

Fibrin glue used as an adhesive agent in CNS tissues.

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Abstract:

One of the limitations of many bridging experiments in neural transplantation is that the CNS tissues cannot be sutured. Fibrin glue is a two-component system derived from whole blood which, when mixed, reproduces the final stage of blood coagulation and solidifies. Many experimental studies of humans and animals show that fibrin glue repair of peripheral nerves is almost equivalent to microsurgical sutures. In this study, we attempted to extend its use to CNS tissues and transplants. Two techniques were tried: (1) Bilateral parietal knife cuts were performed by stereotaxic technique in six rats. Fibrin glue was applied in the right-side cortical lesion. Immunohistochemistry using antisera to tyrosine hydroxylase (TH), glial fibrillary acidic protein (GFAP), laminin and neurofilament (NF) was essentially similar between the control and treatment groups. The immunoreactivity of each marker revealed no significant differences between the two groups on days 1, 7 and 30. There was no difference in terms of gliosis or microvascular proliferation. (2) Embryonic day 16 fetal locus coeruleus was grafted together with E16 cortex to the anterior chamber of sympathectomized eyes. In the six eyes of the glue treatment group, the parietal cortical piece and the locus coeruleus piece were joined together before grafting by immersing them in the solution of fibrin glue. In the eight eyes of the control group, pieces of parietal cortex and locus coeruleus were introduced individually and approximated by gently pressing the cornea. The sizes of double grafts showed no significant difference between groups during six weeks postgrafting. The immunohistochemical pictures using antisera against TH, GFAP and laminin were similar in both groups. Catecholaminergic fibers from the grafted locus coeruleus were found bridging over into the parietal cortical piece in both the control and treatment groups. There was no significant difference in TH-positive nerve fiber density

between tissue glue-joined and control double intraocular grafts. In conclusion, fibrin glue can be used as an adhesive agent in CNS tissues without hampering the outgrowth of neurites or causing adverse tissue reactions in fetal or adult nervous tissues.