A new porcine skull base model: Fibrin glue improves strength of cerebrospinal fluid leak repairs.

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Abstract:

Objectives: Fibrin glue is used in addition to grafts and flaps to repair cerebrospinal (CSF) leaks. We designed a porcine model to test the hypothesis that fibrin glue increases biomechanical strength. Study Design: A randomized experimental animal study. Methods: Ten pigs underwent craniotomy with creation of a fistula through the cribriform plate into the nasal cavity. CSF leaks were endoscopically confirmed and repaired using pericranial grafts. The animals were randomized into a fibrin glue group (n = 5) and a control group (n = 5). Seven days later, endoscopic examination assessed for CSF leaks. The skull bases were harvested and examined for the degree of graft adherence (graded I-V) and subjected to burst pressure testing and histopathological analysis. Results: Eight animals survived, four in each group. There were no CSF leaks in the fibrin glue group and one in the control group. The fibrin glue group showed greater graft adherence (P = 0.029) and higher burst pressures (13.8 +/- 5.4 vs 4.6 +/- 3.1 psi, P = 0.021). Histopathological analysis revealed no difference in inflammation and bone remodeling. Conclusions: The porcine model is a good model for anterior skull base defects. The model confirmed that fibrin glue reduces the rate of CSF leak by improving graft adherence and strength of repair.