TABLE 111-5 CLASSIFICATION OF MIGRAINE

Migraine without aura Migraine with aura	Migraine variants • Hemiplegic migraine • Migraine with basilar aura • Vestibular Migraine • Retinal Migraine

The prevalence of migraine is up to 18% in women and 6% in men. It is estimated that 28 million Americans have disabling migraine headaches. All varieties of migraine may begin at any age from early childhood on, although peak ages at onset are adolescence and early adulthood.

Several subtypes of migraine are described (Table 111-5). The two most common are migraine without aura and migraine with aura; migraine without aura accounts for 70% of patients. Migraine auras are focal neurologic symptoms that precede, accompany, or, rarely, follow an attack. The aura usually develops over 5 to 20 minutes, lasts less than 60 minutes, and can involve visual, sensorimotor, language, or brainstem disturbances. The most common aura is typified by positive visual phenomena (such as scintillating scotomata) that often precede the headache. The differential diagnosis of an aura includes a focal epileptic seizure arising from the visual cortex of the occipital lobe, or a transient ischemic attack (TIA). In the latter, there is no evolution of symptoms, and the symptoms themselves are typically "negative" (such as a hemianopia) rather than the "positive" visual phenomenon of phosphenes that is characteristic of the migrainous aura. The pain of migraine is often pulsating, unilateral, and frontotemporal in distribution and usually accompanied by anorexia, nausea, and, occasionally, vomiting. In characteristic attacks, patients are markedly intolerant of light (photophobia) and seek rest in a dark room. There may also be intolerance to sound (phonophobia) and occasionally to odors (osmophobia). The diagnosis of migraine requires the presence of at least one of these features, particularly in the absence of gastrointestinal symptoms. The presence of these symptoms results in a syndrome that is invariably disabling for the patient, to the extent that for the duration of the attack he or she is unable to function normally. In children, migraine is often associated with episodic abdominal pain, motion sickness, vertigo, and sleep disturbances. Onset of typical migraine late in life (older than age 50) is rare, although recurrence of migraine that had been in remission is not uncommon. Recurrent migraine headache associated with transient hemiparesis or hemiplegia occurs rarely as a clearly genetically determined (Mendelian) disease (*familial hemiplegic migraine*).

Migraine with basilar aura is unusual and occurs primarily in childhood. Severe episodic headache is preceded, or accompanied by, signs of bilateral occipital lobe, brainstem, or cerebellar dysfunction (e.g., diplopia, bilateral visual field abnormalities, ataxia, dysarthria, bilateral sensory disturbances, other cranial nerve signs, and occasionally coma). *Vestibular migraine* is characterized by symptoms of vertigo with or without the other typical migraine symptoms.

Complications of Migraine

Status Migrainosus refers to a severe migraine lasting greater than 72 hours. *Migrainous infarction* is a rare complication of migraine with aura. The term *migralepsy* has been suggested for patients in whom an aura triggers a seizure.

Pathophysiology of Migraine

A migraine attack is the end result of the interaction of a number of factors of varying importance in different individuals. These factors include a genetic predisposition, a susceptibility of the central nervous system to certain stimuli, hormonal factors, and a sequence of neurovascular events. A positive family history is reported in 65% to 91% of cases. Three distinct ion channel gene mutations have been identified in patients with familial hemiplegic migraine (FHM), including a mutation in the *P/Q* type calcium channel on chromosome 19 (FHM 1) and a gene encoding a Na/K- ion pump on chromosome 1 (FHM 2). These findings lend support to the theory that migraine may be a true channelopathy in which mutations of diverse channels result in a common phenotype. The etiology of migraine in the majority of patients remains unknown.

The migrainous aura is likely caused by a "cortical spreading depression," corresponding to a wave of neuronal depolarization spreading over the cortex from posterior to anterior. One of the key structures in the mechanism of pain in migraine is the trigeminal vascular system. Stimulation of the trigeminal nucleus caudalis can activate serotonin receptors and nerve endings on small dural arteries and result in a state of neurogenic inflammation. It is postulated that these processes, in turn, stimulate perivascular nerve endings, with resultant orthodromic stimulation of trigeminal nerve and pain referred to its territory. Furthermore, positron emission tomographic (PET) studies have demonstrated activation of brainstem neuromodulatory structures, including the periaqueductal grey matter, locus coeruleus, and raphe nuclei during a migraine attack.

Treatment of Migraine

The goals of treatment are (1) making an accurate and confident diagnosis of migraine to reassure the patient that there is no more sinister cause for the headache; (2) relieving acute attacks; and (3) preventing pain and associated symptoms of recurrent headaches. The first step is to inform the patient that he or she has a migraine. The benign nature of the disorder and the patient's central role in the treatment plan should be emphasized. It is important that the patient keep a headache diary, which serves to help identify covert headache triggers, assists in monitoring headache frequency and response to treatment, and actively involves the patient in the management of the condition. A sustained pain-free therapeutic response should aim to have the patient pain-free at two hours with no recurrence and no need for subsequent rescue medication.

Acute Migraine Attack

Acute attacks are best alleviated using a stratified, rather than stepped care approach, using single agents or varying combinations of drugs as well as with behavioral modification therapy. Many attacks of migraine respond to simple analgesics, such as acetaminophen, aspirin, or nonsteroidal anti-inflammatory agents (NSAIDs). Opioid drugs and butalbital should not be used in the routine management of patients with migraine. Overuse of analgesics is particularly frequent in headache