

# **Enhancement of withstanding pressure of fibrin sealant by modified mixing ratio of fibrin sealant components for skull base reconstruction -Technical note-.**

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## **Abstract:**

A method to enhance the withstanding pressure of fibrin sealant in gasket-seal closure to prevent cerebrospinal fluid (CSF) leakage after extended transsphenoidal surgery (ETSS) was investigated by adjusting the mixing ratio of the components. A plastic chamber (200 ml) was constructed with a lid made of hydroxyapatite with a hole 10 mm in diameter. The chamber could be pressurized via an opening in the side wall. The hole in the hydroxyapatite lid was covered with a Gore-Tex sheet, 15 mm in diameter. The margin of the sheet was free. Solutions A (fibrinogen 80 mg/ml) and B (thrombin 250 units/ml) of fibrin sealant were mixed in volume ratios of 1:1, 2:1, and 5:1, and applied to the Gore-Tex sheet, then water was introduced to cover the fibrin sealant. The pressure was measured at which air leakage occurred from the side of the Gore-Tex sheet. The pressure values for A/B ratios of 1:1, 2:1, and 5:1 were  $117 \pm 23.8$  mmHg (mean  $\pm$  standard error) ( $n = 5$ ),  $234 \pm 38.8$  mmHg ( $n = 5$ ), and  $345 \pm 36.4$  mmHg ( $n = 5$ ), respectively, in the acute phase (5 minutes after application of fibrin sealant). Pressures were increased after 24 hours, and that for 5:1 was the highest ( $373 \pm 40.4$  mmHg,  $n = 5$ ). The use of devices such as syringes specially designed to mix solutions A and B in the ratio of 5:1 can easily enhance the preventive effect of fibrin sealant against CSF leakage in ETSS.