A HISTOLOGIC AND IMMUNOHISTOCHEMICAL STUDY ON THE HYPERTROPHIC LIGAMENTUM FLAVUM OF
THE LUMBAR SPINAL CANAL STENOSIS

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Objective
The hypertrophic ligamentum flavum frequently compromises the spinal canal in the elderly, but the mechanism of the hypertrophy has not been elucidated. In addition, the hypertrophic ligamentum flavum is a hypovascular tissue, however the relationship between hypertrophic ligamentum flavum and hypovascularity is not clear. To investigate this relationship, we analyzed the matrix composition and localization of the neovascularization in the hypertrophic ligamentum flavum.

Methods
Forty one human ligamentum flavum (28 diseased and 13 healthy) were used in this study. These ligamentum flavum were fixed in 10% buffered formalin and embedded in paraffin. Sections were stained with hematoxylin and eosin, elastica van Gieson, alcian blue and toluidine blue. Localization of the collagen type II was analyzed by immunohistochemical detection. To investigate pathologic neovascularization, antiCD34 antibody was also used for immunohistochemical staining.

Results
Elastic fibers in the hypertrophic ligamentum flavum were irregularly arranged, ruptured, and less in number (Fig. 1a), in contrast with the control group (Fig. 1b). Chondrocytes-like cells were proliferated in all cases of the hypertrophic ligamentum flavum. These changes were localized in the lamina side of the ligamentum flavum (Fig. 2). Only one case in control group showed the same finding. Immunohistochemical study showed that the matrix surrounding the proliferarive chondrocytes-like cells contained type II collagen (Fig. 3). Vascularization was inhibited in the hypertrophic ligamentum flavum group (Fig. 4a), in contrast with the control group (Fig. 4b). These changes were more significant the area of chondrocytes-like cells proliferation in the lamina side.

Conclusions
Degenerative changes of the elastic fibers and chondrocytes-like cells proliferation were found in the hypertrophic ligamentum flavum (1,2). Chondrocytes-like cells proliferation in the hypertrophic ligamentum flavum was significantly hypovascular area. These changes suggested that between chondrocytes-like cells proliferation and inhibition of the neovascularization had some relations.

References

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