

## Review Article

# Late Onset Headache

Debashish Chowdhury<sup>1</sup>, Ashish Kumar Duggal<sup>2</sup>

Late onset headache presents a challenging problem in neurological practice. New onset headache in persons over 50 is a red flag and secondary causes, some of which may be sinister and life threatening must be ruled out. Although migraine and tension type headache continue to be common in this age group, the typical clinical features as seen in younger individuals may not be present and hence may pose a diagnostic challenge. For example, some elderly patients may develop isolated aura without headache that needs to be differentiated from transient ischemic attacks, amyloid spells and seizures. In addition, clinicians should be aware of some of the uncommon primary headache syndromes that are more common in this age group. This review describes some of the important conditions causing late onset headache and provides an algorithm for diagnosis of headache in elderly.

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**Key words :** Headache, Elderly.

Headache is a very common disorder affecting more than half of the adult population with more than 90% of people reporting a lifetime history of headache<sup>1</sup>. However, most of the primary headaches are common in young and middle aged persons. The overall prevalence of headache decreases from 50-75% in adults aged 18-65 years to 56.7% for people aged 65-74 years and 26% for those aged 85-96 years<sup>2,3</sup>. Late onset headaches (variably defined as onset of headache after 45-60 years) are different because the proportion of people affected by secondary headaches doubles with age from 7-8% in the general population to almost 15% in patients aged more than 65 years<sup>3</sup>. In addition, to a change in character of the primary headache disorders, there may be atypical presentations such as late-life migraine accompaniments and comorbid medical conditions can have a bearing on the acute as well as prophylactic management of headache. There are certain primary headache disorders that are unique to this age group such as hypnic headache and exploding head syndrome. Since certain organ or life threatening secondary causes such as giant cell arteritis (GCA) and neoplasms can present in a sinister way sometimes mimicking primary headache, late onset headache often requires a more extensive workup including metabolic as well as imaging studies. In this review we will describe some of the common causes of late onset headache and their management.

### *Epidemiology of Late Onset Headache :*

In general, the prevalence of headache varies accord-

ing to age, peaking in the third and fourth decades of life and declining thereafter<sup>3</sup>. Although many studies have evaluated life time and point prevalence of headache in elderly patients, there is a scarcity of studies that have evaluated the incidence of late onset headache (Table 1)<sup>4-17</sup>. In population based studies overall upto 20-40% of people above 65 years of age may have headache and 4% may have a chronic daily headache. In Hospital based studies, about 5-15% of patients attending headache/neurology clinics were elderly (>65 years). Of all the elderly patients with headache, almost half had onset after 65 years. In general, primary headache continue to be common, accounting for 52-81% of cases even in elderly patients, with tension type headache (TTH) being more common than migraine. Also, cranial neuralgias such as trigeminal neuralgia may become more important in this age group. Although GCA is an important cause of late onset secondary headache in elderly, it has been consistently been uncommon in most studies. In fact, headache attributable to substance use, trauma and cervicogenic headache are distinctly more common in this population.

### *Primary Late Onset Headaches Disorders :*

#### **Migraine and late life migraine accompaniments :**

After a peak in 3rd – 4th decade, prevalence of migraine decreases progressively in older age ranges declining to 10%-23% in patients more than 65 years old<sup>4,6,10,15</sup>. De novo onset of migraine in elderly is even more uncommon (less than 2-3%) and there are very few studies that have evaluated late onset migraine<sup>3,18,19</sup>. There is a change in the character of migraine with age (Table 2) and head-

#### **Editorial Comments :**

- Late Onset Headache often due to secondary causes.
- Late onset headache a red-flag sign, needs careful evaluation.

Department of Neurology, GB Pant Institute of Post Graduate Medical Education and Research, New Delhi

<sup>1</sup>MBBS, DM, Director- Professor

<sup>2</sup>MBBS, DM, Assistant Professor

Table 1—Epidemiological studies on headache in elderly

Author/Year	Setting	Country/Region	Results
Pascual et al (1978-92) <sup>1</sup>	Hospital based	Spain	5.4% (193) of all patients attending the neurological service had a late onset headache (>65 years) More common in females Most common diagnosis: TTH, Trigeminal neuralgia Followed by SAH, Temporal arteritis, intracranial tumors, and headache attributable to cervical spine disorders Migraine less common – only 1 patient had Migraine onset after 65 years as compared to 1801 patients with onset before 65 years of age.
Cull et al (1995) <sup>2</sup>	Hospital	Scotland	69 patients with late onset migraine (age > 40 years) Mean age = 51.6 years, Female: Male = 2:1 Aura in 86% (visual:66%, rest sensory or dysphasic) Imaging showed infarct(s) in 4 cases
Prencipe et al (2001) <sup>3</sup>	Community	Italy	834 persons > 65 years in community Overall prevalence of headache – 51% 16.9% reported onset of headache after 65 years 44.5% - TTH, 11.0% - MH, 2.2% - symptomatic headaches, and 0.7% - others
Wang et al (1997) <sup>4</sup>	Community based	China	38% of 2,003 residents > 65 years had headache 1-year prevalence of migraine = 3% Late onset Migraine: only 1 case 1-year prevalence of TTH = 35% Migraine decreased with age while TTH did not Post traumatic headache was the most common secondary cause of headache
Franceschi et al (1997) <sup>5</sup>	Community sample based	Italy	6% of 312 participants had headache in the past year TTH (2.6%) > secondary headaches (2.2%) > Migraine (1%)
Wang et al (2000) <sup>6</sup>	Community based	China	CDH prevalence: 3.9% in 1,533 respondents CM:25%, CTTH:70%, other:5%
Camarda et al (2003) <sup>7</sup>	Community based	Italy	21.8% of 031 participants evaluated had recurrent headaches Migraine: 4.6%, TTH: 16%, Other headaches: 1.3% Migraine prevalence decreases with advancing age
Lisotto et al (2004) <sup>8</sup>	Hospital based	Italy	4417 patients attending headache clinic 6.4% (282) had headache onset after 65 years Primary headache – 81.6%, secondary headache - 14.9% and unclassifiable – 3.5% TTH - 25.7% , Migraine - 27.8% , CM - 26.1% Most common secondary headache – Headache due to cervical spine disorder
Pérez-Martínez D e al (2008) <sup>9</sup> (Article in Spanish)	Hospital based	Spain	All patients > 75 years 736 patients with median age of 81.5 years ± 5.3 years Primary headache: 89.4%, Secondary Headache: 10.6% Most common cause: TTH, greater occipital neuralgia and Migraine Temporal Arteritis: 4/736 patients (0.6%)
Schwinger et al (2009) <sup>10</sup>	Community based	Austria	Lifetime prevalence: 51.7% and 1-year prevalence: 40.5% TTH (40.9%)> Migraine (19.3%) Hymnic Headache:0.5%
Manzoni et al (2012) <sup>11</sup>			Subset of 73 patients with Cluster headache onset after 50 years CH in older persons more likely to be chronic and with longer active periods
Smitherman et al (2103) <sup>12</sup>	Compilation of public health surveys	USA	Prevalence in age 65-74: 11.8% in females, 6.9% in males Prevalence in > 75 years: 7.1% in females and 4.6% in males
Ruiz et al (2014)	Hospital based	Spain	14% (262) of 1868 patients with headache were > 65 years Onset of headaches > 65 years in 51.9% (136) of elderly patients with headache with a mean age of 65.5 years Primary headache – 62.2%, Secondary headache - 16%, Cranial Neuralgias - 7.2%, Other headaches – 6.4% and Appendix – 8.3% Primary Headache: TTH followed by Migraine Secondary Headache: Most common Headache attributable to substances, followed by associated with cranial trauma.
Zhang et al (2016) <sup>13</sup>	Community based	China	5248 residents in Tianjin Province 1 years Prevalence of primary headache – 10/30% TTH - 2.02 % , Migraine - 0.85 % , CDH - 3.79 % , and unclassifiable 3.63 % Patients with heart disease more likely to have primary headache
Song et al (2016) <sup>14</sup>	Hospital based	China	1,627 patients who visited neurology clinics in 11 tertiary level hospitals 152 (9.3%) had onset of headache after 65 years of age 1,475 patients who first experienced headache before the age of 65 years Primary headache - 82.9%, Secondary headaches - 11.2% TTH most common (55.6%), migraine (13.5%), other primary headaches (31%) – most common Primary Stabbing headache (22%)

ache resembles TTH more and more making the diagnosis of migraine difficult. Two features that may be helpful in differentiating migraine from TTH in this group are – throbbing nature and headache related disability. Another caveat in evaluation of apparent new onset migraine is that some patients may not spontaneously report a history of migrainous headaches, leading to over investigation for a secondary headache. Although in a systematic study of elderly patients with new-onset migraine-like headache, most patients did not have an underlying disease, because of its relative rarity, all elderly patients with a new onset migraine should be evaluated with imaging and other investigations.

Another crucial feature of migraine is that up to 50% of patients who had migraine with aura when young may present with isolated aura without associated headache -

“late-life migraine accompaniment” or “migraine equivalents” or as the ICHD 3 beta describes this as “typical aura without headache”<sup>20-24</sup>. Although typical aura without headache can occur at any age, it is particularly common in elderly patients and a number of elderly patients may experience these symptoms for the first time without a prior or accompanying headache. Fisher in his landmark paper noted that these symptoms are most commonly visual (blindness, homonymous hemianopia and blurred vision, difficulty focusing) but can also be sensory (paresthesias), speech disturbance (aphasia, dysarthria), brainstem symptoms or motor weakness occurring either alone or in combination with visual symptoms<sup>22,23</sup>. These symptoms are usually stereotypical that may occur in a flurry, gradually building up over a period of minutes with progression of symptoms or area, lasting for 15-60 minutes with a gradual offset of symptoms with primal symptoms resolving before the ensuing symptoms. The differential diagnosis includes transient ischemic attacks, partial seizures, amyloid spells in cerebral amyloid angiopathy, vasculitis (SLE and APLS), polycythemia, essential thrombocythemia, arteriovenous malformation, dural arteriovenous fistula patent foramen ovale, posterior circulation embolism, internal carotid artery dissection, vertebral artery dissection, carotid artery stenosis (Table 3).

Unless occurring in a patient with classic migraine with aura (MA), typical aura without headache in elderly is a diagnosis of exclusion. Even in elderly patients with a history of MA, clinical clues, that raise suspicion for secondary causes, include short or long duration (<5 minutes or >60 minutes), negative phenomena, prominent weakness, increased frequency or change in pattern of aura. As a minimum a complete blood count with metabolic profile, MRI with or without contrast, including DWI, T2\*GRE, or SWI sequences should be performed and magnetic resonance angiography may be needed if carotid or vertebral dissection is suspected. EEG is needed if differentiation from seizures is not possible on clinical grounds. Another condition that is considered a borderland of migraine is transient global amnesia (TGA). Clinical studies show a

Table 2 — Differences in Character of Migraine between Young and Old Patients

	Elderly (>65 years)	Young (< 65 years)
Duration	Less (< 12 hours)	Longer (often > 24 hours)
Unilaterality	More often bilateral (~47%) and global	More often unilateral (84%) and more severe in one part of the head
Nausea	Mild Nausea	Moderate to severe Nausea
Vomiting	Less common	More common
Photophobia and Phonophobia	Less common	More common
Premonitory symptoms	Paleness, dry mouth and anorexia are more common	Less common

Table 3 — Differential diagnosis of typical aura without headache

	TIA	Seizure	Aura without headache	Amyloid Spells in CAA
Onset	Sudden	Sudden	Progressive	Sudden or progressive
Progression rate	None	Fast	Slow	Fast or slow
Different symptoms	Simultaneous	In succession	In succession	In succession
Territory	Vascular	Cortical	Cortical	Cortical
Duration	Short (10–15 min)	Short (few minutes)	Long (5–60 min)	5–30 minutes
Type of symptoms	Motor > visual > sensory	Motor > sensory > Visual	Visual > Sensory Motor symptoms rare	Sensory > Visual > Motor
Visual Symptoms				
Positive symptoms	Not seen	Present, circular or spherical	Present, linear or flash, zig zag	Rare but, flickering or flashing lights, transient 'zig-zags'.
Negative symptoms	Present, complete or partial, monocular, altitudinal or homonymous defect	Less common – post ictal Todd's scotoma may occur	Often follows positive symptoms, Scintillating scotoma or fortification spectra	Rarely monocular blurred vision or visual loss Unlike migraine either negative symptoms are present independently and do not follow positive symptoms
Color	NA	Colored	Black and white, rarely may be colored	Black and white, rarely may be colored
Formed visual hallucinations	NA	May be seen in temporal lobe seizures	Rare, may be seen in basilar migraine	Not reported
Sensory Symptoms	Paresthesias, sensory loss less common, no spread	Paresthesias may spread rapidly	gradual spread of transient parasthesia	gradual spread of transient parasthesia most common manifestation
Motor Symptoms	Usually negative but may be limb shaking	Usually positive	Usually negative	Negative or positive
Stereotypy	Usually not seen	Stereotypic	Stereotypic	Stereotypic

clear temporal link between migrainous headache and transient global amnesia, with some episode being triggered only by migraine<sup>25,26</sup>. Absence of vascular risk factors, normal investigations including imaging and a low recurrence rate favor migrainous cause over vascular TGA.

Treatment of migraine in elderly also requires special considerations. Triptans and ergotamines should be avoided in elderly, particularly those with vascular disease. Although paracetamol and NSAIDs are preferable as acute management, but patients should be closely monitored for azotemia. Prophylactic agents should also be used with caution in view of potential for significant adverse effects. Amitriptyline (may precipitate glaucoma, urinary retention and cause increased sedation) and flunarazine (may precipitate parkinsonism) should be avoided in old patients. Divalproex seems to be the safest option, followed by topiramate, beta blockers and angiotensin receptor blockers. Older patients usually require lower doses of prophylactic agents. Non-pharmacological treatments such as biofeedback, relaxation and acupuncture may be useful<sup>27</sup>.

### Tension Type Headache :

Unlike migraine the clinical characteristics of TTH in

older individuals are same as seen in younger adults. De novo TTH in old age is apparently much more common than migraine primarily because of negative psychological events (retirement, bereavement, loneliness and economic difficulties) that are frequent in this group. At the same time, it is essential to exclude other possible causes of secondary headache before making a diagnosis of TTH in an elderly patient. It is essential to address the associated depression and anxiety in elderly with TTH. Although tricyclic antidepressants are useful in management of TTH, their use is fraught with significant adverse effects in elderly, making non-pharmacological measures such as relaxation techniques, biofeedback, and stress management skills more important<sup>28</sup>.

### Cluster Headache :

Cluster headache (CH) is primarily a disease of the young with a peak incidence in the 3rd – 4th decade, but in females there may be a 2nd peak in the 6th decade

of life. The clinical characteristics of late onset CH are similar to that in young, but in elderly, the male predominance of CH is lost. An important point is that the marked agitation associated with CH may be mistaken for delirium or pseudodementia particularly if a proper history is not taken<sup>29</sup>. Additionally, CH in older individuals tends to more chronic and in episodic CH, the episodes may last longer, thus portending a poor prognosis. It is essential to rule out causes of secondary cluster like headache as in younger individuals particularly in atypical cases. While treating older CH patients, one should be cautious using verapamil, since elderly patients may be overly sensitive to the negative chronotropic effects.

Short-lasting unilateral neuralgiform headache attacks with conjunctival injection and tearing (SUNCT)/ Short-lasting unilateral neuralgiform headache attacks with cranial autonomic symptoms (SUNA)

SUNCT and SUNA are characterized by sudden brief attacks of severe unilateral head pain in orbital, periorbital, or temporal regions, accompanied by ipsilateral cranial autonomic symptoms lasting between 1-600 seconds. Attacks occur in three typical patterns: (1) a single short-

lived stab; (2) groups of stabs; or, (3) a group of many stabs, between which pain does not fully resolve, lasting minutes in duration (the “saw-tooth” pattern)<sup>30</sup>. The typical age of onset is between 35 and 65 years with a median age of 48 years<sup>31,32</sup>. So SUNCT/SUNA are an important differential of short lasting headache/facial pain in elderly individuals (Table 4). All patients with SUNCT/SUNA should undergo imaging of the brain with special attention to pituitary and intraorbital structures, along with magnetic resonance angiography (MRA) of intracranial and cervical blood vessels to rule out structural causes<sup>33</sup>. Lamotrigine is the initial preventive medical therapy in patients with frequent or debilitating attacks of SUNCT/SUNA and topiramate and gabapentin are reasonable alternatives.

### *Hypnic Headache :*

Hypnic Headache (HH) occurs exclusively during sleep, and at a fixed time. So, it also has been termed “alarm clock headache”. HH is characterized by dull and moderately severe headache that is usually bilateral and diffuse, but some patients may report a throbbing migrainous type of headache. HH occurs at night, lasting for 15-180 minutes. HH usually occurs 3 hours after falling asleep, and in some patients, it may occur regularly between 1 AM and 3 AM every day. In contrast to migraine, HH improves with activity. Another important differential is CH but moderate intensity, and bilateral location help in differentiating HH from CH. Also, cranial autonomic symptoms are absent in HH. Imaging to rule out rare structural causes such as posterior fossa meningioma, cerebellar hemangioblastoma, pontine reticular formation stroke, pituitary tumors should be done in atypical cases. Other causes of nocturnal headache such as OSA and nocturnal hypertension may require polysomnography and ambulatory blood pressure monitoring in appropriate setting (Table 5). Lithium in a dose of 300-600mg at bedtime is the treatment of choice with melatonin (3-6 mg), indomethacin (75 mg), flunarizine (5 mg), and caffeine (40-60 mg, or a cup of coffee) being reasonable alternatives<sup>34,35</sup>.

### *Exploding Head Syndrome :*

Exploding head syndrome (EHS) is a very unique and rare syndrome most often encountered in elderly adults. It is a parasomnia rather than a headache and patients will awaken from sleep with a

sense that a loud, painless, explosive noise has occurred in their head. Some patients may report associated flashing lights<sup>36</sup>. Rarely patients may report brief, mild jab-like sensation but there is no severe sudden or persistent headache that differentiates EHS from the thunderclap headache (TCH). It is a relatively benign condition and re-assurance should suffice, though clomipramine and topiramate can be used for recurrent cases<sup>37</sup>.

### *Primary Stabbing Headache (PSH) :*

Earlier studies have found that the mean age of PSH is 28 years, but recent studies from Asia have found that PSH may be common among the elderly<sup>38-40</sup>. Song et al found it to be the 2nd most common primary headache after TTH in their community based study<sup>17</sup>. Primary stabbing headache is characterized by transient, sharp, jabbing pains lasting 1-5 seconds that occur anywhere in the head either as single stabs or in volleys of mild to intense stabbing pain without any autonomic symptoms with a frequency of  $\leq 1/\text{day}$  to  $> 5/\text{day}$ . Most patients will also report concurrent or past history of migraine. It is a benign condition that responds to indomethacin, but needs to be differentiated from SUNCT (periorbital and unilateral), and V1 trigeminal neuralgia (trigger points).

**Table 4 — Differential diagnosis of ultra short duration headaches in elderly**

	SUNCT/SUNA	Trigeminal Neuralgia	Primary stabbing headache	Exploding head syndrome
Mean age	48 years	52 years	47 years	Onset after age 50
Number of attacks required for diagnosis	At least 20 attacks	At least 3 attacks	NA	NA
Intensity	Moderate – severe pain	Severe intensity	mild to intense stabbing pain	No pain but a loud explosive noise
Location	Unilateral with orbital, supraorbital, temporal, mainly V1 distribution but can occur outside trigeminal nerve distribution in 22%	Unilateral facial pain (V2, V3 > V1) distribution No radiation beyond V1 V2:35%, V3:30% and V1:10%	Variable location all over the head, involves extratrigeminal regions in 70% of cases May have a fixed location in 33%	Inside the head
	SUNCT V1:67% V2: 33% V3:0%	SUNA V1:56% V2:56% V3:33		
Duration	1 – 600 seconds	1 – 20 seconds	< 3 seconds, rarely 10-120 seconds	Few seconds
Quality	Occur as single stabs, series of stabs or a sawtooth pattern	Electric shock like, sharp stabbing or shooting	single stab or series of stabs	loud bang, shotgun, or bomb explosion
Autonomic symptoms	Prominent seen even with low levels of pain	Seen only with very severe pain	None	None
Triggers	Usually triggerable without a refractory period	Triggerable with a refractory period	None	None
Frequency of attacks	At least 1 attack/day	NA	Variable but low - one or a few per day.	May be a one time event, or recur with a variable frequency
Associated neurological deficits	Miosis and/or ptosis ipsilateral to pain	Not seen	None	None
Response to Carbamazepine	Partial (20 – 39%)	Complete (>80%)	No	No

### *Primary Cough Headaches :*

Cough headaches are brief paroxysms of pain that accelerates almost instantaneously, and then declines gradually over 1 to 30 s, with peak of headache corresponding to the sound “puh” that occurs at the point of coughing or other Valsalva maneuvers<sup>41</sup>. It usually follows an upper respiratory illness probably due to a temporary sensitivity of the carotid baroreceptors to intrathoracic pressure. Cough headache may be secondary to posterior fossa lesions such as Chiari malformations, tumors or abscess in 40% of cases. In older individuals, cough headache is more likely to be primary, but secondary causes should always be excluded even in older patients particularly in patients with a history of rheumatoid arthritis. Workup consists of diagnostic MRI with and without contrast and MRA of intracranial and extracranial vasculature. The primary cough headache is responsive to indomethacin.

### *Secondary Late Onset Headache Disorders :*

New-onset headache in an elderly person is a “red flag” situation that should prompt a careful search for an underlying causative condition. Although most of the secondary conditions that cause headache in young, can also cause headache in the elderly, some of the conditions are relatively unique in elderly (Table 6).

Cranial or cervical vascular disorders are a common cause of headache, but GCA is one disorder that occurs exclusively in old people > 50 years of age. GCA is a granulomatous vasculitis that affects the medium and large sized vessels. Moderately severe dull aching pain usually localized to temporal area that the patient recognizes as new or different is the most common symptom. Associated symptoms include scalp tenderness, jaw claudication and pain, stiffness in the neck, shoulders, and hip-girdle area that are usually much worse in the morning and low-grade fever. Visual symptoms include amaurosis, diplopia, and permanent visual loss. Erythrocyte sedimentation rate (ESR) is typically between 60 and 120 mm/hour, but may be normal in 1% and < 40 in 5% of patients with GCA<sup>42</sup>. An elevated C-reactive protein (CRP) may yield more sensitivity and specificity. Temporal artery ultrasound may reveal a “halo” and is diagnostic with a sensitivity of 75% and a specificity of 83%<sup>43</sup>. Temporal artery biopsy is necessary to make the definitive diagnosis. However, it is not necessary to wait for a biopsy before starting steroids especially in case of amaurosis and impending visual failure. Steroids may be tapered once clinical symptoms have stabilized but most patients will require low dose steroids for several months. Other cranial vascular diseases such as ischemic stroke, intracranial hemorrhage and vascular malformations can also cause acute headache with associated neurological signs and often remits rapidly with reso-

lution of symptoms. Stroke however can also cause “post stroke pain” which presents as unilateral facial and/or head pain that occurs within 6 months of a stroke involving the ascending projections of the trigeminal nuclei. Cerebral venous thrombosis can cause headache of various phenotypes (migrainous, thunderclap or raised ICP) and could be a harbinger of neoplasia or a myeloproliferative disorder in elderly patients.

The increased incidence of neoplasia in elderly means that “headache attributed to intracranial neoplasia” is the most dreaded cause of headache in elderly. Mostly, these patients present with sub acute onset headache and slow progression of in terms of severity and frequency. However, isolated headache as a manifestation of a brain tumor occurs in only 1% of patients with brain tumors. Headache is diffuse generalized dull aching type of pain thus often mimicking TTH, but may be migrainous in 10% of cases and can occur even without raised ICP. The “clas-

Table 5 — Causes of nocturnal headache

- (1) Cluster Headache
- (2) Hypnic Headache
- (3) Obstructive Sleep Apnea
- (4) Nocturnal Hypertension
- (5) Nocturnal occurrence of Migraine
- (6) Restless Leg Syndrome and Periodic Limb Movement Disorder
- (7) Exploding Head Syndrome
- (8) Turtle Headache (Headache due to hypoxia when lying retracted beneath a blanket, that resolves after emergence from blanket)
- (9) Chronic Pain states

Table 6 — Common causes of secondary headache in elderly

- (1) Headache attributable to trauma
- (2) Medications (including medication-overuse headache)
  - i) Vasodilators (nitroglycerin, isosorbide dinitrate, dipyridamole, nicotinic acid)
  - ii) Nonsteroidal anti-inflammatory drugs
  - iii) H2 blockers
  - iv) Proton Pump Inhibitors
  - v) Antiparkinson (levodopa, amantadine)
  - vi) Stimulants (caffeine, methylphenidate)
  - vii) Antibiotics (trimethoprim-sulfamethoxazole, tetracyclines)
  - viii) Erectogenic agents (sildenafil)
- (3) Toxic and metabolic headaches
  - i) Chronic respiratory disease
  - ii) Hypercalcemia
  - iii) Hyponatremia
  - iv) Chronic renal failure
  - v) Anemia, polycythemia
  - vi) Severe hypertension
- (4) Structural lesions
  - i) Cervical spondylosis and disc disease (vs. cervicogenic headache)
- (5) Vascular Causes
  - i) Giant cell arteritis
  - ii) Atherothrombotic cerebrovascular disease
- (6) Intracranial mass lesions, including hydrocephalus and hematomas
- (7) Meningeal irritation: hemorrhage and infection

tic” brain tumor headache, a severe morning headache associated with nausea and vomiting, occurs in only 17% of patients<sup>44</sup>. Some especially those with pituitary, cavernous sinus and posterior fossa pathology may present with TACs phenotype. Thus, any type of headache can occur because of intracranial neoplasia and appropriate imaging should be done in all elderly patients with new onset headache. Headache attributed to trauma or injury to the head and/or neck is also very common secondary headache disorders and can have a TTH or migrainous phenotype. Diagnosis requires a close temporal relation between the trauma or injury and headache onset with onset of headache within seven days of trauma or injury or regaining consciousness and treatment depends on the phenotype of headache.

Some disorders of homeostasis are particularly common in elderly and may present with headache, but a proper medical history and examination will always provide the clue to diagnosis. Sleep apnoea, which is a common problem in elderly, may cause a recurring morning headache which is usually bilateral, mild or moderate in intensity and lasts for less than 4 hours occurring on more than 15 days a month. Patients with chronic kidney disease undergoing hemodialysis may develop headache in the latter half of dialysis that often remits within 72 hours of dialysis and after transplant. An abrupt severe rise in blood pressure (> 180/120mmHg) can also cause a bilateral and pulsating headache. Hypothyroidism should be ruled out in elderly because it can cause headache as well as worsen pre-existing headaches. Cardiac cephalgia refers to migraine-like headache, usually aggravated by exercise,

occurring during an episode of myocardial ischemia. Although headache usually accompanies chest pain, it can be the sole manifestation. Therefore, all elderly patients with exercise induced headache should be evaluated for myocardial ischemia.

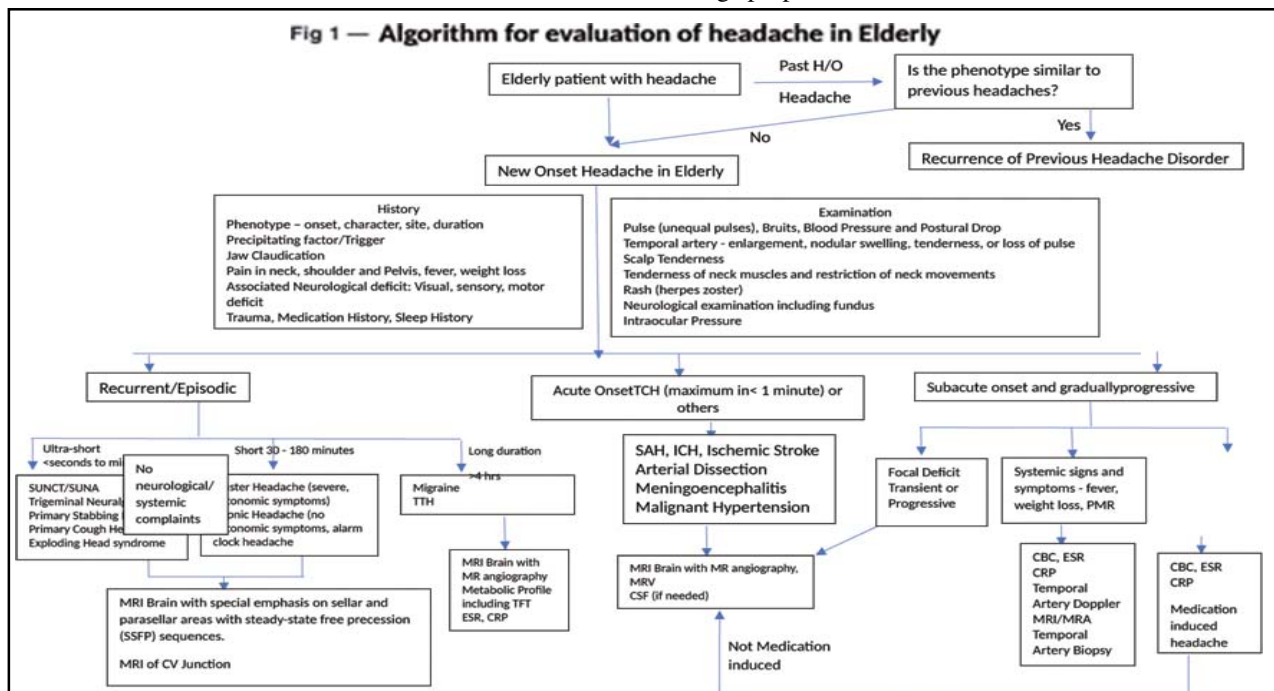
**Medication Induced Headache and Medication Overuse Headache :**

Elderly patients often have coexisting medical conditions requiring treatment with medications, some of which can cause headache. In fact, “headache attributed to a substance abuse or withdrawal” is the most common cause of secondary headache in elderly in various series<sup>15</sup>. Some of common medications such as proton pump inhibitors, histamine receptor blockers, nitrates and NSAIDs can be a cause of headache and a careful medication history is crucial in elderly patients (Table 6). Elimination of the offending agent is the treatment of choice, if possible.

**Conclusion :**

As in young patients, primary headaches predominate in the elderly. Secondary headaches are more common than in the young and hence need to be identified. Physicians should be well versed with the diagnostic features of primary headaches as well as the red flags. As in young patients, the most important step in evaluating headache is a proper history, but there are certain important points in history and examination that are especially pertinent in elderly patients (Fig 1). However, because old age itself is a red flag, all patients with late onset headache should undergo proper evaluation based on the leads obtained from

**Fig 1 — Algorithm for evaluation of headache in Elderly**



history and examination. A detailed medication history is essential in all cases. Though some uncommon headache disorders occur exclusively in elderly, their identification is important in the proper management of elderly patients with headache.

#### REFERENCES

- Headache Fact sheet WHO <http://www.who.int/mediacentre/factsheets/fs277/en/>
- Prencipe M, Casini AR, Ferretti C, Santini M, Pezzella F, Scaldaferrì N, *et al* — Prevalence of headache in an elderly population: attack frequency, disability, and use of medication. *J Neurol Neurosurg Psychiatry*. 2001 ;70(3):377-81.
- Wang SJ, Liu HC, Fuh JL, Liu CY, Lin KP, Chen HM, Lin CH, Wang PN, Hsu LC, Wang HC, Lin KN — Prevalence of headaches in a Chinese elderly population in Kinmen: age and gender effect and cross-cultural comparisons. *Neurology* 1997; **49**: 195-200.
- Pascual J, Berciano J — Experience in the diagnosis of headaches that start in elderly people. *J Neurol Neurosurg Psychiatry* 1994; **57**: 1255-7.
- Cull RE — Investigation of late-onset migraine. *Scott Med J* 1995; **40**: 50-2.
- Prencipe M, Casini A, Ferretti C — Prevalence of headache in an elderly population: attack frequency, disability, and use of medication. *Journal of Neurology, Neurosurgery, and Psychiatry* 2001; **70**: 377-81.
- Franceschi M, Colombo B, Rossi P, Canal N — Headache in a population-based elderly cohort. An ancillary study to the Italian Longitudinal Study of Aging (ILSA). *Headache* 1997; **37**: 79-82.
- Wang SJ, Fuh JL, Lu SR, Liu CY, Hsu LC, Wang PN, Liu HC — Chronic daily headache in Chinese elderly: prevalence, risk factors, and biannual follow-up. *Neurology* 2000; **54**: 314-9.
- Camarda R, Monastero R — Prevalence of primary headaches in Italian elderly: preliminary data from the Zabùt Aging Project. *Neurol Sci* 2003; **24**: S122-4.
- Lisotto C, Mainardi F, Maggioni F, Dainese F, Zanchin G — Headache in the elderly: a clinical study. *The Journal of Headache and Pain* 2004; **5**: 36-41.
- Pérez-Martínez D, Puente-Muñoz A, Anciones B — Headache among oldest old (+75 years): findings from 736 consecutive subjects in outpatient neurological clinic. *Neurologia* 2008; **23**: 436-40. Spanish.
- Schwaiger J, Kiechl S, Seppi K, Sawires M, Stockner H, Erlacher T, Mairhofer ML, Niederkofler H, Rungger G, Gasperi A, Poewe W, Willeit J — Prevalence of primary headaches and cranial neuralgias in men and women aged 55-94 years (Bruneck Study). *Cephalalgia* 2009; **29**: 179-87.
- Manzoni GC, Maffezzoni M, Lambru G, Lana S, Latte L, Torelli P — Late-onset cluster headache: some considerations about 73 cases. *Neurol Sci* 2012; **33**: S157-9.
- Smitherman TA, Burch R, Sheikh H, Loder E — The prevalence, impact, and treatment of migraine and severe headaches in the United States: a review of statistics from national surveillance studies. *Headache* 2013; **53**: 427-36.
- Ruiz M, Pedraza MI, de la Cruz C, Barón J, Muñoz I, Rodríguez C, Celorrio M, Mulero P, Herrero S, Guerrero AL — Headache in the elderly: characteristics in a series of 262 patients. *Neurologia* 2014; **29**: 321-6.
- Zhang Y, Shi Z, Hock D — Prevalence of primary headache disorders in a population aged 60 years and older in a rural area of Northern China. *The Journal of Headache and Pain* 2016; **17**: 83.
- Song T-J, Kim Y-J, Kim B-K — Characteristics of Elderly-Onset (>65 years) Headache Diagnosed Using the International Classification of Headache Disorders, Third Edition Beta Version. *Journal of Clinical Neurology (Seoul, Korea)* 2016; **12**: 419-25. doi:10.3988/jcn.2016.12.4.419.
- Selby F, Lance JW — Observations on 500 cases of migraine and allied vascular headache. *J Neurol Neurosurg Psychiatry* 1960; **23**: 23-32.
- Lipton RB, Silberstein SD, Stewart WF — An update on the epidemiology of migraine. *Headache* 1994; **34**: 319-28.
- Rasmussen BK, Olesen J — Migraine with aura and migraine without aura: An epidemiological study. *Cephalalgia* 1992; **12**: 221-8.
- Queiroz LP, Rapoport AM, Weeks RE — Characteristics of migraine visual aura. *Headache* 1997; **37**: 137-41.
- Fisher CM — Late-life migraine accompaniments as a cause of unexplained transient ischemic attacks. *Can J Neurol Sci* 1980; **7**: 9-17.
- Fisher CM — Late-life migraine accompaniments—further experience. *Stroke* 1986; **17**: 1033-42.
- Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition (beta version). *Cephalalgia* 2013; **33**: 629-808.
- Caplan L, Chedru F, Lhermitte F — Transient global amnesia and migraine. *Neurology* 1981; **31**: 1167.
- Maggioni F, Mainardi F, Bellamio M — Transient global amnesia triggered by migraine in monozygotic twins. *Headache* 2011; **51**: 1305-8.
- Sarchielli P, Mancini ML, Calabresi P — Practical considerations for the treatment of elderly patients with migraine. *Drugs Aging* 2006; **23**: 461-89.
- Kunkel RS — Headaches in older patients: special problems and concerns. *Cleve Clin J Med* 2006; **73**: 922-8.
- Manzoni GC — Cluster headache and lifestyle: remarks on a population of 374 male patients. *Cephalalgia* 1999; **19**: 88-94.
- Cohen A, Kaube H — Rare nocturnal headaches. *Curr Opin Neurol* 2004; **17**: 295-9.
- Vikelis M, Xifaras M, Mitsikostas DD — SUNCT syndrome in the elderly. *Cephalalgia* 2005; **25**: 1091.
- Matharu MS, Cohen AS, Boes CJ, Goadsby PJ — Short-lasting unilateral neuralgiform headache with conjunctival injection and tearing syndrome: a review. *Curr Pain Headache Rep* 2003; **7**: 308.
- Wilbrink LA, Ferrari MD, Kruit MC, *et al*. Neuroimaging in trigeminal autonomic cephalgias: when, how, and of what? *Curr Opin Neurol* 2009; **22**: 247-53.
- Liang JF, Fuh JL, Yu HY — Clinical features, polysomnography and outcome in patients with hypnic headache. *Cephalalgia* 2008; **28**: 209-15.
- Dodick DW, Mosek AC, Campbell JK. They hypnic ("alarm clock") headache syndrome. *Cephalalgia* 1998; **18**: 152-6.
- Pearce JM. Clinical features of the exploding head syndrome. *J Neurol Neurosurg Psychiatry* 1989; **52**: 907-10.
- Palikh GM, Vaughn BV — Topiramate responsive exploding head syndrome. *J Clin Sleep Med* 2010; **6**: 382-3.
- Pareja JA, Sjaastad O — Primary stabbing headache. *Handb Clin Neurol* 2010; **97**: 453-7.
- Fuh JL, Kuo KH, Wang SJ — Primary stabbing headache in a headache clinic. *Cephalalgia* 2007; **27**: 1005-9.
- Ruiz M, Pedraza MI, de la Cruz C, Barón J, Muñoz I, Rodríguez C, Celorrio M, Mulero P, Herrero S, Guerrero AL — Headache in the elderly: characteristics in a series of 262 patients. *Neurologia* 2014; **29**: 321-6.
- Karassa FB, Matsagas MI, Schmidt WA, Ioannidis JP — Meta-analysis: test performance of ultrasonography for giant-cell arteritis. *Ann Intern Med* 2005; **142**: 359-69.
- Loghin M, Levin VA. Headache related to brain tumors. *Curr Treat Options Neurol* 2006; **8**: 21-32.