

Migraine-pathophysiology, clinical features, and modern therapy

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Abstract

Migraine is a prevalent and disabling neurological disorder characterized by recurrent attacks of moderate to severe headache accompanied by various neurological, gastrointestinal, and autonomic symptoms. Affecting approximately 15% of the global population, migraine significantly impairs quality of life and contributes substantially to disability worldwide. Recent advances in understanding migraine pathophysiology have led to the development of targeted therapeutic approaches, particularly therapies directed against calcitonin gene-related peptide (CGRP). This article reviews the current understanding of migraine pathophysiology, clinical manifestations, diagnostic approaches, and contemporary treatment strategies.

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Keywords: migraine, headache, calcitonin gene-related peptide, aura, neurovascular disorder, diagnosis, treatment, CGRP inhibitors.

Migraine is a chronic neurological disorder characterized by recurrent episodes of headache and associated symptoms such as nausea, vomiting, photophobia, and phonophobia. It is one of the leading causes of disability among individuals under 50 years of age and affects women more frequently than men.

Although migraine has been recognized for centuries, its underlying mechanisms have become better understood only in recent decades. Advances in neurobiology and neuroimaging have transformed migraine from being viewed solely as a vascular disorder to being recognized as a complex neurovascular disease involving multiple neural pathways. Migraine imposes a substantial burden on patients, families, and healthcare systems. Frequent migraine attacks can significantly affect academic performance, occupational productivity, and social relationships. Many patients experience anxiety, depression, and reduced quality of life due to the unpredictable nature of attacks. Chronic migraine, defined as headache occurring on 15 or more days per month for at least three months, is associated with greater disability and increased healthcare utilization. Studies have demonstrated that migraine is among the leading causes of years lived with disability worldwide. Effective management not only reduces headache frequency but also improves psychological well-being and overall functioning. Future migraine treatment is expected to focus on precision medicine approaches that integrate genetic, molecular, and clinical data. Artificial intelligence may assist clinicians in predicting treatment responses and identifying patients at risk for chronic migraine. Advances in neuromodulation technologies and gene-based therapies may further expand available treatment options. As scientific understanding of migraine mechanisms continues to evolve, healthcare professionals will be better equipped to provide individualized care and improve long-term outcomes for patients suffering from this disabling neurological disorder.

Migraine is a complex neurovascular disorder that significantly impacts individuals and healthcare systems worldwide. Advances in understanding its pathophysiology, particularly the role of the trigeminovascular system and CGRP,

have transformed clinical management. Contemporary therapies, including triptans, gepants, monoclonal antibodies, and neuromodulation techniques, offer improved outcomes for many patients. Continued research into migraine mechanisms and personalized treatment strategies promises further progress in reducing the burden of this common neurological disease.

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