

Short Communication

Histological Study of Nerve Endings in Ligamentum Flavum in Patients with Discopathy

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Abstract

Background: Ligamentum flavum normally has neural ends so it has sensory role and helps to protect vertebral column against different injuries. The aim of this study was to detect the neural ends in ligamentum flavum in patients with discopathy.

Methods: Samples were taken from ligamentum flavum of the patients with discopathy during surgery. One hundred samples were considered. Five hundred sections were obtained and stained with H & E method and were studied under light microscope.

Results: Nerve corpuscles were found in none of the sections of the patients.

Conclusion: It seems that ligamentum flavum in patients has a loss in the nerve ends that leads to a decrease in proprioceptive information to control nervous system and may injure tissues like cartilage, osseous and fascia.

Key Words: Discopathy, Nerve Ends, Ligamentum Flavum.

Ligamentum flavum is yellowish in colour and contains elastic fibers. They join the contiguous borders of adjacent vertebral laminae¹ and attach to the front of the upper lamina and to the back of the lower lamina. They are stretched by flexion of the spine, in leaning forward their increasing elongation becomes an increasing antigravity support¹. Ligamentum flavum has mechanical and sensory receptors^{2, 3, 4}. The mechanical receptors transfer proprioceptive information to the upper nervous system and inform them of the changes in position that may injure the joints^{5, 6}. So it is possible that it plays its protective role by efferent responses in order to protect the spine against unfavorable movements⁶. The few number of receptors in knee ligaments of the patients who develop arthritis shows that a reduction in receptors results in reduction of information transference and can have a

role in the development of disease⁶. In this study we estimated the nerve endings in ligamentum flavum of individuals with discopathy.

Materials and Methods

This descriptive study was done on 100 samples taken from human ligamentum flavum. Samples were taken during operation on vertebral column. The fresh samples were fixed in 10% formalin saline solution. After fixation, tissue processing including dehydration, clearing, impregnation and embedding was done, then 5 micron serial sections were prepared. From each sample, 5 sections (one section out of 100 cuts) were chosen and 500 sections were stained with H & E method. Presence of nerve endings in the sections was carefully studied under a light microscope.

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Results

There were no sensory receptors or nerve endings in the ligaments of patients with discopathy. In normal individuals ligamentum flavum has sensory receptors^{5,6}.

Discussion

Stilwell et al⁷ found some large Pacinian corpuscles and some corpuscles similar to Pacini and Golgi in thoracolumbar fascia. Hirsch et al⁸ only could find some delicate free endings and some capsule free endings. Isobe et al⁹ used the S100 protein as a marker to detect schwane and glial cells. They found the receptors near blood vessels next to hard collagen bundles. in a similar study by Bednar et al⁶ on thoracolumbar fascia of patients with chronic mechanical back pains using electron microscopy, no nerve corpuscles were seen. In some samples there were foci of calcifications and precalcifications. The results of our study were similar to the studies done by Bednar et al⁶.

The nerve endings in ligamentum flavum of healthy people send the proprioceptive information to the nervous system. Such information could protect vertebral column against injuries by inhibiting and stimulating reflexes during extension and flexion or pressure, so their loss can decrease or remove that effect⁵. In fact, lack of nerve endings in ligamentum flavum can initiate the injury to muscles, ligaments, tissues or to vertebral column and joints. In this study we did not find any nerve ends in patients with discopathy. The presence of nerve corpuscles were reported in studies on the ligaments in healthy people⁶. The reason for lack of nerve endings in ligamentum flavum in abnormal conditions is unknown and their loss has not been justified. Also in other studies done on thoracolumbar fascia of patients with discopathy no nerve ends were ever found⁶.

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