

Fibrin sealant for treatment of cerebrospinal fluid leaks.

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Abstract:

Objective: Persistent cerebrospinal fluid leaks in the human population are rarely found in otherwise healthy individuals, but occur in patients with comorbid illnesses. These leaks are frequently resistant to dural suturing or closure of the defect site with connective tissue, cartilage, or plastic materials. In this study, fibrin sealant (ViGuard Fibrin Sealant was used to adhere muscle grafts to surgically created dural defects to close cerebrospinal fluid leaks in chinchillas. Histologic evaluation of the defect sites were conducted to assess healing and tissue response in the test and control groups. **Method:** In 20 chinchillas, after a skin incision, a 6 mm X 6 mm window was created in the right superior bulla exposing the underlying bony tegmen. Using a microcutting burr, a 3 mm X 3 mm area of tegmen was drilled out and the exposed dura was resected to create a large cerebrospinal fluid (CSF) leak. In the control group (n = 10), a small muscle graft from the surrounding tissue was placed into the defect site. In the test group (n = 10), the muscle graft was glued into the defect with ViGuard Fibrin Sealant. Bulla and skin were then closed. All animals were killed at 3 weeks into the experiment, and tissue was harvested for histologic examination. **Setting:** The Department of Otolaryngology, Head and Neck Surgery Research Laboratory, University of Illinois, Chicago. **Results:** Three weeks after surgery in the test group the tegmen defects were found to be closed by bone or connective tissue or both. Meninges had regrown, and the underlying brain appeared histologically normal. There was no evidence of CSF leak, toxicity, infection or other deleterious tissue reactions. In the control group, again the meningeal and bony tegmen defects were seen to be closed by connective tissue or bone or both. Brain tissues appeared histologically normal. There was no evidence of CSF leak, toxicity, or other deleterious tissue reactions. One animal of the test

group died of unknown causes. On autopsy, no signs of meningitis or encephalitis could be detected and the cause of death was unapparent. Conclusion: Fibrin Sealant, made from pooled donor blood and treated with viral elimination procedures, was found in combination with muscle grafts to securely close induced CSF leaks in the chinchilla model. Inflammation, infection, or toxic reactions were not observed. We believe that ViGuard Fibrin Sealant has stronger bonding power compared with available autologous fibrin tissue adhesives.