Nociceptive and neuropathic pain

Nociceptive pain

Nociceptive pain arises as a result of mechanical, thermal or chemical stimulation of the pain receptors (nociceptors). The pain-conducting nerves are generally not damaged.

Pathological nerve pain resulting from impaired processing of pain due to nerve damage

Autoimmune disease (e.g. rheumatism) Mechanical pressure Amputation Other operation Injuries Diabetes, metabolism Viruses Alcohol, poisons

How is neuropathic pain manifested? [3]

Damaged nerve fibre

Nerve damage is "over-repaired"

Overactivity of the nerve fibres

Intensified or spontaneous pain signals

Burning pain Electric-shock pain Stabbing pain

Drawing modified from: Illustration of the pain pathway in René Descartes’ Traité de l’homme (Treatise of Man) 1664
Nociceptive and neuropathic pain

A Nociceptive pain

Results from stimulation of the nociceptors ("pain sensors") by mechanical, thermal or chemical stimuli or by lesions (as described in Sections 1-3).

It can be triggered in almost all tissues. Nociceptive pain arises following pain-producing stimuli by activation of the healthy peripheral nervous system. Examples are pain after surgery, bone fractures, skin injury or joint diseases.

B What is neuropathic pain? [1, 2]

Neuropathic pain is nerve pain that arises develops as a direct consequence of injury or damage to various nerve fibres.

As the C fibres are very fine and sensitive, they can be damaged very easily. Alcohol abuse, long-term metabolic dysfunctions (e.g. diabetes mellitus), viruses (e.g. herpes), persistent mechanical effects (defective intervertebral discs, tumours), inflammation or autoimmune diseases (Guillain-Barré syndrome, multiple sclerosis) can lead to neuropathy.

Neuropathic pain arises through damage to the central and peripheral nervous systems, leading to impaired pain processing.

C How is neuropathic pain manifested? [3]

The nerve cell counters neuropathy with "surplus" repair processes, including the formation of new molecules, which increase stimulus conduction (receptors and ion channels). Nerve fibres may become hyperactive as a result.

This leads to a lowering of the pain threshold (peripheral sensitisation) and consequently to hyperalgesia (excessive pain sensitivity), allodynia (pain perception caused by non-painful stimuli) and ectopic discharges (pain signalling in the absence of stimuli).

Neuropathic pain is commonly of a shooting, burning or stabbing nature and is generally not directly related to a noxious stimulus.

Neuropathic pain tends to become chronic, as pain stimuli are constantly generated in an uncontrolled manner as a result of the sensitisation (see also Sections 7-8). Central sensitisation may consequently also occur in addition to peripheral sensitisation.