

Neuropathic Pain

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Abstract

Background and purpose: Neuropathic pain (NP) is often refractory to pharmacologic and non-interventional treatment. Neuropathic pain can be distinguished from non-neuropathic pain by two factors. In neuropathic pain there is no transduction (conversion of a nociceptive stimulus into an electrical impulse). Finally, injury to major nerves is more likely than injury to non-nervous tissue to result in chronic pain. This review focuses on the clinical treatment of neuropathic pain as well aims to improve the care of adults with neuropathic pain.

Methods: Clinical treatment of neuropathic pain depends on clinical evaluation, as treatment can be pharmacological or not; invasive treatment or other therapies.

Results: Neuropathic pain because of its heterogeneity, there is often uncertainty regarding the nature and exact location of a lesion or health condition associated with neuropathic pain.

Conclusions: Both peripheral and central nervous system mechanisms contribute to the persistence of most types of neuropathic pain. Patients with conditions as diverse as diabetic polyneuropathy, human immunodeficiency virus (HIV) sensory neuropathy, poststroke syndromes, and multiple sclerosis frequently experience daily pain that greatly impairs their quality of life.

Implications: Progress in basic science will lead to a greater understanding of the pathophysiologic mechanisms of neuropathic pain.

INTRODUCTION

Neuropathic pain (NP) has been defined by the International Association for the Study of Pain as pain arising as a direct consequence of a lesion or disease affecting the somatosensory nervous system.¹ According to an Institute of Medicine report, one in three Americans experiences chronic pain more than the total number affected by heart disease, cancer, and diabetes combined.² The prevalence of NP is 6-8% in the general population, but associated factors are advancing age, female gender and lower socioeconomic groups.³ Around 15-25% of people with chronic pain are currently thought to have neuropathic pain.^{3,4}

PHYSIOLOGY AND MECHANISM

The generation of pain in response to tissue injury

involves four basic elements. Transduction, a function of nociceptors that converts noxious stimulation to nociceptive signals; Transmission, a process that sends nociceptive signals along nerve fibers from the site of injury to the central nervous system (CNS); Transformation or plasticity, a mechanism that modulates nociceptive signals at synaptic sites and at the level of the CNS through ascending, descending, or regional facilitation and inhibition; Perception, a key component of the clinical pain experience that integrates cognitive and affective (emotional) responses.

Neuropathic pain can be classified according to the underlying disease (diabetic neuropathy, multiple sclerosis), the location of the lesion (peripheral nerve damage, spinal cord) and the underlying

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mechanism. Characteristics of neuropathic pain are automatic start, independent stimulus, continuous burning, breakthrough pain, electric shock-like pain, dysaesthesia (abnormal and unpleasant sensation), paraesthesia, hyperalgesia (increased response to normally painful stimuli), allodynia (pain from non-painful stimuli). In neuropathic pain, tissue damage directly affects the nervous system, resulting in the generation of ectopic discharges that bypass transduction.⁵ The pain is initiated or caused by a primary lesion or dysfunction in the nervous system, and yet its cause is heterogeneous and commonly may be inflammatory (for example, post herpetic neuralgia), metabolic, or ischaemic.⁶ The main approach is to divide peripheral neuropathic pain into stimulus evoked pain or stimulus independent pain (spontaneous pain).⁷

EVALUATION AND TREATMENT OF NEUROPATHIC PAIN

Clinical evaluation of pain includes: historical and onset of symptoms; localization, quality, intensity and duration of pain; evaluation of the impact of pain on ordinary activities and any sleep disorders; effect of pain in the psychological realm of patient; answer or not previous treatments.

Non pharmacological treatments for neuropathic pain includes: maintain activity and labor employment; mobilisation, exercise, TENS, Acupuncture. Pharmacological treatments includes: analgesics such as Paracetamol, mild opioid (tramadol, codeine); non-steroidal anti-inflammatory drugs; opioids, antidepressants, antiepileptika, local factors such as Lidocaine 5%. Invasive techniques such as Neuromodulation in which a series of treatments aimed at changing the perception of pain after stimulation or inhibition of neural pathways. Another treatment is induction of bone marrow; in resistant neuropathic pain are inserted one or two epidural electrodes, which are then connected to an electrical source, such as that of the pacemaker. Finally another option is pulsed radiofrequency in which a single needle is inserted in the area of neural damage. The resulting heat creates a temporary impairment of the nervous tissue.⁸

CONCLUSIONS

Injury to the peripheral or central nervous system results in maladaptive changes in neurons along the nociceptive pathway that can cause neuropathic pain. Neuropathic pain is very challenging to manage because of its heterogeneity. There is often uncertainty regarding the nature and exact location of a lesion or health condition associated with neuropathic pain. Chronic neuropathic pain is common in clinical practice. Patients with conditions as diverse as diabetic polyneuropathy, human immunodeficiency virus (HIV) sensory neuropathy, poststroke syndromes, and multiple sclerosis frequently experience daily pain that greatly impairs their quality of life.

Both peripheral and central nervous system mechanisms contribute to the persistence of most types of neuropathic pain. Interest in the mechanisms and treatment of chronic neuropathic pain has increased during the past several years, and this is likely to result in significant treatment advances in the future. Progress in basic science will lead to a greater understanding of the pathophysiologic mechanisms of neuropathic pain.

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