Withstand pressure of a simple fibrin glue sealant: Experimental study of mimicked sellar reconstruction in extended transsphenoidal surgery.

Authors: Oshino S., Saitoh Y., Yoshimine T.

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Abstract:

Background To examine the strength and tolerance of the fibrin glue sealant in a situation of extended transsphenoidal surgery. The withstand pressure of fibrin glue sealant was measured using a simple sellar reconstruction model. Methods A 15-mm diameter hole at the bottom of a 51-cm high cylinder was covered with a Gore-Tex (Gore-Tex, Tokyo, Japan) sheet. A small plate was placed on the center for a brief fixation, and 3 mL of fibrin glue was applied over the entire bottom. Then water was gradually filled in five cylinders, and the water level at leakage was measured as withstand pressures at 10 minutes and 24 hours after sealant application. The stability of the sealant under pressures of 20 and 30 cm H<inf>2</inf>O for 12 hours was also examined. Results The median initial withstand pressure at 10 minutes was 32 cm H<inf>2</inf>O (n = 5), and was significantly increased to 47.5 cm H<inf>2</inf>O after 24 hours (n = 4). In four of five cylinders, fibrin glue sealants were stable against a pressure of 20 cm H<inf>2</inf>O for 12 hours and 30 cm H<inf>2</inf>O for the next 12 hours. Conclusions The withstand pressure of simple fibrin glue sealant without other biological reactions could be estimated to be more than 20 cm H <inf>2</inf>O after application, and increased to more than 40 cm H<inf>2</inf>O after 24hours. These data are practical for neurosurgeons to comprehend the strength and limit of fibrin glue sealant and suggests the importance to control the intracranial pressure to less than 20 cm H<inf>2</inf>O, especially for the first 12 to 24 hours. © 2010 Elsevier Inc.