

CERVICAL AND LUMBAR DISCOGRAPHY AND NOVEL THERAPEUTIC APPROACHES

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The intervertebral discs might be a source of pain. Inman and Saunders in 1947 showed that the discs received a nerve supply, and thus were potentially painful. However, until the last decade this concept was neglected, leading to confusion and misdiagnosis of discogenic pain. Nowadays, there can be no objection on anatomical basis that the discs could be sources of back pain. The role of sinuvertebral nerves in the pathogenesis of discogenic pain has been until recently a neglected field. Mendel identified the primary rami origination proximally to the nerve root and ganglion as a sole supply of the sinuvertebral nerve of the disc and adjacent ligaments. Freemont has investigated the innervation of the lumbar disc in the sympathetic nerve supply from the sympathetic chain, which is located anteriorly to the disc, showing that sprouting of sinuvertebral nerves also exists to injured discs. These nerve structures may be exposed to inflammatory and algogenic chemical substances, such as phospholipase A2, creatine phosphokinase, stromelysin and metalloproteinase, adding to chemical nociception the mechanical nociception originated in the tears and fissures of the damaged discs. The close relation of these neural and somatic structures to the sympathetic chain gives a theoretical basis for the participation of the autonomic nervous system in the chronification of spinal pain. The concept of "endplate zone" has been introduced in MRI diagnosis as a functional equivalent of the endplate cartilage. Recent studies showed that Diffusion through the vertebral endplates is the only source of nutrition of the discs, but no firm data are available on pattern of diffusion in humans. Apparently, aging and degeneration of the discs are two separate processes, according to identification of clear-cut differences in diffusion characteristics. Discography used as a diagnostic technique can predict to a great extent the relief of discogenic pain as this method can reproduce the original pain and visualizes the pathology of the disc, enabling the appropriate determination of treatment. The correlation between reproduction of pain and the presence of a grade 3 fissure - internal disc disruption - is very strong and it could be defined as paradigmatic in the field of back pain. Freemont and collaborators have published that in a disrupted disc the sinuvertebral nerve grows and sprouts not only into the inner one-third of the annulus fibrosus, but extends to the disrupted nucleus pulposus in lumbar regions, thereby playing an important role in the pathogenesis of spinal pain with axial and radiated distribution whether in the cervical, thoracic or lumbar segments. However, it appears that annular degeneration of the lumbar discs appear earlier and are more clearly related to back pain than previously thought. Current diagnostic techniques using MRI may not be adequate to fully distinguish ruptured or leaking annular tears. The intervertebral disc has been claimed to be a source of chronic low back pain and discogenic pain accounts for 39% of patients complaining of low back pain. Conservative therapeutic approach is usually poor in this group of patients, being a subpopulation with difficult prognosis despite invasive surgical treatment as vertebral fusion. Studies on intradiscal thermal therapy have been reported on the use of radiofrequency to heat the disc. Clinical studies and cadaver necropsies have shown the various factors limiting the efficacy of this technology for the treatment of chronic pain with discogenic origin, resulting in variable outcomes.

Recent prospective studies have been reported using a navigable intradiscal thermal catheter at a temperature range for heating the disc, destroying nociceptive nerve endings. These studies show an overall > 60% favourable outcome with statistically significant improvement in functional outcome in patients with chronic discogenic pain and suggest that intradiscal electrothermal annuloplasty (IDET) may be an effective, minimally invasive treatment for this condition. Controversy on the value of this disc therapy is still on air. Large randomized trials and prospective cohort studies must be developed. Percutaneous disc decompression has its main indication in the presence of a contained herniated disc. It can be achieved by a number of minimally invasive techniques, namely chemonucleolysis, automated percutaneous lumbar discectomy (APLD), percutaneous laser discectomy, nucleoplasty and CAM with coblation technology, and endoscopic microdiscectomy.