

Differential Diagnosis for Headache

Headache	Goroll & Mulley	Porter	Labus & Kowalak	Eisenberg	Wasson	Gomella	Kasper	Paulman	Seller	Total	Collected Cases
Cluster headache	x	x	x	x		x	x	x	x	8	
Migraine headache	x	x	x	x	x		x	x	x	8	
Systemic infection with fever	x	x	x	x		x	x		x	7	
Tension headache	x	x	x	x	x		x	x	x	7	
Brain abscess	x	x	x	x		x	x			6	
Brain tumor	x	x	x	x		x		x		6	3 meningioma; 2 metastatic deposit; 1 pineal cyst; 4 pituitary adenomas; 1 Rathke cleft cyst; 1 colloid cyst; 5 astrocytoma
Drugs		x	x	x		x	x	x		6	
Hypertension	x	x	x	x	x		x			6	
Meningitis	x	x	x	x		x		x		6	1 herpes; 1 neurocysticercosis
Subarachnoid hemorrhage	x	x	x		x		x	x		6	6 from aneurysm; 3 trauma
TMJ dysfunction	x	x		x	x		x		x	6	
Sinusitis	x	x		x	x				x	5	15
Subdural hematoma	x	x	x	x			x			5	14
Trauma: Post-concussive	x		x	x	x		x			5	
Arteriovenous malformation	x	x	x				x			4	1 with IPH
Glacoma	x	x	x		x			x		4	
Intraparenchymal hemorrhage	x	x		x			x			4	5 stroke; 2 trauma; 1 AVM
Tic douloureux	x					x	x		x	4	
Carotid or vertebral artery dissection		x				x	x			3	1 vertebral
Cervical radiculopathy/disc disease	x							x	x	3	
Encephalitis		x	x				x			3	
Hypoglycemia	x					x	x			3	
Idiopathic intracranial		x					x		1	3	

hypertension											
Temporal arteritis			x		x		x	x	3		
>2 cm aneurysm	x		x						2		
Carbon monoxide poisoning	x				x				2		
Epidural hematoma			x	x					2	1	
Giant cell arteritis	x	x							2		
Hypercapnea		x				x			2		
Hypoxia		x				x			2		
Pseudotumor cerebri	x				x				2		
Venous sinus thrombus		x				x			2		
Stroke	x					x			2	10	
Intracranial hypotension						x		x	2	1	
Chiari I malformation		x							1		
CSF leak		x							1		
Dialysis						x			1		
Eyestrain	x								1		
Hydrocephalus – obstructive		x							1		
Indomethacin-responsive headache	x								1		
Sarcoidosis						x			1		
TIA	x								1		
Mastoiditis										1	
Carotid-cavernous sinus fistula										1	
Tonsillar ectopia										1	
Multiple sclerosis										1	
Empty sella										2	
Post-traumatic fracture											7

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Cause	Clinical Findings	Imaging Findings
Brain and CSF Spaces		
Brain abscess	Fever, N/V, stiff neck, FND, Sz, MSC	Rim-enhancing mass with surrounding white matter edema
Brain tumor	N/V, FND, Sz, MSC, personality change, difficulty with balance	Rim-enhancing mass with surrounding white matter edema; multiple lesions with metastatic ds
Meningitis	Fever, stiff neck, MSC, photophobia, phonophobia	Thickened and/or enhancing meninges
Subarachnoid hemorrhage	Thunderclap headache, N/V, Sz, MSC, stiff neck, CN palsy	Abnormal density/SI in the subarachnoid space
Arteriovenous malformation	Sz, Bruit, FND, MSC	Mass with characteristic “bag of worms” appearance
Subdural hematoma	Crescent shaped extra-axial lesion of variable density (depending on age)	Crescent shaped extra-axial lesion
Intraparenchymal hemorrhage	Thunderclap headache, N/V, Sz, MSC, stiff neck, FND, CN palsy	Abnormal density/SI in the brain parenchyma
Encephalitis	Sz, MSC, FND	Brain swelling; abnormal signal/density and enhancement
Epidural hematoma	Herniation symptoms (fixed, dilated pupil, CN palsy)	Lentiform shaped extra-axial lesion of variable density/SI
Idiopathic intracranial hypertension (2) (Pseudotumor cerebri)	N/V, neck and shoulder pain, pulsatile tinnitus, extremity numbness	Empty sella; flattened pituitary gland; distended peri-optic subarachnoid space
Intracranial hypotension	Orthostatic headache, dizziness or vertigo, facial numbness, double vision, fatigue, N/V	Enhancing meninges, widened subarachnoid space (subdural effusion/hematoma), descent of the brain
Stroke	FND, MSC, Sz, N/V	Abnormal brain density/SI; brain swelling; abnormal enhancement; restricted DWI; associated hemorrhage
Hydrocephalus – obstructive	N/V, papilledema, lethargy, coma	Dilated ventricles; abnormal flow in ventricles
Chiari malformation	Tinnitus, dizziness, vertigo, facial pain, restless leg syndrome, sleep apnea, dysphagia, syncope	Cerebellar tonsil ectopia; peg-like tonsils; dilated ventricles; flattened spinal cord; syrinx; elongated fourth ventricle; small posterior fossa
Sarcoidosis	CN palsies, Sz, stiff neck	Meningeal enhancement; brain masses
Trauma: Post-concussive	Trauma, MSC, Sz, N/V, FND	Brain swelling; abnormal SI and enhancement
Vasculature		
Temporal arteritis	F, jaw pain, tongue pain, bruit, tenderness/sensitivity over scalp	Thick, enhancing temporal artery margins

Carotid or vertebral artery dissection	Neck pain, associated stroke symptoms (see “Stroke”)	Narrowing or lack of filling
Venous sinus thrombus	Associated stroke (see Stroke), papilledema	Filling defect in the venous sinus; associated venous intraparenchymal hematoma
>2 cm aneurysm	See SAH and IPH; else as brain tumor	Contrast-enhancing mass along the course of a vessel
Paranasal Sinuses		
Sinusitis	Nasal congestion or discharge, fever	Mucus membrane thickening or enhancement; sinus fluid levels
Bones and Joints		
Cervical radiculopathy from disc disease	Neck, shoulder, and UE pain; UE weakness, numbness, paresthesias	Disc narrowing, osteophytic spurring, disc herniations, neural compression
TMJ dysfunction	Jaw pain, locking, clicking or popping	Degenerative changes of the TMJ
NO SPECIFIC IMAGING FEATURES ON CT OR MRI		
Cluster headache, migraine headache, tension headache, systemic infection with fever, drugs, hypertension, glaucoma, tic douloureux, hypoglycemia, carbon monoxide poisoning, hypercapnea, hypoxia, dialysis, eyestrain, TIA, CSF leak		

FND = focal neurologic deficit; MSC = mental status changes; Sz = seizures; N/V = nausea/vomiting; SI = signal intensity; CN = cranial nerve; UE = upper extremity; SAH = subarachnoid hemorrhage; IPH = intraparenchymal hemorrhage