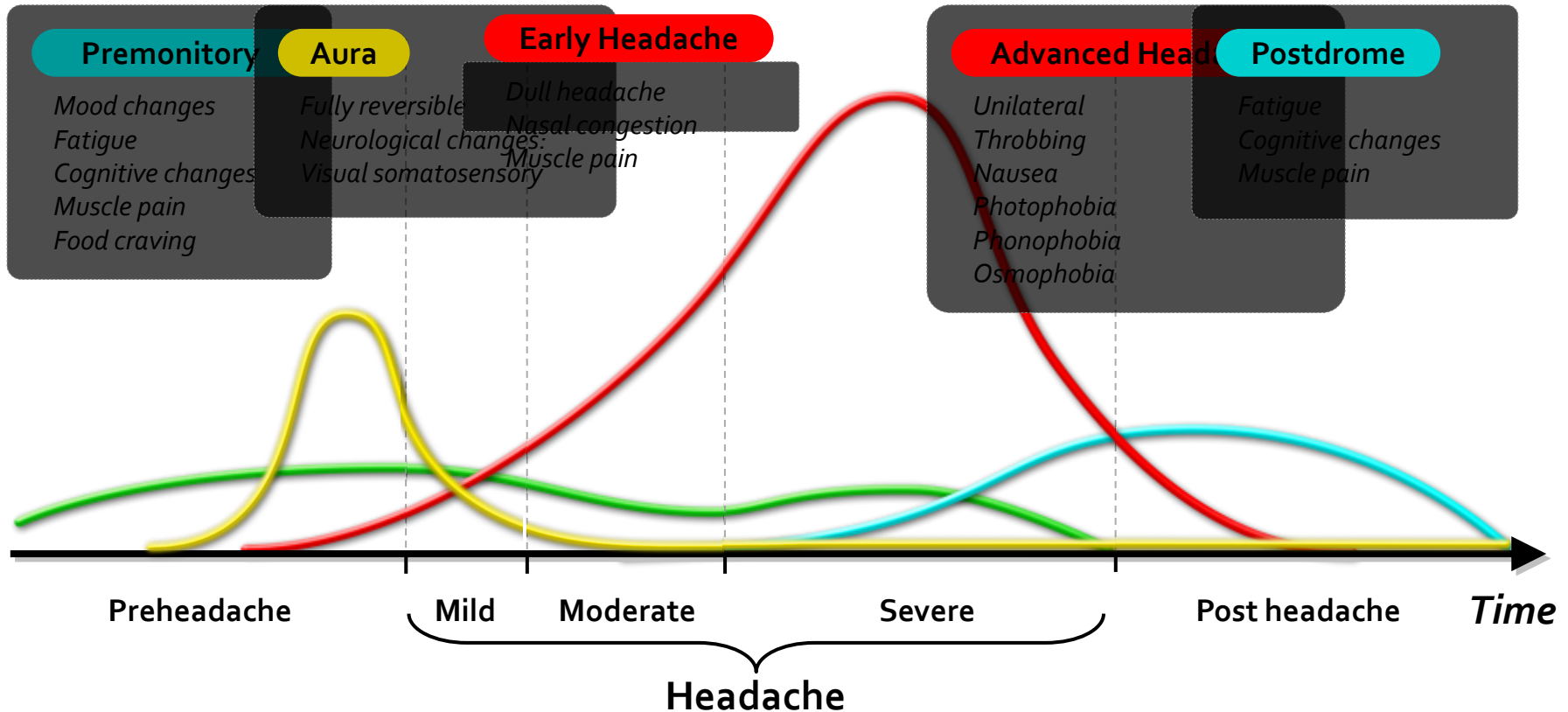
\*Areas of red indicate cerebral blood flow increases ( $p < 0.001$ )

Implications for gastric stasis and neck pain





# Migraine: A Featureful Headache



# Migraine

## Acute treatment

- Paracetamol, Aspirin, Prokinetic (Domperidone/metochlorpropamide).
- Triptan
- Not opiates



30 year old  
Migraine with aura  
GP given Sumatriptan 50mg  
Not effective

# Problems

- Gastric stasis

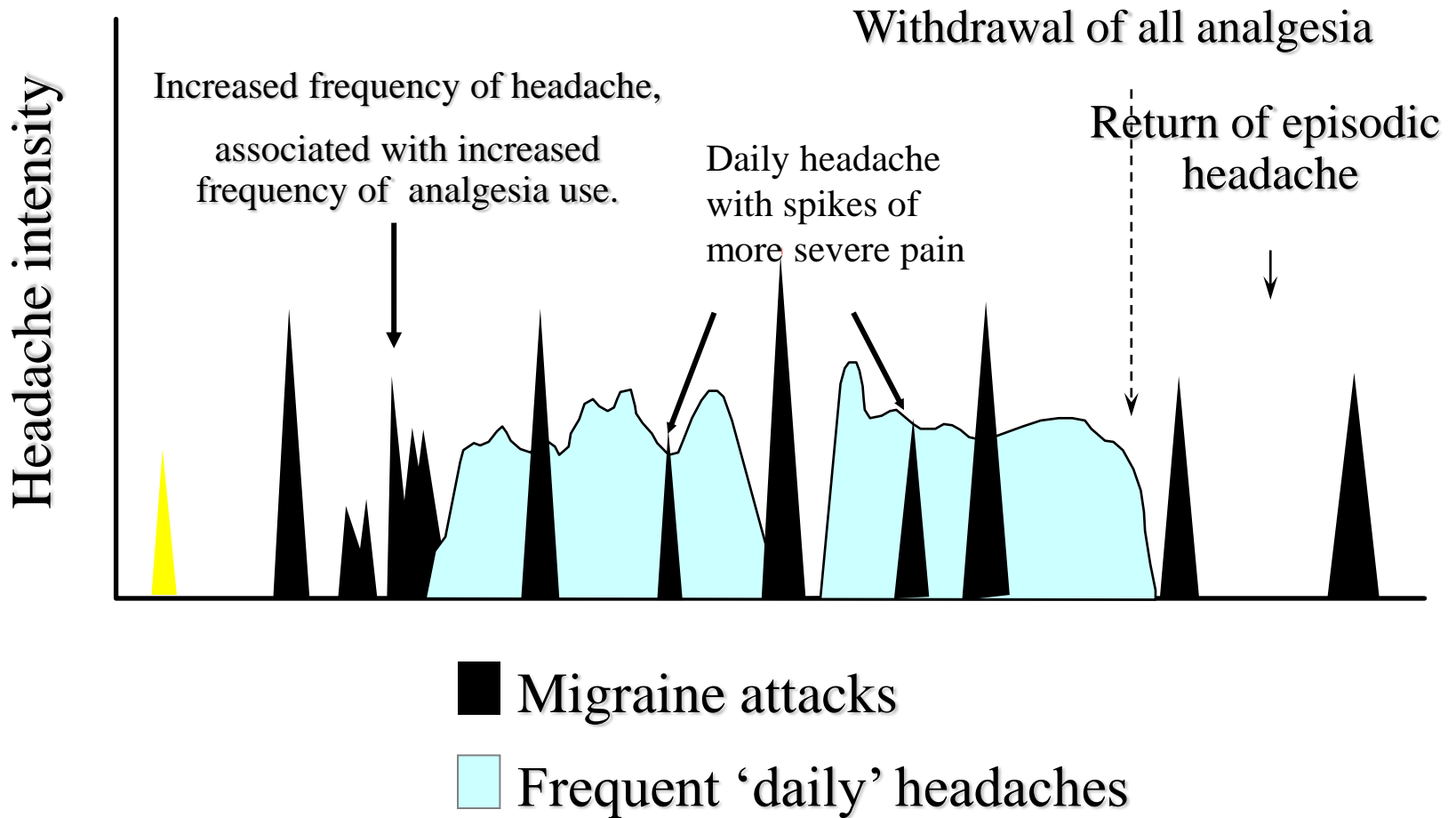
Change formulation (nasal, (wafer), inj)

- Takes too late or in aura phase
- Change the Triptan (failure not a class effect)
- Medication overuse headache

# Medication overuse Headache

- 3% of population
- Analgesics > 15 days of month
- Triptans > 10 days of month

# Medication overuse headache



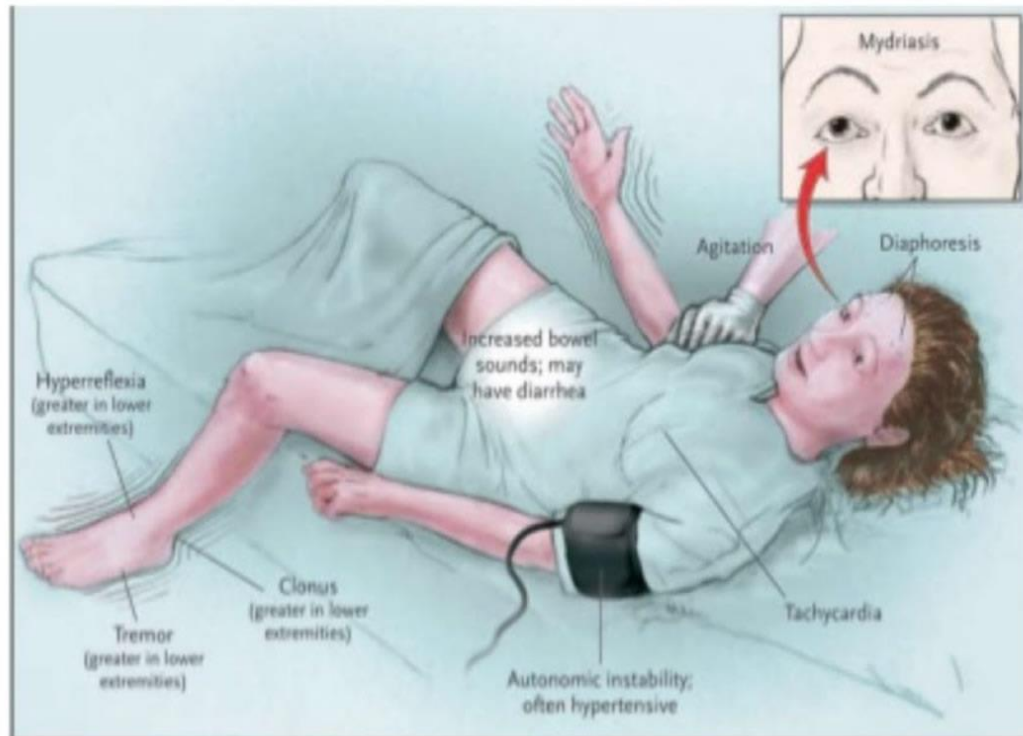
Migraine with aura taking Sumatriptan 100mg  
Which cause you concern?

- On Loestrin 20
- Age 69
- Past history TIA
- Started SSRI



# Serotonin Syndrome

- Cluster of autonomic, motor & mental status changes resulting from excess 5-HT (5-HT<sub>2A</sub>)



## Agents

MAO-Is

TCA

SSRIs

opiate analgesics

cough medicines (OTC)

antibiotics

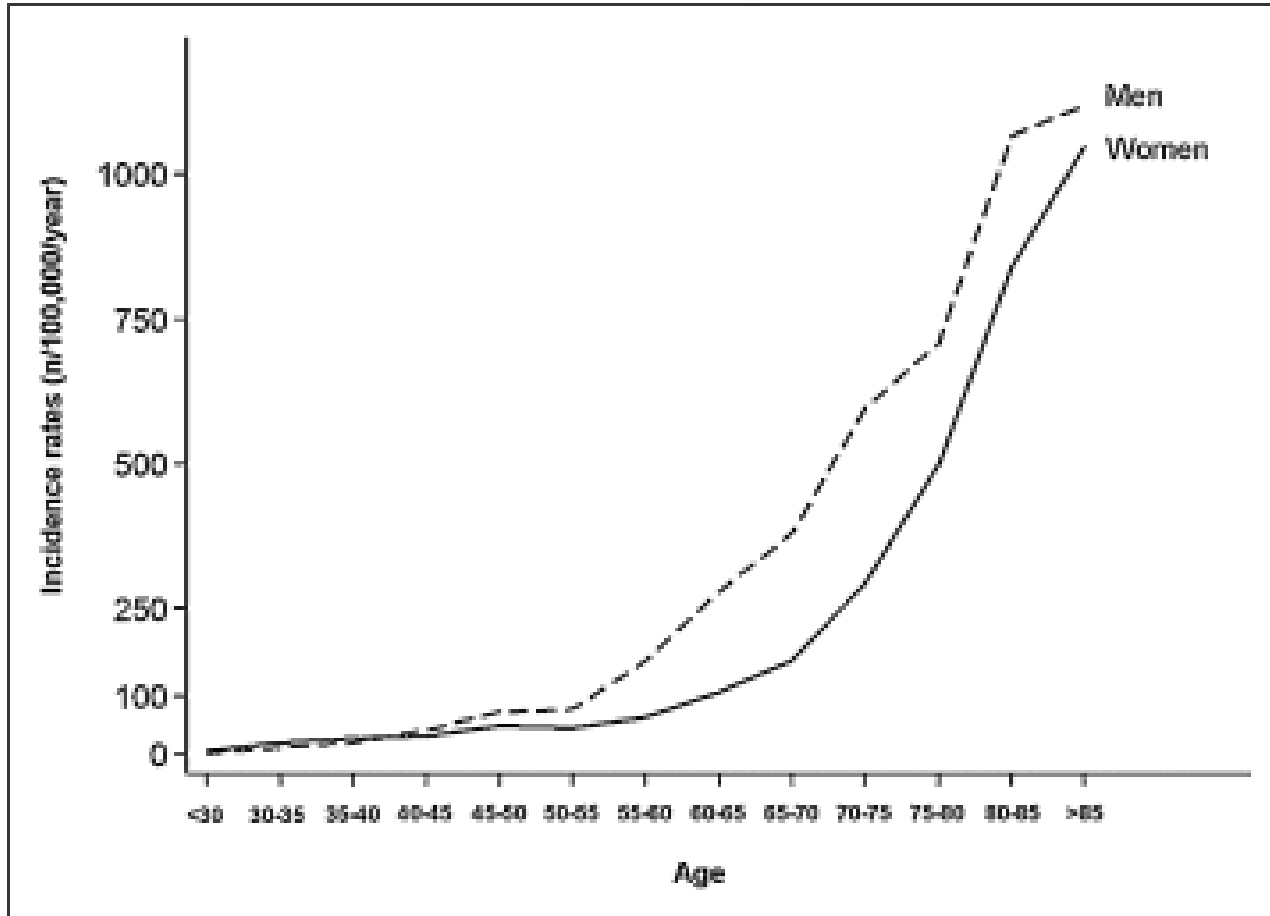
triptans

anti-nausea

herbal products

abused drugs

# Loestin 20

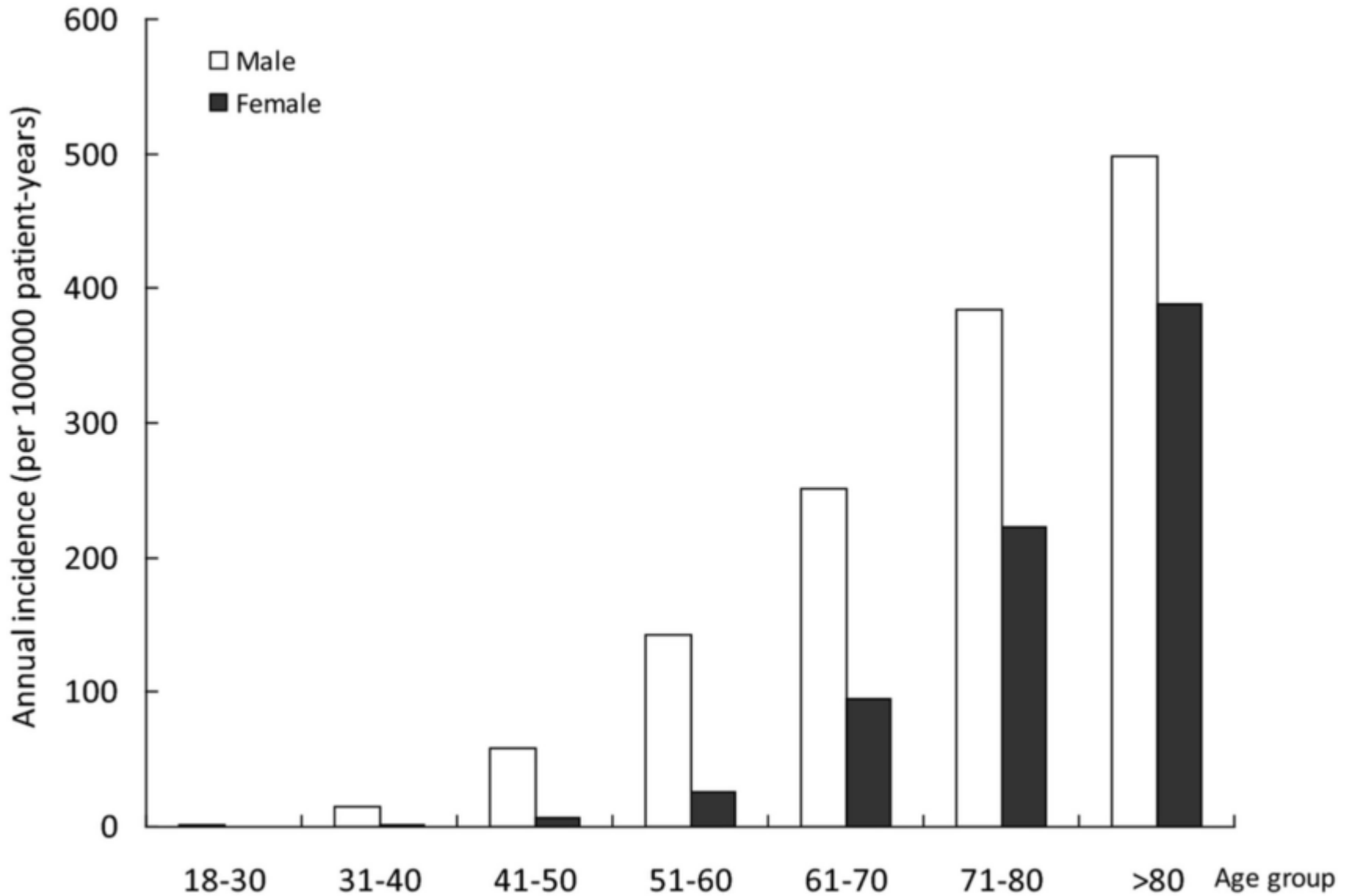


Absolute risk of stroke Bejot 2016

# Stroke relative risks

Schurks 09

- MA 2.2 (1.5-3.0) > MwA 1.2 (0.9-1.7)
- Female>male: 2.08 (1.13-3.84) > 1.37 (0.09-2.11)
- Under 45>over 45: 3.65 (2.21-6.04)



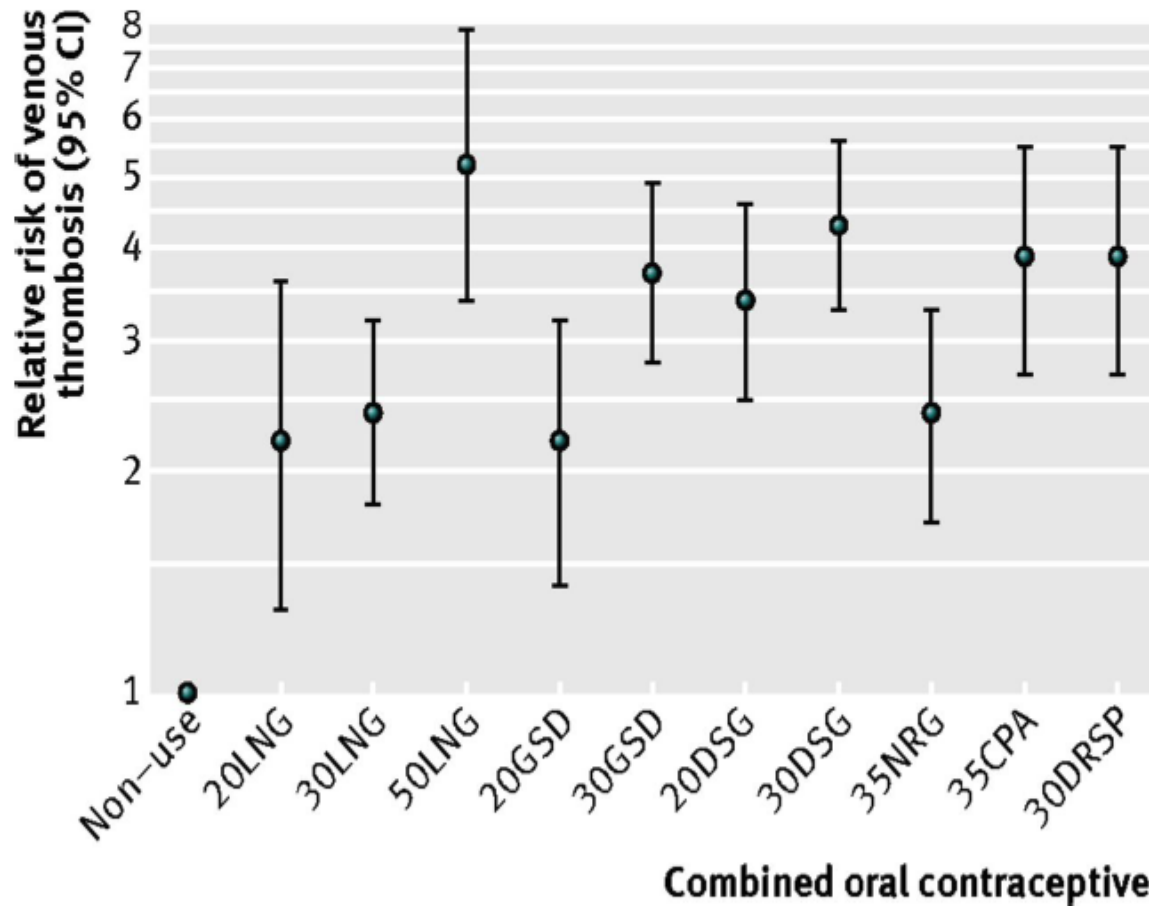
Incidence MI/100,000 Cheng-Han 14

# Myocardial infarct

Sacco 2009

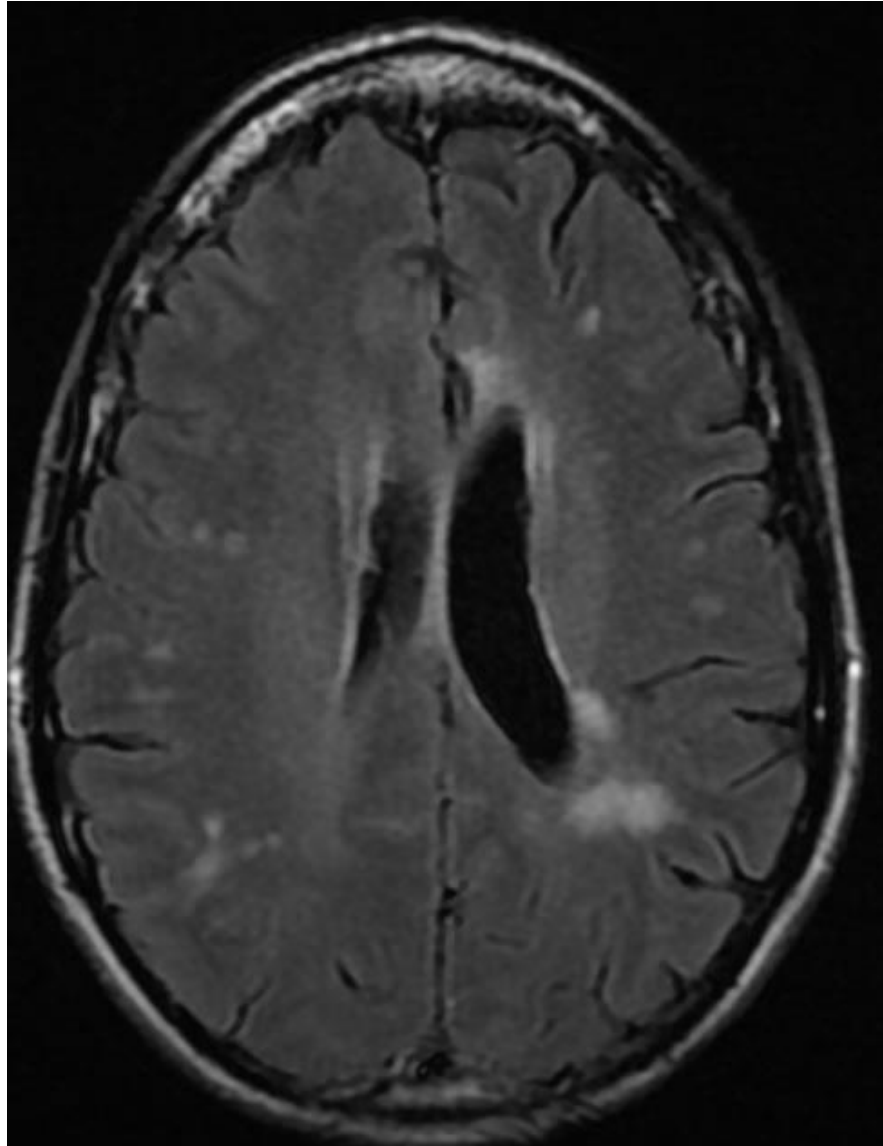
- Meta analysis 15 studies
- All migraine RR 1.33 (1.08-1.64)
- MA (n-1) 1.71 (1.16-2.53)

# Risks: COC use and VTE



# Possible mechanisms

- Endothelial dysfunction
- Platelet dysfunction
- Mitochondrial dysfunction
- Patent foramen ovale



The white matter story



# The white matter story

Krutz 2004, Swartz 2004, Xie 2018

- Nature of lesions unclear (? Microvascular)
- Increase with age
- Associated with posterior circulation infarcts (? More vulnerable)
- Female>male
- Migraine>non-migraine
- Aura>without aura
- Related to migraine frequency

# Preventative Medications in Migraine

Cupboard 1

**Propranolol**

**Amitriptyline**

**Topiramate**

# CGRP monoclonals

Eptinezumab		Alder	IV
Erenumab <sup>1</sup>	AIMOVIG	Novartis	SC
Galcanezumab <sup>2</sup>	EMAGALITY	Lily	SC
Fremenezumab <sup>3</sup>	AJOVY	Teva	SC

EU Approval

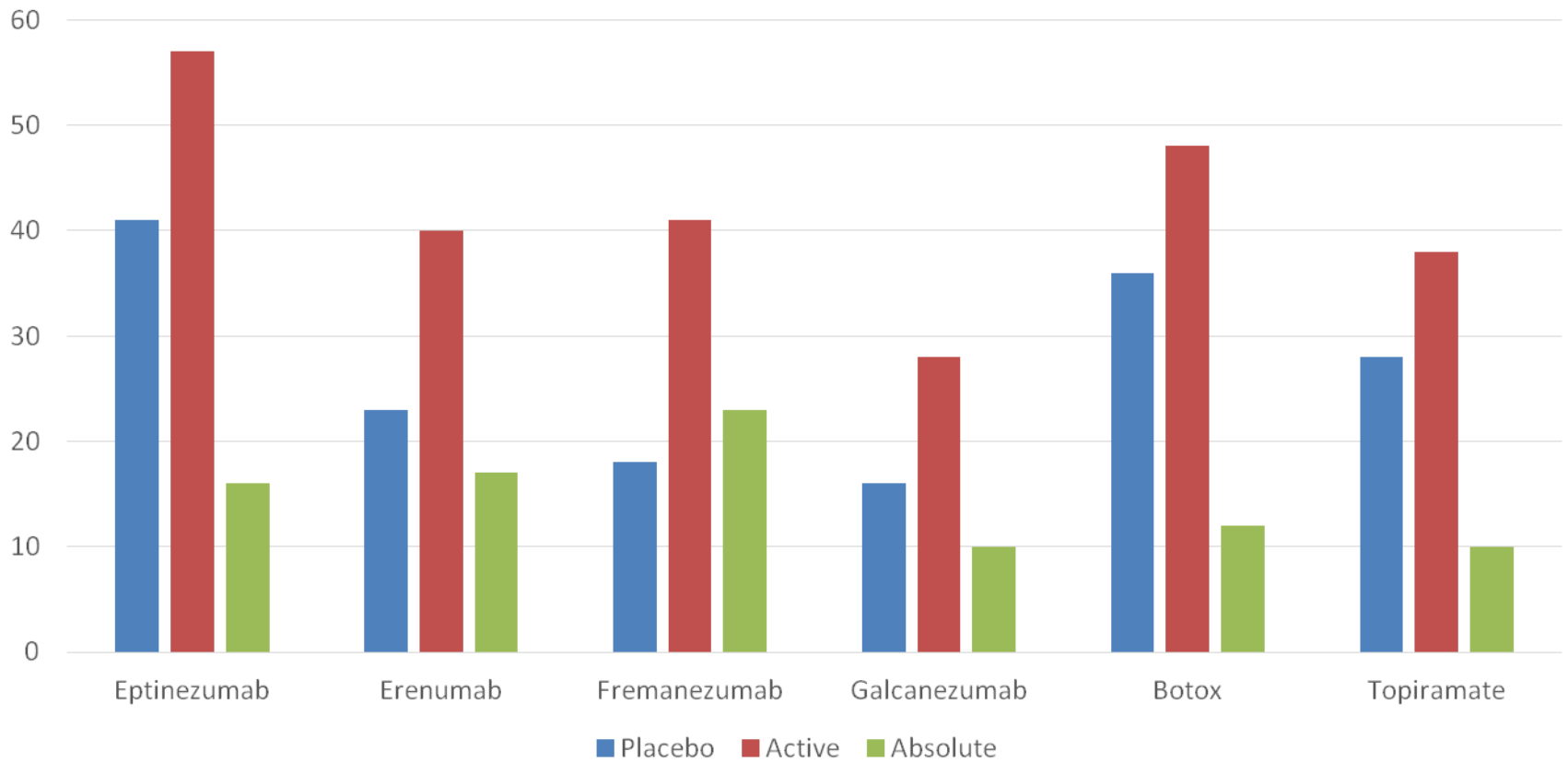
1 = July 18

2 = Nov 18

3 = Likely April 19

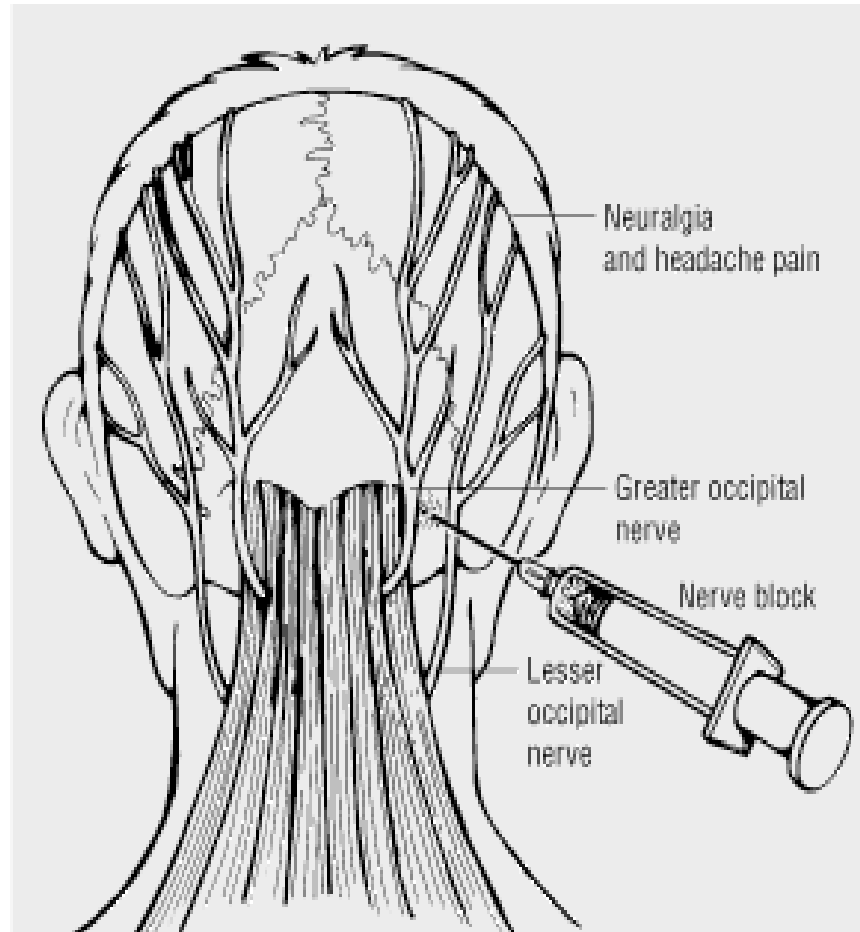
# Chronic Migraine CGRP v Current Therapies

50% Responder Rate



# Needles – occipital nerve injection

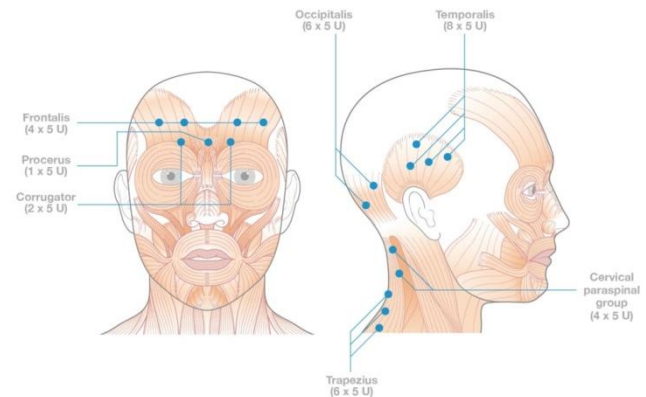
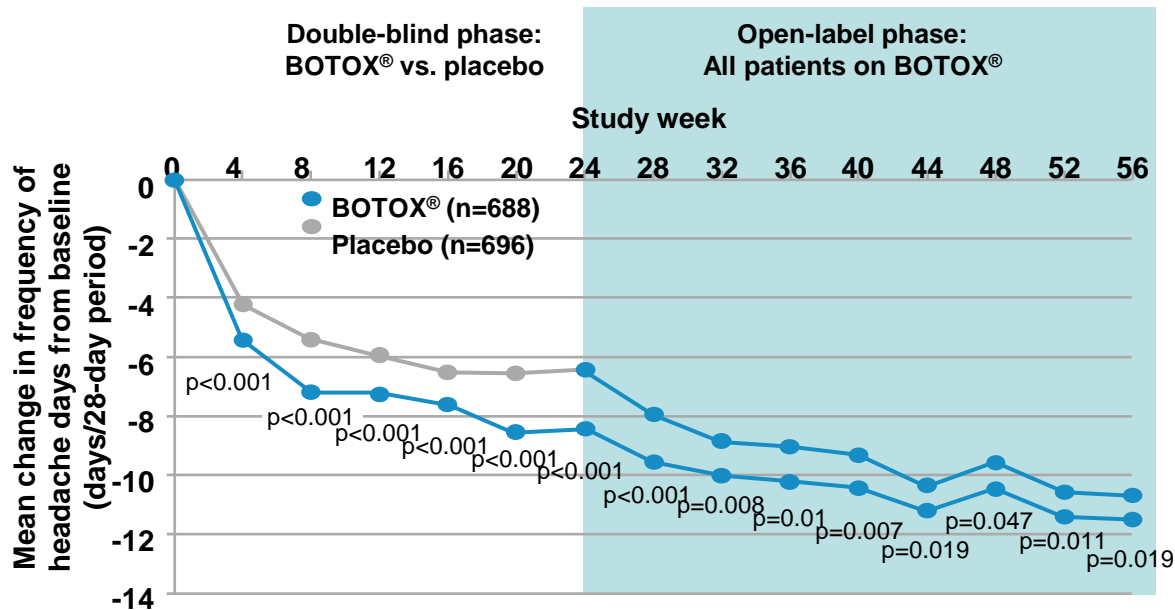
Figure 3. Occipital nerve block. Via a needle inserted at the base of the skull, an anesthetic agent is injected around the origin of the greater occipital nerve.

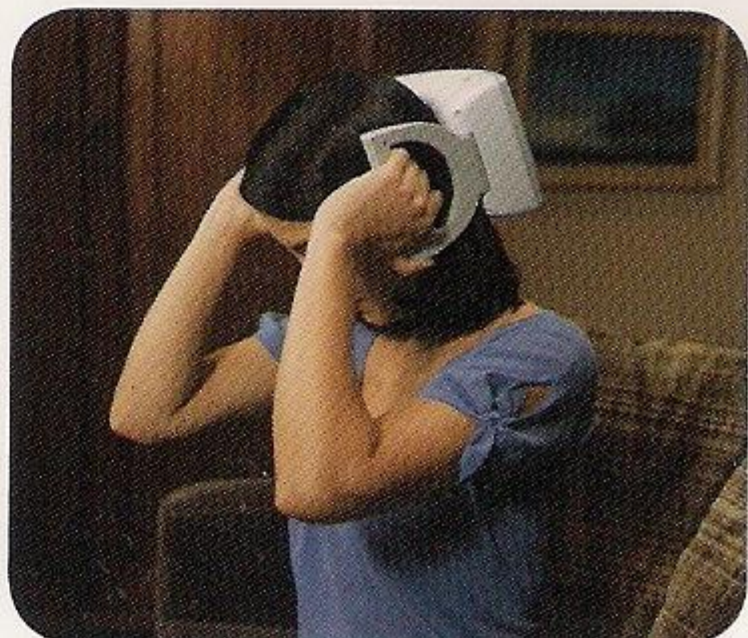
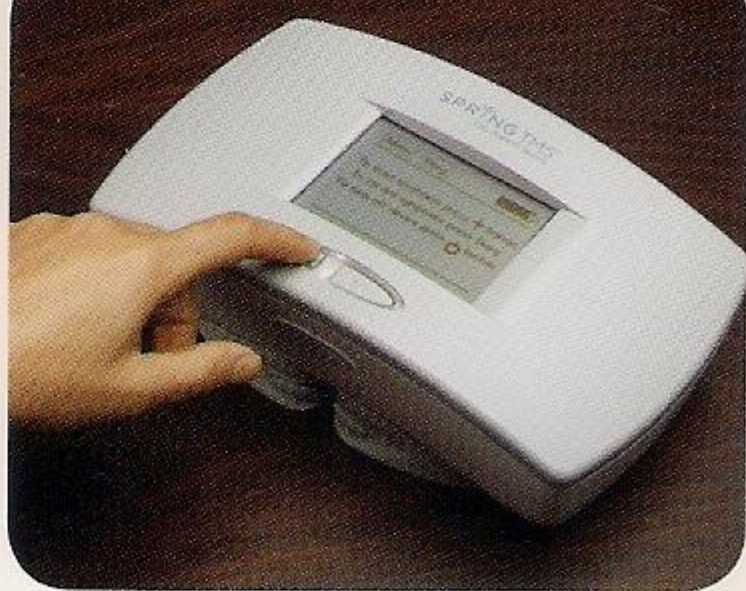


# Needles - Botox

## BOTOX® for Chronic Migraine

- UK licence for Chronic Migraine, NICE approved
  - $\geq 15$  days headache of which  $\geq 8$  days are migraine
- Rejected by SMC (2011 and 2013)
  - Starting to be used in patients where most other treatments have failed







Transcutaneous vagal nerve stimulation



## Supra-orbital nerve stimulator



# Exercise headache

35 yr female

Migraine 1-2 each year

Noticed headache on running

Diagnosis?

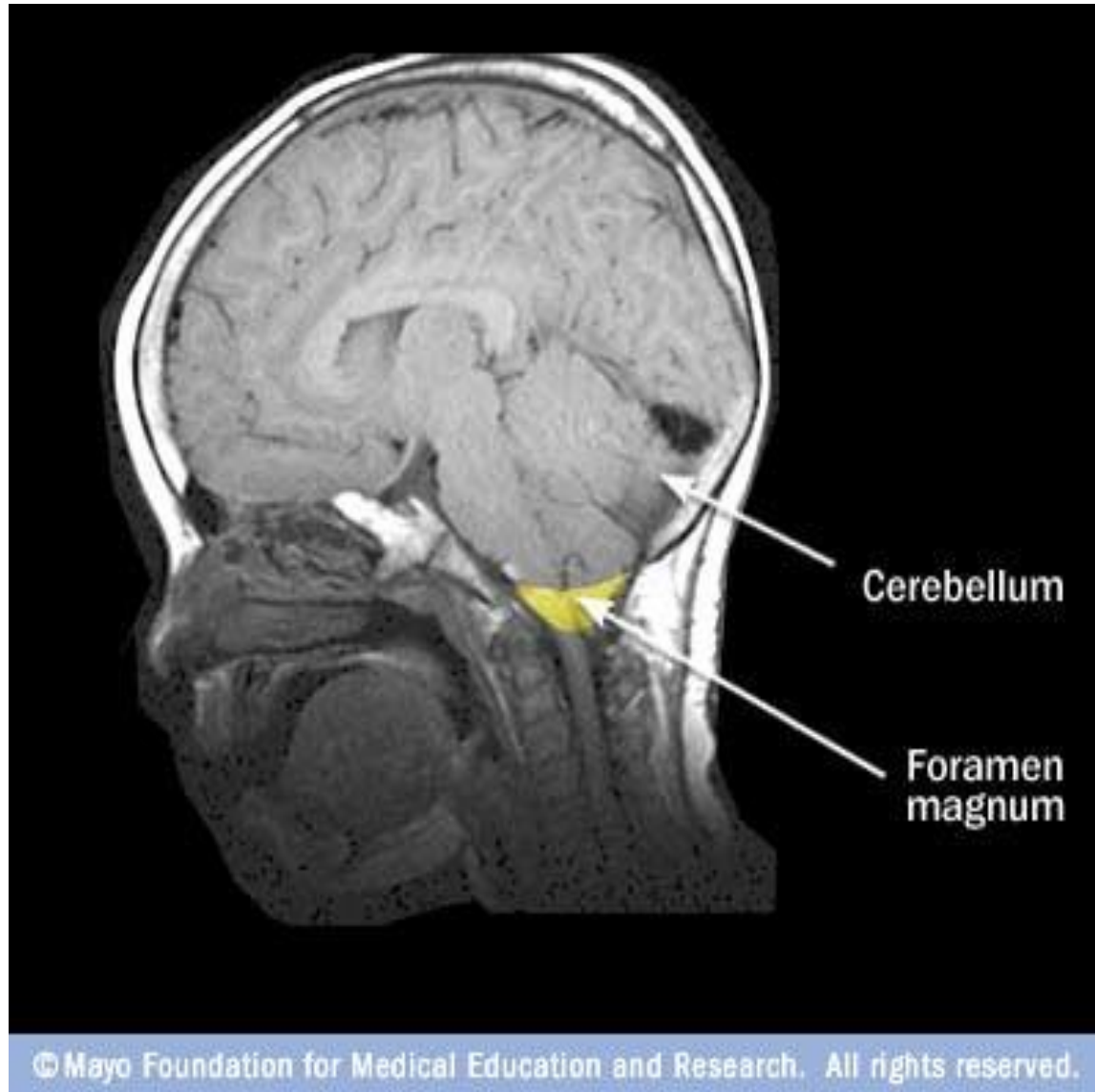


# Exercise headache

- Migraine

10%

- Sub arachnoid
- SOL
- AC malformation
  
- Primary exercise headache



Pressure too low

35 yr male  
Car shunt one week ago  
3 days non specific headache  
Diagnosis?

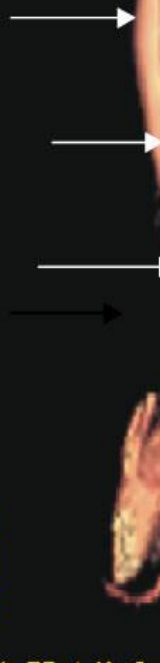


Set: 2 +c  
Volume Rendering No cut

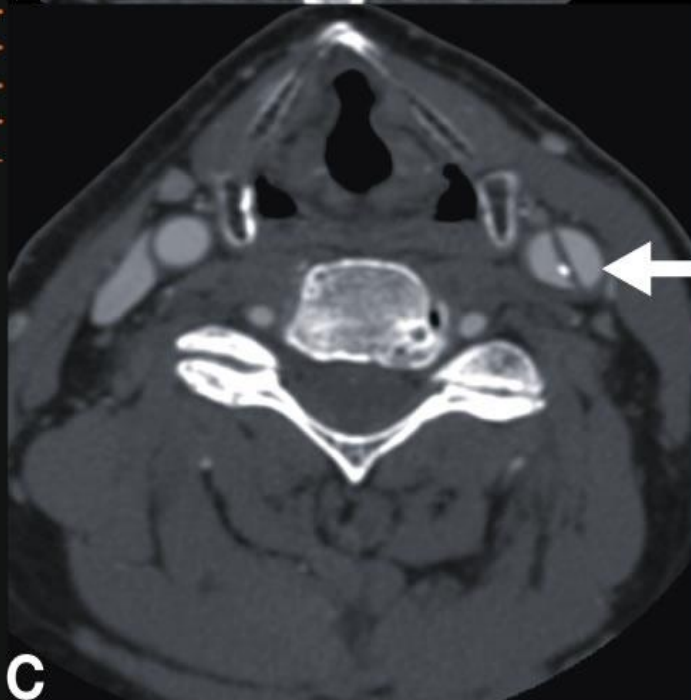
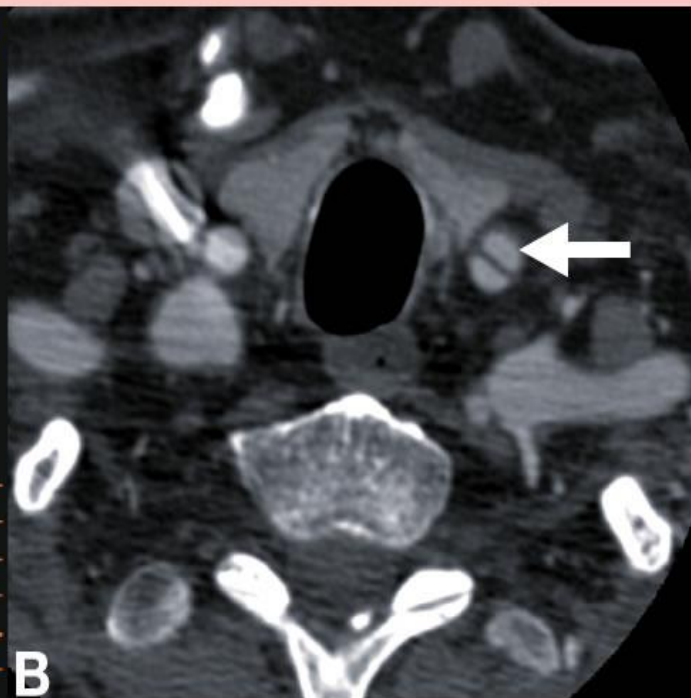
M 70 294803  
Mar 16 2004

DFOV 20,5 cm  
STANDARD  
433/7

L  
A  
S



I  
P  
R



No VOI  
kv 120  
mA 315  
1,4  
1,2 mm 0,75; 1/0,8 sp  
Tilt: -18,5  
11:43:18 AM  
W = 644 L = 324

**A**

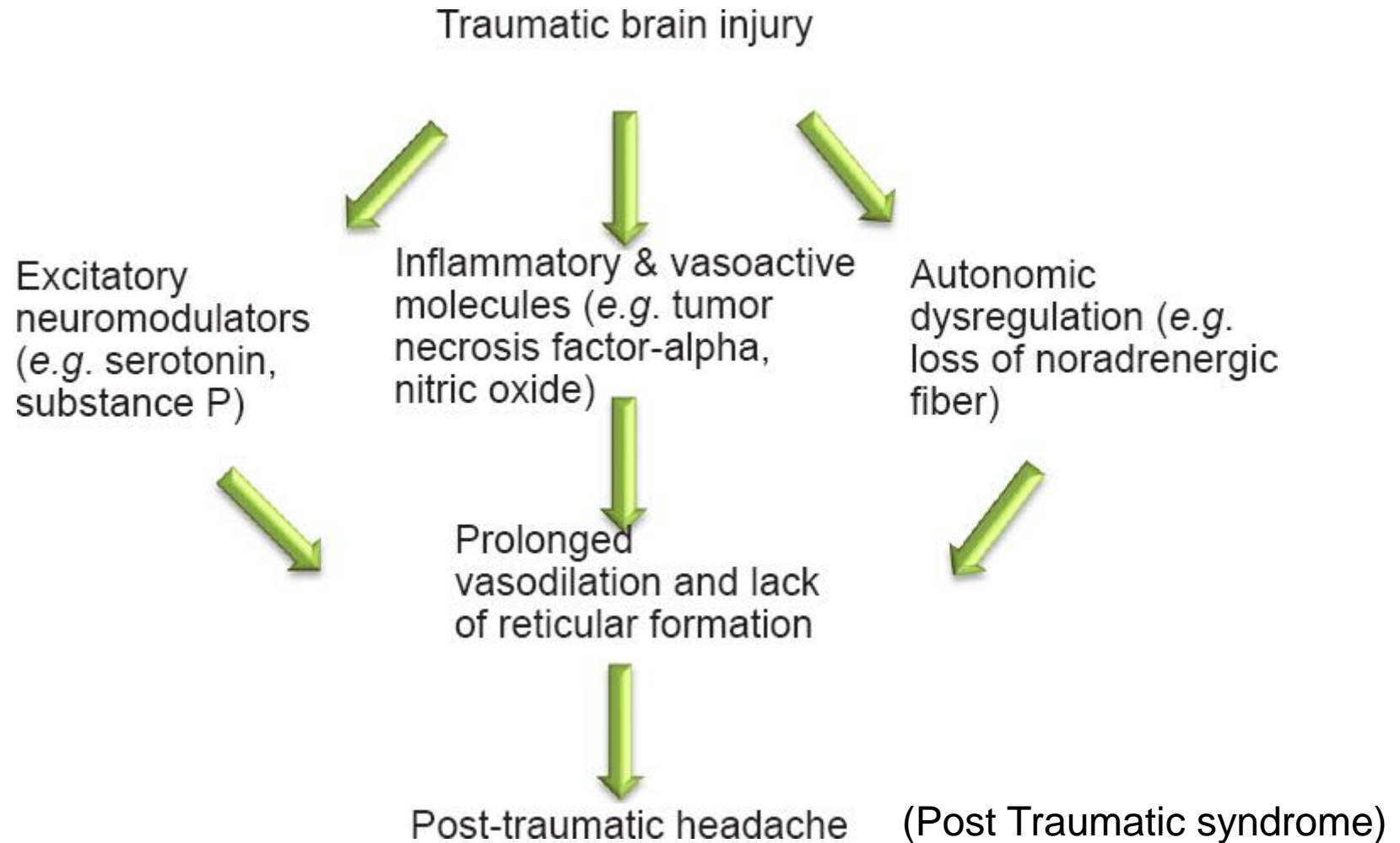
**B**

**C**

# Brain injury

- Direct neuronal damage
- Secondary damage due to vascular insult
- Inflammatory response and resolution

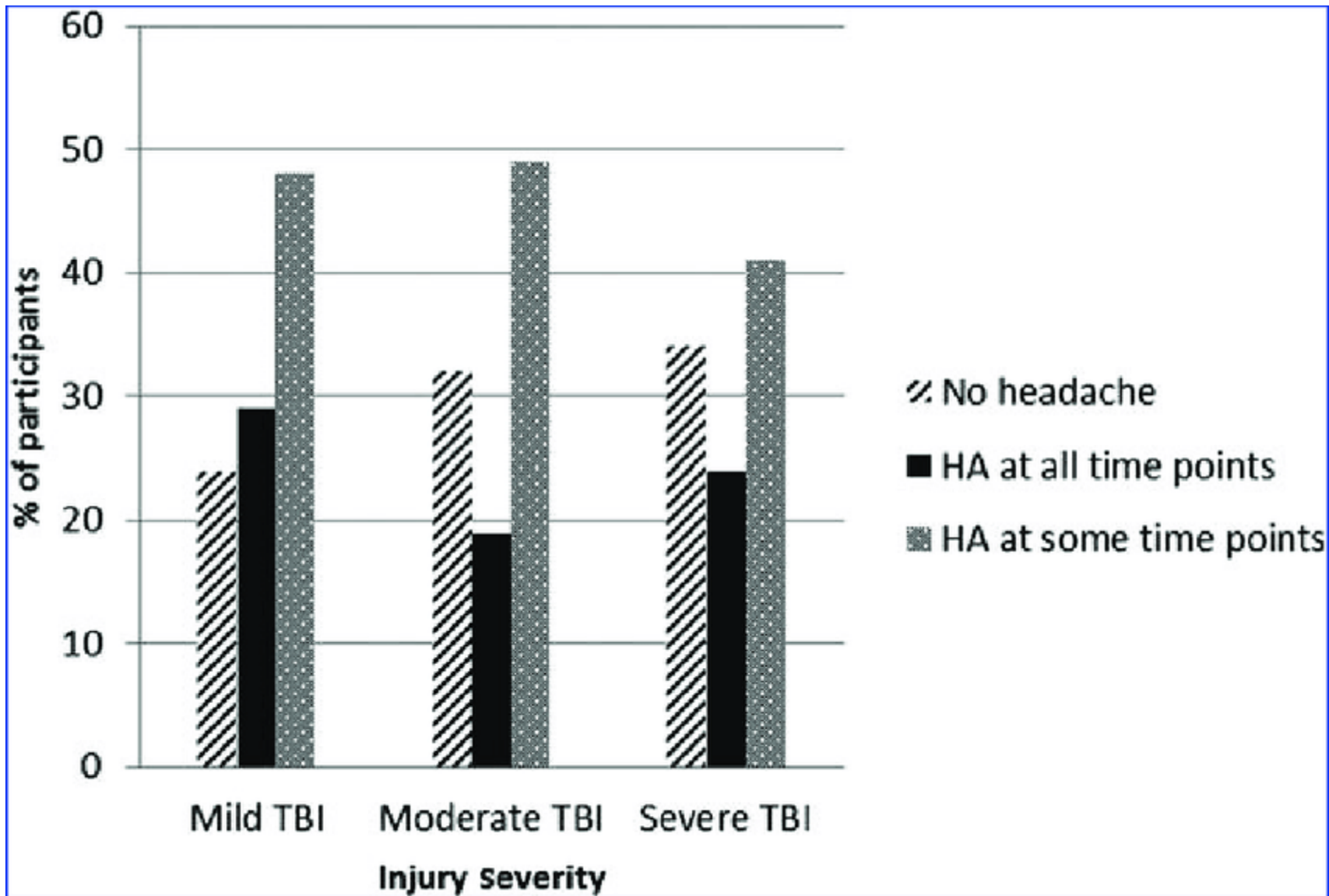
# Post Traumatic Headache

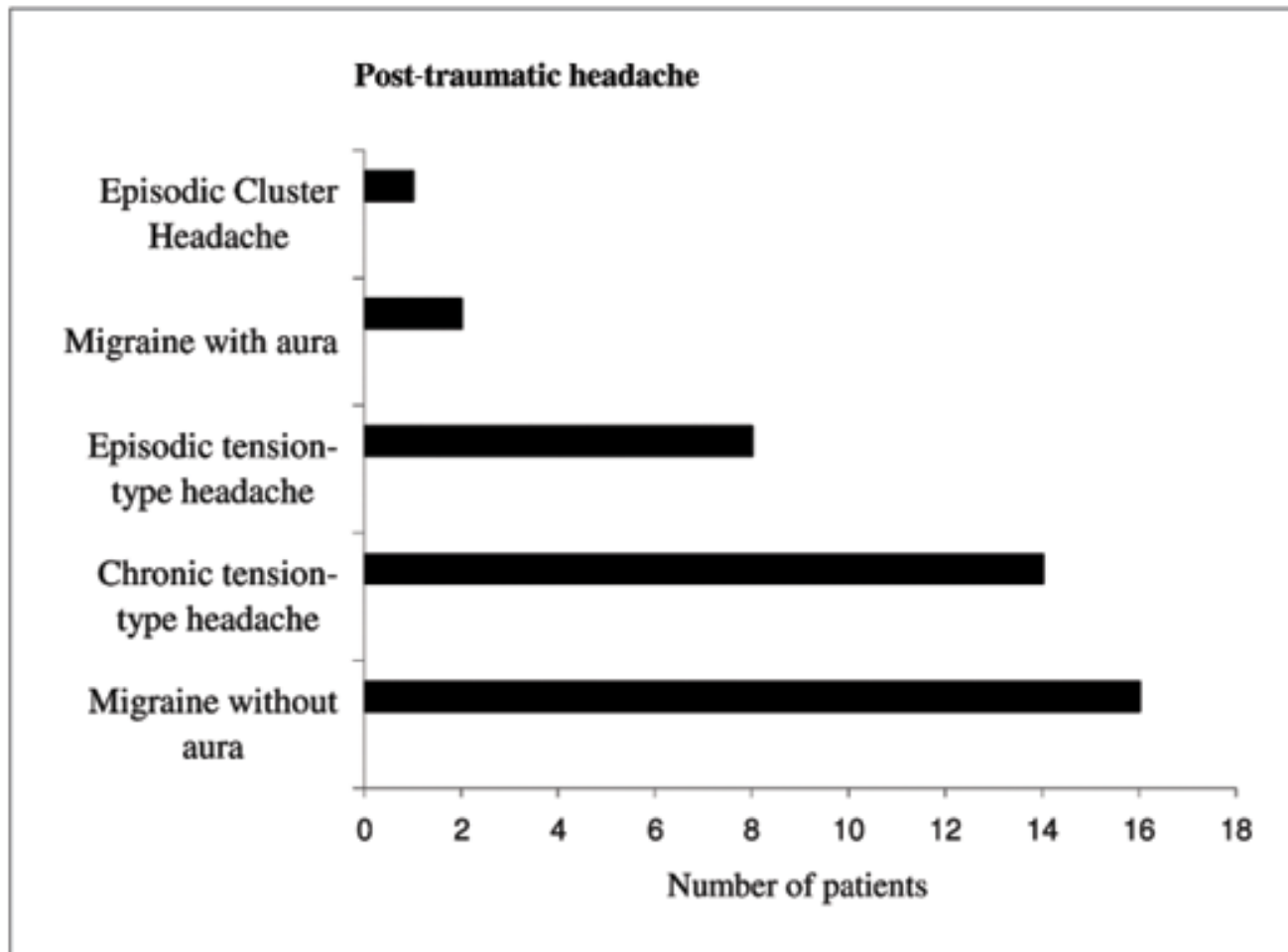




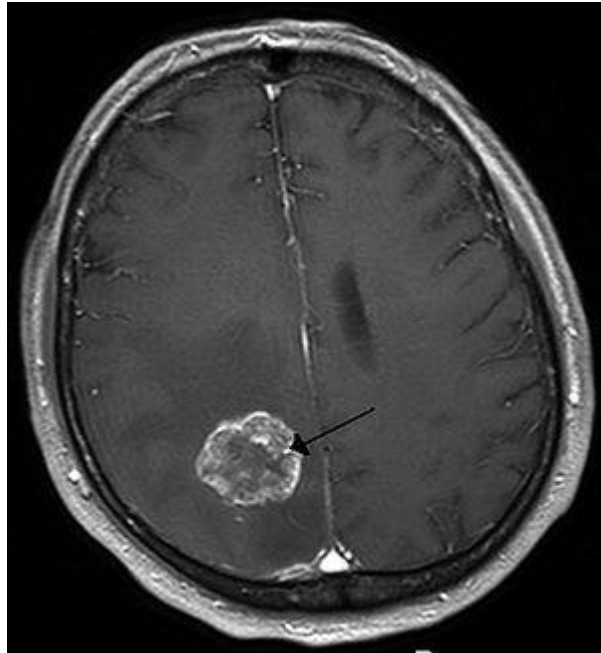
<b>Classification</b>	<b>Current terms</b>	<b>Time to onset</b>	<b>Length of symptoms</b>	<b>Insult</b>	<b>Predominant clinical feature</b>	<b>Pathophysiology</b>
Traumatic brain injury with immediate effects	Acute traumatic brain injury <i>Concussion</i>	Immediate	Days	Single episode of trauma	Alterations in consciousness	Direct axonal damage
Traumatic brain injury with early effects	Sub-acute traumatic brain injury	Hours to days	Weeks to months	Single episode of trauma	Headache (IHS < 7 days)	Inappropriate inflammatory cascade
Traumatic brain injury with late effects	Chronic traumatic encephalopathy	Years	Years	Multiple small traumas. E.g. boxing, heading of the football	Cognitive dysfunction	Inappropriate inflammatory cascade

Pragmatic classification of traumatic brain injury with associated features





*Fig 1. Characteristics of post-traumatic headache.*



Brain tumour primary or secondary

# Tumour diagnosis setting



**Table 2** Proportion of tumours by route, for selected tumours

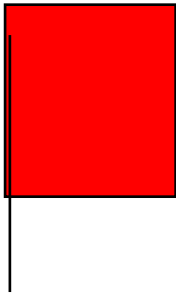
	Screen-detected (%)	TWW (%)	GP referral (%)	Other outpatient (%)	Inpatient elective (%)	Emergency presentation (%)	DCO (%)	Unknown (%)	n
All cancers	5	26	21	10	6	24	1	8	739 667
Under 50 years	2	29	24	10	6	15	0	13	81 072
Aged 50–59 years	12	26	21	9	6	15	0	10	102 487
Aged 60–69 years	10	26	22	10	6	18	0	8	181 958
Aged 70–79 years	2	28	23	10	6	25	1	6	207 389
Aged 80–84 years	0	25	20	9	5	34	1	6	87 940
Aged 85+ years	0	20	16	7	4	43	3	7	78 821
Bladder		30	24	13	9	19	1	5	25 639
Central nervous system		1	13	11	7	62	1	6	11 697
Breast	28	43	11	3	1	5	0	9	110 173
Colorectal	2	27	20	9	9	26	1	6	91 416
Kidney and unspecified urinary organs		19	26	17	6	25	1	6	20 594
Lung		24	17	10	4	39	1	5	96 735
Melanoma		41	27	7	3	3	0	18	26 660
Multiple myeloma		11	27	13	6	37	1	6	11 221
Non-Hodgkin lymphoma		18	28	12	6	27	0	9	25 413
Oesophagus		34	16	8	14	22	1	5	19 449
Ovary		23	20	12	5	32	1	7	16 026
Pancreas		11	16	9	6	50	1	6	19 896
Prostate		26	32	11	8	10	0	12	92 922
Stomach		23	17	8	13	33	1	5	18 613
Uterus		37	31	10	5	8	0	8	18 462

Abbreviations: DCO = Death Certificate Only; GP = general practitioner; TWW = Two-Week Wait. Cases diagnosed in persons with an English residential address, 2006–2008. Cervical cancer proportions relate to 2006–2007 data due to incomplete screening data in 2008. All 95% confidence intervals are below  $\pm 1\%$ .

Routes to diagnosis for cancer – determining the patient journey using multiple routine data sets

# Presentations

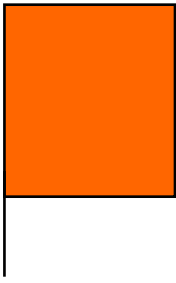
- New onset seizure has the highest positive predictive value of 1-2%
- Headache most common 23-56% of patients present with headache as their initial symptom



# Red Flags

Headache with:

- Abnormal neurological symptoms or signs
- New seizure
- Headache with exercise
- History of cancer elsewhere



# Orange Flags

- Aggregated by Valsalva manoeuvre
- Headache with significant change in character
- Awakes from sleep
- New headache over 50 years
- Memory loss
- Personality change
- *If a primary headache diagnosis has not emerged in an isolated headache after 8 weeks*



Population investigated	Risk of tumour
All consultations with GP for headache	0.09%
All consultations with GP where a diagnosis of migraine is made	0.045%
All consultations with GP with special interest in headache with headache in intermediate care setting	0.6%
All consultations with secondary care neurology with headache	0.8%
Casualty	0.17%

## Primary Brain Tumour

Population incidence 10/100,000 per year

Two default diagnoses



< 50 years Migraine



>50 years  
Temporal  
arteritis

Systemically unwell

- Tender artery with allodynia
- CRP better than ESR
- Problem with skip lesions

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## Primary Brain Tumour

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# Exeter Headache Clinic

## St Thomas Medical Group in conjunction with the NHS South West Headache Network

### Home

Educational Video Links for Doctors and Patients

Patient Information Sheets

Management Guidelines

Research Activity and Publications

Education

Reducing the Impact of Migraine in the Workplace

Support for NHS Commissioners

School Policy Guidance

BASH GPwSI Meeting Presentations

Proposed NHS Devon Headache Referral Guidelines

Headache Support Groups

Contact us

How to find us

Statement on Transcranial Magnetic Stimulation

### Clinic personnel

*Dr David Kernick* is a GP with a special interest in headache. He has a research interest in the area and has written a number of publications including the Oxford University Press Manual of Headache. He was formally the Chair of the British Association for the Study of Headache and currently leads the Royal College of General Practitioner's initiative on headache. He chairs the International Headache Society Primary Care Interest Group.

*Dr Peter Miller* is a GP with a special interest in headache and has an interest in homeopathy.

*Mrs Sam Hotton* is the Clinic Manager.

### Clinic times

Regular clinics are held on a Thursday afternoon at St Thomas Health Centre between 1530 and 1830 and Tuesday mornings between 0930 and 1230.

### Referral criteria

We have a contract to take referrals from practices within the new Devon CCG area (North, East and West Devon). This should be done through the Devon Access Referral Team (Choose & Book) - specify Neurology and choose Headache Clinic (Dr David Kernick). Any referrals outside this area are extra contractual referrals and must be accompanied by a letter of funding agreement from the relevant CCG. We can also accept self funded referrals by arrangement but this must be done through a GP referral. Our current waiting list is 2-3 months. We are happy to see adults over 18 years but we ask that headache should have been present for at least 6 months. This is because we are not set up to deal with headaches that may have a serious underlying pathology and we do not have direct access to imaging. We are happy to discuss cases with GPs either by email [sam.hotton@nhs.net](mailto:sam.hotton@nhs.net) or telephone [01392 676635](tel:01392676635).