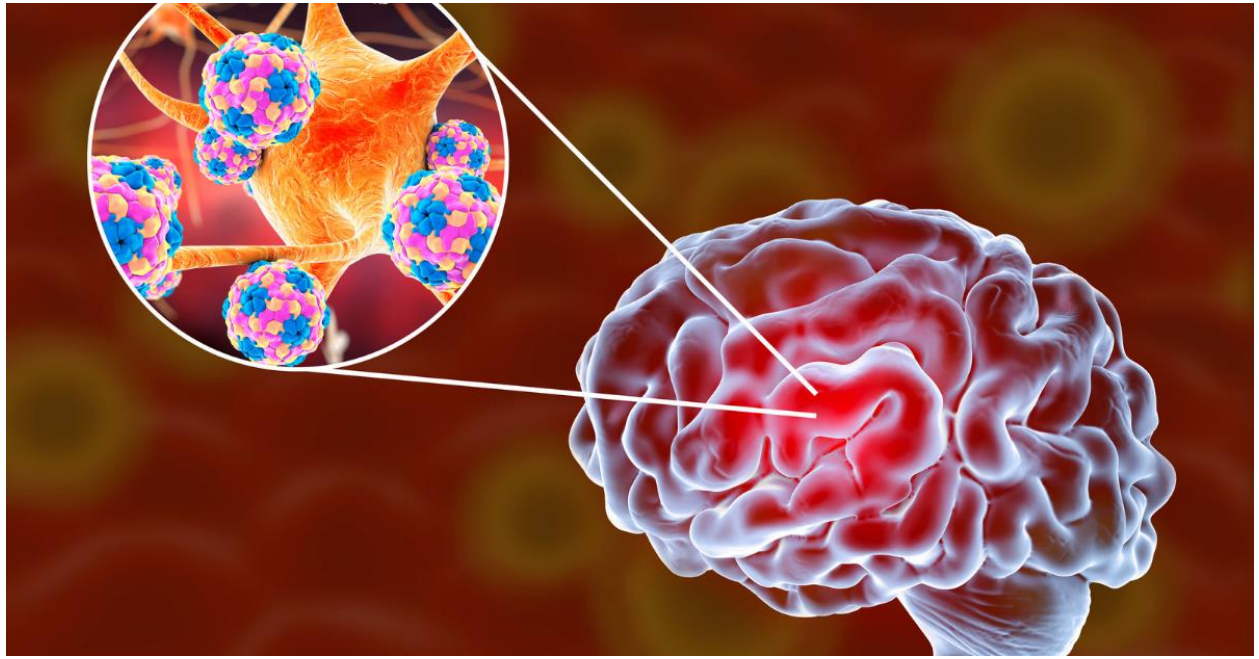
HEADACHE ATTRIBUTED TO INFECTION



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Warning signals for suspicion of secondary causes of headache ($SNOOP_4$)

Letter	Signals	Features	D/Dx
S	Systemic symptoms Secondary diseases	Fever , night sweats, chills, wt.loss, jaw claudication Cancer, immunosuppression, chronic infection	Metastases, GCA, infection
N	Neurological S/S	Confusion, focal signs, diplopia, visual obscurations, seizure, pulsatile tinnitus	Mass lesion, structural lesion, stroke
O	Onset	Thunderclap	RCVS,stroke, SAH, CVST,arterial dissection, pituitary apoplexy,IIH
O	Older >50 years	New onset, persistent/progressive headache	Mass lesion, GCA

P1	positional	Orthostatic, recumbent, worsen with change in position	Low intracranialpressure, mass lesion, CVST, sinus pathology
P2	Prior history	New onset or change to persistent/daily headache	Mass lesion, infection (CNS/systemic)
P3	Pregnancy/ post partum	New onset during pregnancy	CVST, preeclampsia,RCVS, pituitary lesion, stroke
P4	Precipitated by Valsalva	Cough, sneeze, bending, straining	Intracranial, posterior fossa mass, Chiari malformation

CASE - 1

- A young male college student and athlete with a history of episodic migraine without aura sought evaluation for a recent change in headache pattern
- Reported malaise and 3 days generalized non descript headache of moderate severity
- Continue to attend class but was not concentrating well and not able to exercise because it made his headache worse

O/E-

- Afebrile
- Neck was slightly stiff . Physician thought this might be due to inability to relax his neck during examination, which was otherwise normal
- Advised to take rest and analgesic medication and explained the important symptoms that may make him to come back for emergency consultation
- Patient had a witnessed seizure at home later that night, was taken to ED

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- EEG – generalized theta slowing with left temporal spikes
- CT (head) was normal
- MRI (brain) – subtle bitemporal enhancement
- CSF test result was consistent with viral process
- Antiviral was started
- PCR testing for HSV was later reported as positive
- Eventually recovered and headache resolved 2 weeks after antiviral therapy

Headache attributed to intracranial infection
ICHD-3 Diagnostic criteria

A. Headache of any duration fulfilling criteria C

B. Bacteria/Viral meningitis or meningoencephalitis has been diagnosed

C. Evidence of causation demonstrated by at least 2 of the followings:

1. Headache has developed in temporal relation to onset of bacterial/viral meningitis or meningoencephalitis
2. Headache has slightly worsened in parallel with worsening of meningitis or meningoencephalitis
3. Headache has significantly improved in parallel with improvement in meningitis or meningoencephalitis
4. Headache is either or both of
   a) Holocranial
   b) Located in nuchal area and associated with neck stiffness

D. Not better accounted by another ICHD-3 diagnosis

ICHD-3 Diagnostic Criteria

Headache attributed to intracranial infection	Bacteria meningitis/ meningoencephalitis	Acute- Headache < 3 months
		Chronic – Headache > 3 months
		Persistent – Headache >3 months after resolution of meningitis or meningoencephalitis
	Viral Meningitis/ encephalitis	
	Fungal or parasitic infection	Acute – headache < 3 months
		Chronic - > 3months
	Localized brain infection	

CASE -2

- A 63 year old retired teacher came for evaluation of 4months headache
- Headache was continuous dull aching character involving whole cranium
- It was initially relieved by acetamnophen but became progressively worsen and need NSAID later and now not relieved by those medicines
- Starting 2 months ago, she noticed low grade fever and sometimes chills when she experienced headache and night sweating

- Sometimes had non productive cough which was relieved by 5-7 days course of antibiotics and cough suppressant prescribed by family doctor
- Also has loss of appetite and 8 Lbs weight loss
- Has type-2 DM which was treated with metformin and sulphonyuria, needed higher doses during this period
- No past history suggestive of primary headache disorder
- Seen by primary physician and repeated septic work out was done

- CBC – Normochromic normocytic anaemia Hb - 9.8 mg%, raised total WBC 13×10^9/L with mild neutrophilia and normal platelet count
- Renal and Liver profile – Normal
- TFT – Normal
- Hb A1c – 8.0%
- Urine RE – Pus cells 4-10/ mm^3, protein ++, RBC 2-3/mm^3
- Repeated urine and blood C&S – sterile
- CXR - normal
- USG (Abd+pelvis) – mild fatty liver
- Echocardiogram – normal
- Treated with several courses of antibiotics to which her fever responded transiently and recurred again

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Examination in neurology department

- GCS 15/15
- No cranial nerve palsy
- No focal motor weakness
- No sign of meningeal irritation
- Other systemic examination - Unremarkable
- Temperature 100°F
- Further work up
- CBC – Hb- 9 mg%, WBC - 15×10^9/L with neutrophilia, normal platelet count
- Repeat urine and blood culture – sterile

- MRI (Brain) with contrast – no evidence of meningeal enhancement or encephalitis/ cerebritis
- CT (Chest) – mild pneumonitis in RMZ
- CT (Abd+pelvis) – Normal
- CSF RE – Normal protein with no cell, 2/3 of blood sugar level
- CSF fungal study – negative
- CSF culture – sterile

What is causing her headache?

- On detail history reviewing, she enjoyed gardening since her retirement till her recent illness
- Request for Meloidosis culture
- Blood culture for Meloidosis – growth of Burkholderia pseudomallei
- Bronchial washing C&S – growth of Burkholderia pseudomallei
- Treated with IV Cetazidime followed by oral sulphamethoxazole and trimethoprim
- Headache resolved after clearance of infection

Headache secondary to Burkholderia pseudomallei bacteraemia and pneumonitis

Headache attributed to systemic infection
ICHD-3 Diagnostic criteria

A. Headache of any duration fulfilling criterion C

B. Both of the following:

1. Systemic infection has been diagnosed (bacteria, viral, fungal, protozoal or parasite)

2. No evidence of meningitic or meningoencephalitic involvement

C. Evidence of causation demonstrated by at least 2 of the following:

1. Headache has developed in temporal relation to onset of systemic infection

2. Headache has slightly worsened in parallel with worsening of systemic infection

3. Headache has significantly improved in parallel with improvement in or resolution of systemic infection

4. Headache is either or both of the following characteristics:

a) Diffuse pain

b) Moderate or severe intensity

D. Not better accounted by another ICHD-3 diagnosis

ICHD-3 Diagnostic Criteria

Headache attributed to systemic infection	**Systemic Bacterial Infection**	Acute – Headache < 3months
		Chronic – Headache > 3 months
	Systemic Viral Infection	Acute – Headache < 3months
		Chronic – Headache > 3 months
	Other systemic infection Fungal/Protozoa or parasites	Acute – Headache < 3months
		Chronic – Headache > 3 months

KEY MESSAGE

- All headache are not benign
- Sinister causes of headache should be screened by $SNOOP_4$
- Infection is one of those sinister causes
- Fever, malaise, new onset or persistent headache should raise suspicion of headache attributed to infection
- Both intracranial and systemic infection can cause headache
- In patients with persistent headache and fever, organism that can be grown in special culture media should be considered when infection source is obscure

THANK YOU