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Parasympathetic cholinergic and neuropeptide mechanisms of migraine

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Abstract

© 2016, Iranian Society of Regional Anesthesia and Pain Medicine (ISRAPM). Context: Migraine mechanisms remain largely uncovered for various reasons including a very high complexity of the neurophysiological mechanisms implicated in this disorder and a plethora of endogenous biologically active compounds involved in the pathological process. The functional role of parasympathetic innervation of meninges and cholinergic mechanisms of migraine are among little explored issues despite multiple evidence i ndirectly indicating the role of acetylcholine (ACh) and its analogues in migraine and other types of headache. In the current short review, we discuss morphological, functional, and clinical issues related to the role of ACh and its analogues such as carbachol and nicotine in this most common neurological disorder. Evidence Acquisition: In the present work, studies published from 1953 to 2016 were investigated. Literature was searched with following keywords: acetylcholine (ACh), carbachol, nicotine, parasympathetic, mast cells, vasoactive intestinal polypeptide (VIP), and pituitary adenylate cyclase-activating polypeptide (PACAP). Results: Parasympathetic fibers originatedfromSPGandtrigeminal nerves can interact at the level of meninges which is considered to be the origin site of migraine pain. Here, in dura mater, ACh, VIP, and PACAP released by parasympathetic afferents can both affect mast cells provoking its degranulation and additional release of neurotransmitters, or they can directly affect trigeminal nerves inducing nociception. Conclusions: In summary, cholinergic mechanisms in migraine and other types of headache remain little elucidated and future studies should clarify the role of parasympathetic nerves and molecular mechanisms of cholinergic modulation within the nociceptive system.

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Keywords

Cholinergic, Headache, Mast cells, Migraine, Nicotine, Trigeminal pain

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