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Review Article

Neuropathic Pain: An Overview

Ankur Rohilla^{1*}, Pinki¹, Seema Rohilla², Amarjeet Dahiya¹ and Ashok Kushnoor¹

¹Department of Pharmaceutical Sciences, Shri Gopi Chand Group of Institutions, Baghpat, Uttar Pradesh, India.

²Department of Pharmaceutical Sciences, Hindu College of Pharmacy, Sonapat, Haryana, India.

ABSTRACT

The capacity to experience pain has a protective role for counseling the tissue damage that bring forth coordinated reflexes and behavioral responses in order to keep such damage to least amounts. Neuropathic pain (NP) has been considered as a condition caused by various central and peripheral nerve disorders. NP results from various causes affecting brain, spinal cord and peripheral nerves like cervical or lumbar radiculopathy, diabetic neuropathy, cancer-related NP, HIV-related neuropathy and spinal cord injury. Recommended therapies of NP involve antidepressants, certain antiepileptics, topical lidocaine and opioid analgesics. The present review aims at explaining various causes and treatments for the prevention and treatment of NP.

Keywords: Neuropathic pain, Nerve, Treatment.

INTRODUCTION

Neuropathic pain (NP) refers to pain that occurs due to various central and peripheral nerve disorders resulted from injury to a single or several nerves in the body.¹⁻² Various diseases, injuries and interventions have been noted to cause NP by producing lesions in somatosensory pathways in central or peripheral nervous system. Nerves that remain intact following tissue injury remain hyperactive, signaling pain in the dearth of painful stimuli.³ The epidemiology studies of NP pain have not been sufficiently premeditated because of the multiplicity of the associated conditions. However, numerous causes for the occurrence of NP have been widely reported that include chemotherapeutic drugs, radiation therapy, tumor pushing on a nerve, surgery for cancer, trauma, herpes zoster infections, chronic conditions like diabetes, nutritional deficiencies, toxins, trigeminal neuralgia and complex regional pain syndrome type II.⁴⁻⁷ Moreover, various symptoms of NP have been recorded in various studies that include burning, cramping, jolting, numbness, pressure, squeezing, stabbing and tingling. Plenty of evidences have suggested that NP impairs patients' mood, quality of life, activities of daily living and performance at work. Hence, the treatment strategies of NP have been aimed at eliminating the cause of pain, providing relief from pain, maintaining usual activity level and improving the quality of life.⁸⁻⁹ In addition, treatments with one or more medicines have also been reported that include anti-seizure

drugs, antidepressants, anticancer drugs, opioids, steroids, topical and local anesthetics.¹⁰⁻¹¹ The review article highlights about various causes and treatment strategies of NP.

TYPES OF NP

NP is referred to as the pain caused by primary lesion or dysfunction in the nervous system. The types of NP can be primarily studied under three main headings, i.e., Postherpetic Neuralgia (PHN),¹² Painful HIV-Distal Sensory Polyneuropathy (HIV-DSP)¹³ and Painful Diabetic Neuropathy (PDN).¹⁴ PHN is a chronic pain disorder resulting from varicella zoster virus reactivation, commonly known as shingles.¹⁵ The definitions of PHN ranges from persistent pain for one month to long six years after shingle rash crusting. Moreover, PHN has been noted to occur frequently in elderly and immunosuppressed populations.¹⁶⁻¹⁷ In addition, the incidence of PHN has been vitally seen to occur in patients with enhanced immune suppression like in cancer and human immuno virus (HIV). Further, HIV-DSP has been considered as the most common neurological complication of HIV infection. HIV-DSP has been noted to primarily caused by direct activation of sensory neurons by HIV, fight of immune system against HIV and antiretroviral drugs.¹⁸ The HIV-DSP has been characterized by significant chronic pain in the hands and feet leading to loss of sensation in the arms and legs. The symptoms range from mild tingling to severe pain in response to normal daily stimuli.¹⁸⁻¹⁹ The third type of PN is

PDN which can be regarded as the chronic pain resulting from damage to sensory nerves due to multiple factors like high glucose-mediated metabolic insult and inadequate oxygenation related to diabetic microvascular damage.²⁰⁻²¹ The symptoms of PDN include paraesthesias, stabbing, shooting and burning pains that are commonly present in the feet often worsening at night.²²⁻²³ Other types of NP have also been reported to be associated with traumatic nerve injury, stroke, multiple sclerosis, syringomyelia, epilepsy, spinal cord injury and cancer.

TERMS ASSOCIATED WITH NP

There are various terms that have been frequently used in regard to the understanding of NP like allodynia, paraesthesia, hyperesthesia, hyperalgesia, hyperpathia and hypoesthesia.²⁴⁻²⁸ A situation where a normal stimulus elicits an abnormal painful response is referred to as allodynia, for example, touch, light pressure and cold have been felt as pain.²⁹ Paresthesia is defined as an abnormal sensation whether spontaneous or provoked, whereas, hyperesthesia is an increased sensitivity to stimulation, which requires specific mention of stimulus and location.³⁰⁻³¹ It may be due to reduced threshold to any stimulus and an enhanced response to stimuli that are normally recognized. In general, the hyperesthesia to painful stimulus is regarded as hyperalgesia, whereas, hyperesthesia to touch is referred to as allodynia.³²⁻³³ Moreover, an increased response to a stimulus which is normally painful is called as hyperalgesia.²⁷ It may also be defined as an increased response to normal threshold or at a normal threshold. Further, hyperpathia is another term that is frequently used in reference to NP which can be defined as a painful syndrome characterized by increased reaction to a stimulus, especially a repetitive stimulus as well as increased threshold. Another related term associated with NP is hypoesthesia which is known to be condition of decreased sensitivity to stimulation, accept the special senses, in which stimulation and location must be specified. Furthermore, two more terms have been noted to be associated with NP that includes hypoalgesia and dyesthesia.²⁶ However, hypoalgesia can be identified as the diminished pain in response to a normally painful stimulus, whereas, dyesthesia is an unpleasant abnormal sensation, whether spontaneous and evoked.³⁴

CLINICAL PRESENTATION OF NP

It has been widely accepted that the blockade of nerve conduction in neuropathic conditions lead to nerve dysfunction resulting in numbness, weakness and loss of deep tendon reflexes in the affected nerve area.³⁵ NP can be classified on the basis of the etiology of the insult to the nervous system or to the anatomical distribution of the pain.

Moreover, the neuropathic conditions cause uncharacteristic symptoms of spontaneous and stimulus-evoked pain.³⁶ However, spontaneous pain may be described as a sensation of burning, shooting or shock-like, whereas, stimulus-evoked pain includes allodynia and hyperalgesia.³⁷⁻³⁸ The allodynia can be caused by the lightest stimulation like skin contact with clothing and cold. Such sensory abnormalities extend beyond nerve distributions ultimately causing inappropriate diagnosis of a functional or psychosomatic disorder. The diagnosis of neuropathic pain is based primarily on history and findings on physical examination, sudomotor and other changes and neurological deficits.³⁹ Without recognition of the mechanisms of NP, the optimum treatment strategy for the clinically presented patient cannot be selected. Hence, the assessment of patient presented with suspected NP should focus on ruling out treatable conditions like, spinal cord compression, confirming the diagnosis of NP and identifying clinical features like insomnia and autonomic neuropathy that might help for the individualized treatment.⁴⁰⁻⁴¹

TREATMENTS FOR NP

Ample research has concluded that treatment specifically adapted may help in managing the pain associated with NP. Depending on the specific needs, it has been suggested the treatment strategies of NP include increasing the physical activity, using stress management techniques to help with mood and functioning, using medications to help with pain and mood, managing stress, improving blood pressure and lowering blood sugar levels.⁴² The main aim of treating NP is centered on improvements in the daily life by physical activities like swimming, water aerobics, walking and biking. Moreover, cognitive-behavioral and stress management strategies have been shown to help people better manage and cope up with NP.⁴³ The cognitive-behavioral approach emphasizes about thoughts, ideas and beliefs that affect behavior and emotions. Additionally, in cognitive-behavioral therapy, change of thinking styles in order to decrease sufferings is learnt.⁴⁴⁻⁴⁵ Further, medications are prescribed to decrease pain and discomfort associated with NP. It has been shown that nonsteroidal anti-inflammatory drugs (NSAIDs) decrease mild to moderate pain and inflammation for a short period of time.⁴⁶⁻⁴⁷ In addition, medications such as tricyclic antidepressants (TCAs) like amitriptyline, nortriptyline and desipramine have been noted to help in reducing the pain and help with sleep and mood.⁴⁸⁻⁵⁰ In addition, based on various methodologically flawed trials, it has been suggested that various anticonvulsants can be used as second line therapy for the treatment of NP.⁵¹⁻⁵² Moreover, Capsaicin and Lidocaine cream have

been found to soothe the skin sensitivity and relieve from pain.⁵³

CONCLUSION

NP is generally considered as the pain caused by dysfunction in the central or peripheral nervous system. Various causes of NP have been found like radiation therapy, surgery and trauma, diabetic neuropathy and cancer. The treatments available for NP are generally palliative and include conservative nonpharmacological therapies as well as drugs. The individualizing management requires deliberation of functional impacts like mood disorders and depression. However, various treatments have been well reported for NP like topical lidocaine, tricyclic antidepressants and opioids but it can be suggested that the field of NP research and treatment is in the preliminary stages of development with several unidentified. Hence, several advances are expected in the basic and clinical sciences of NP in the upcoming years in order to afford prevention and better treatments.

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