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The Effect of l-Arginine on Dural Healing After Experimentally Induced Dural Defect in a Rat Model

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Introduction

Incomplete repair of the dura mater may result in numerous complications such as cerebrospinal fluid leakage and meningitis. For this reason, accurate repair of the dura mater is essential. In this study, the effect of systemic and local supplementation of l-arginine on dural healing was evaluated.

Methods

Thirty male Wistar rats were used and divided into control, local, and systemic l-arginine groups, with 10 rats in each. In each group, a 5-mm experimental incision was made at the lumbar segment of the dura mater and cerebrospinal fluid leakage was induced. Each group was divided into 2 subgroups and at the end of the first and sixth weeks, the rats were killed and the damaged segments of the dura were separated, histologically evaluated and the dural healing indicators including cell types, granulation tissue formation, collagen deposit, and vascularization were compared between groups.

Results

The systematic supplementation of l-arginine showed a significant effect in dural healing compared with the control group. After the first week, granulation formation increased considerably ($P < 0.031$), and after 6 weeks, collagen deposition and neovascularization were significantly different compared with the control group ($P < 0.030$; $P < 0.009$). In comparison between different groups at the end of the first and sixth weeks, maximum changes in healing indicators were observed in the systemic group and the least variations were related to the control group.

Conclusions

The systemic supplementation of l-arginine may accelerate dural healing by increasing the level of granulation tissue formation, collagen deposition, and vascularization.

Learning Objectives

Arginine could be used as a supplement to inhance dural healing in patients with CSF leak.

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