



To Scan or not to scan?

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Direct GP access to MRI

GPs can refer appropriately

Kernick BJGP 2011

What do people think they present with headache?

- I need glasses
- Its my blood pressure.
- I have a tumour.

What should GPs think when patients present with headache?

- Malignancy – primary/secondary?
- Structural problem?
- Benign space occupying lesion – AV malformation, cyst.

Primary Tumours

- Meningioma 20% - 10 yr survival 80%
- Glioma 70% - 5yr survival 20%
- Misc. 10% - Variable

Headache and tumour

- Headache prevalence with tumour 70%+
- Headache at presentation 50%
- Headache alone at presentation 10%

(Iverson 1987)

Population 100,000 adults each year: 10 primary brain tumours

- 220,000 headaches
- 4,000 GP consultations for headache
- 200 Secondary care consultations - 50% scanned (Laughey 1999, Elrington 2003)
- 100 Intermediate care consultations – 4% scanned (Kernick 2004)

Population 100,000 adults each
year:

- 220,000 headaches
- 1 tumour will present as isolated
headache

Risk of brain tumour with headache presenting to primary care (Kernick 2008)

	Risk %	
	Undifferentiated headache	Primary headache
Under 50	0.09%	0.03%
Over 50	0.28%	0.09%

Why scan?

The advantages:

- Allay anxiety - reassurance if negative
- Better management - improved quantity and quality of life if positive

Are investigations Anxiolytic?

- RCT of 150 patients with CDH
- Short term reduction in HAD score at 3 months but not maintained to 1 year

Howard 2005

Why not scan everyone with headache?

The disadvantages

- Resource implications
- Exposure radiation with CAT scan
- Exposes incidental abnormalities

Headache population 0.6- 10%

Population average 2.7%

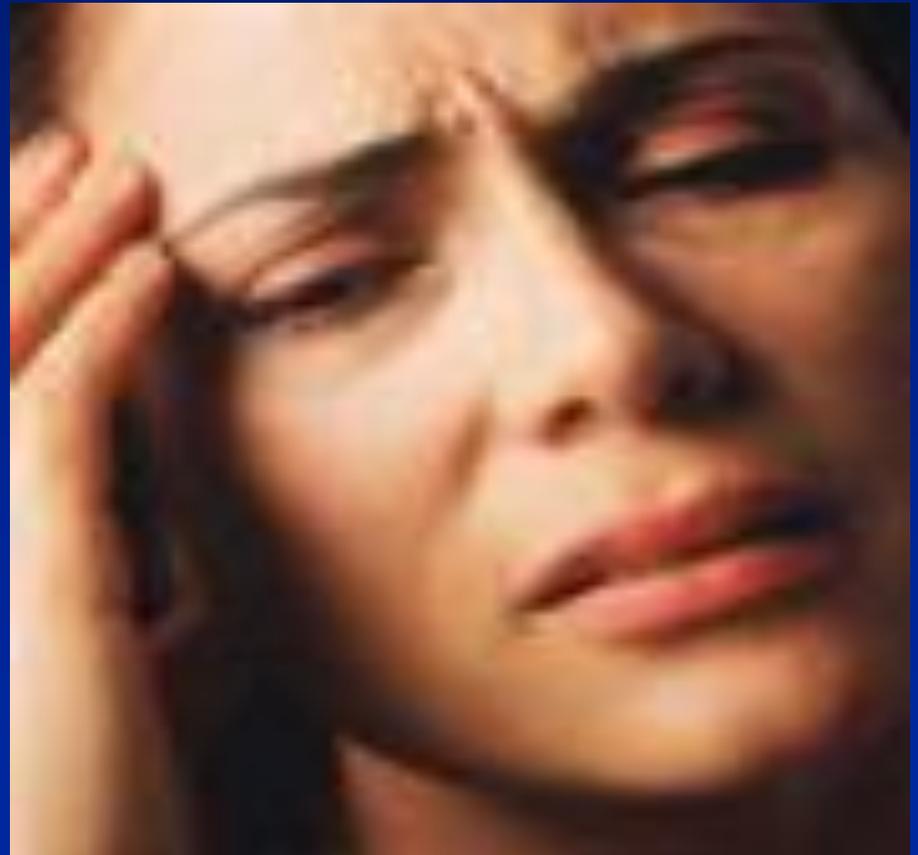
Luftwaffe pilots (n-2370) Weber 2006

- 93% normal
- Of the normal images, 25% were variations of the norm
- 6.7% abnormalities (n-166)
- Most common: 56 cysts; 13 vascular abnormalities; 4 adenomas; 4 tumours

A 45 year old nurse with a long history of migraine getting more frequent

VOMIT syndrome

Hayward 2003



MRI scan revealed a 5mm aneurysm



Chances of rupture over a five year period

Wiebers Lancet 2003

Size of aneurysm	Five year rupture rate %	
	A	B
<7mm	0	2.5
8-12mm	2.6	14.5
13-24 mm	14.5	18.4
>25mm	40.0	50.0

A = internal carotid, ant. communicating, ant/middle cerebral artery

B = post circulating, post. communicating artery

We need to scan when the advantages out way the disadvantages



Reassurance,
treatment

Cost, exposure
incidental pathology

How do we make the decision?

Knowledge
Private/professional
domain

Decision
implemented
by the
individual

Decision
implemented
by external
direction

Knowledge
Public domain

The derivation and application of knowledge (after Harrison)

Knowledge Private

RELECTIVE PRACTICE

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Knowledge Public

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CRITICAL APPRAISAL

SCIENTIFIC
BUREAUROCRATIC

Knowledge Public

Scientific Bureaucratic approach

Two key questions

- 1 - At what risk should patients be imaged for tumour?

Risk of tumour with headache	Cost per QALY
0.4%	£581,000
4%	£66,000

- NICE – prepared to recommend up to £20,000/QALY supported by good evidence

At what level of risk should we investigate – what do we do in other areas?

- Risks for carcinoma colon:
 - Weight loss 1.2%
 - rectal bleeding 2.4%

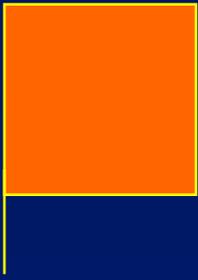
- Risks carcinoma lung: haemoptasis 2.4%



Red Flags

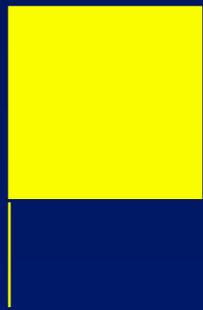
Probability of significant morbidity or mortality
>1%.

Need urgent investigation



Orange Flags

Headache presentations where probability is likely to be 0.1% and 1%. Need careful monitoring and low threshold for imaging



Yellow Flags

Probability of underlying morbidity or mortality is
<0.1%.

Needs appropriate management and follow up
there are no green flags

Scientific bureaurocratic approach

Two key questions

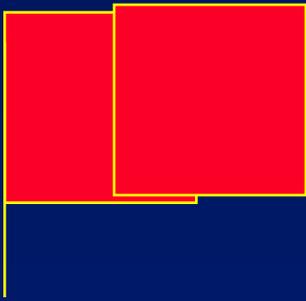
- 1 - At what risk should patients be imaged for tumour?
- 2 - What symptoms or signs indicate a level of risk of tumour?

Problems with the Evidence Base

- Poor methodology – no prospective RCTs
- Acute conflated with non-acute
- Imaging sensitivity changes
- Small sample sizes and wide range of estimates
- All studies in secondary care

Probabilities

Associated Feature	Probability (some very wide CI)
Awakes from sleep	5%
New seizure	1.2%
Cluster type	1%
Rapidly increasing frequently	1%
Worse with Valsalva	0.3%
Headache with vomiting	0.2%
Isolated Confusion	0.2%
Isolated Memory loss	0.036%



Red Flags +

Do something now

- Sub-arachnoid?
- Temporal Ateritis
- Meningitis
- Carbon Monoxide



Red Flags

Probability of significant morbidity or mortality >1%.

Need urgent investigation.

Headache with:

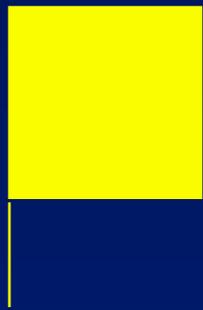
- Abnormal neurological symptoms or signs
- New seizure
- With exercise
- History of cancer elsewhere
- (New cluster type headache)



Orange Flags

Headache presentations where probability is likely to be 0.1% and 1%. Need careful monitoring and low threshold for imaging

- 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*



Yellow Flags

Probability of underlying morbidity or mortality is $<0.1\%$. Needs appropriate management and follow up – there are no green flags

- Diagnosis of migraine or tension type headache

Who to refer in children?

- Population rate tumour 3/100,000
- GPs don't diagnose 80%, refer 25%
- Risk of tumour with headache presentation is 0.03%
- Isolated headache 40%
- Early referral improves outcomes
- Incidental abnormalities 4-20%

Red/orange flags in children

- Wakes from sleep or on waking
- Persistent headache in young children
- Unilateral pain
- Occipital pain
- Headache with deterioration in school work

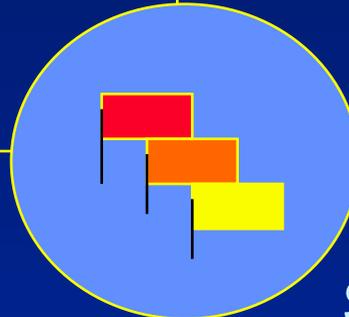
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In conclusion – to scan or not to scan?

- No simple answer
- Think carefully why you are doing it
- Medico-legally. Can't go wrong with a simple examination with good record keeping
- If in doubt, follow patient up
- The exclusion of serious pathology does not exclude adequate management of a primary headache!

All this uncertainty
gives me a headache

"I'm sorry to
hear that, doctor!"

