Information for Doctors

Your patient has been diagnosed with a Neuropathic Pain Syndrome (NPS) and has been treated with Neural Prolotherapy (NPT), a treatment specifically developed for neuropathic pain.

Recent neuroscientific findings have clarified the underlying physiology and pathology of neurogenic inflammation (1), neuropathic pain (2), peripheral nerve injury and regeneration (3), the importance of Schwann cells (4), the critical role of Nerve Growth Factor (NGF) (5) and key processes in nerve function like 'axoplasmic flow' (6)

In essence, neuropathic pain is a cardinal sign of neurogenic inflammation. The other cardinal signs of neurogenic inflammation are swelling and to a much lesser degree heat and redness.
Neurogenic inflammation is caused by dumping of neuropeptides stored in polymodal unmyelated C-fibers and small myelated Aδ fibers in response to neuronal insult (1).
Some 20 neuropeptides have so far been identified (7). The best known are Calcitonin Gene Related Peptide (CGRP) and Substance P (SP).
Biopsies from Sural nerves have identified 30,000 unmyelated C-fibers and 8,000 small myelated Aδ fibers per mm2 (3). At least 30% of these fibers store neuropeptides in axonal vesicles and are called ***peptidergic sensory nerves*** or ***capsaicum sensitive nerves*** **(**1).
Capsaicum has been the main biochemical tool for research into neurogenic inflammation since 1967 (1, 8).
Immune reactivity studies into CGRP (IR-CGRP) have identified dense innervations of peptidergic sensory nerves in the dermis, underlying fascia, perimysium, periostium, bone, deeper arterial networks and epi-perineurium (9).
Peptidergic sensory nerves have also been identified perivascular in brain and lung tissue and this explains the now generally held opinion that migraines and asthma are paroxysmal neurogenic inflammatory conditions (1, 10).

Under physiological conditions tonal release of neuropeptides from peptidergic sensory nerves serves tissue maintenance and renewal and this is considered to be their primary function (1, 9).
Following nerve insult peptidergic sensory nerves change phenotype within minutes to days and generate neurogenic inflammation through dumping of large quantities of neuropeptides.
Neuronal response to injury normally follows an orderly and organised release of different neuropeptides, resulting in full and complete nerve regeneration.

Full and complete regeneration of peptidergic sensory nerves is also largely dependent on the presence of Nerve Growth Factor (NGF) (5).
NGF is produced in the receptive field of the traumatised peptidergic sensory nerve, assimilated into the axon and transported through retrograde axoplasmic transport to the cell body (perikarya) in the Dorsal Root Ganglion (DRG). Here it targets the DNA for nerve repair molecules, which are transported back in anterograde axoplasmic flow to the damaged peripheral nerve.

Impairment of full and complete regeneration of peptidergic sensory nerves results in chronic neurogenic inflammation and/or neuropathic pain.
Neuropathic pain has been aptly described as ‘a debilitating pain, which renders patients unable to walk, work, sleep or enjoy life’ (3).
It has been stated that full and complete regeneration of peptidergic sensory nerves will extinguish this pain. (3)
Other characteristic features of neuropathic pain are hyperalgesia, allodynia and disaesthesia.

Extensive clinical experience with weekly subcutaneous near nerve injections of Dextrose have demonstrated potent and instant analgesic effects on neuropathic pain and long term reduction in neurogenic inflammation. (11, 12, 13, 14)
It is postulated that a subpopulation of glucosensing peptidergic small fibers down-regulates arousal in neighbouring peptidergic sensory nerves in response to high tissue levels of glucose and reduce neurogenic inflammation and neuropathic pain.
Such glucosensing nerves have already been identified in the brain and gut (15).

The production of NGF in the receptive field of the peptidergic sensory nerves can be stimulated by Vitamin D Hormone (VDH) in the dermis.
This forms the basis for the empirically found beneficial effect on neuropathic pain of the application of a customised cholecalciferol transdermal cream.
Cholecalciferol is readily converted into Calcitriol, the active form of VDH, in the skin.

Dr John Lyftogt
MD, MRNZCGP, Dip Obst.
Active Health
QE II Sports Stadium
Christchurch
New Zealand
Email johnl@activehealth.co.nz
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