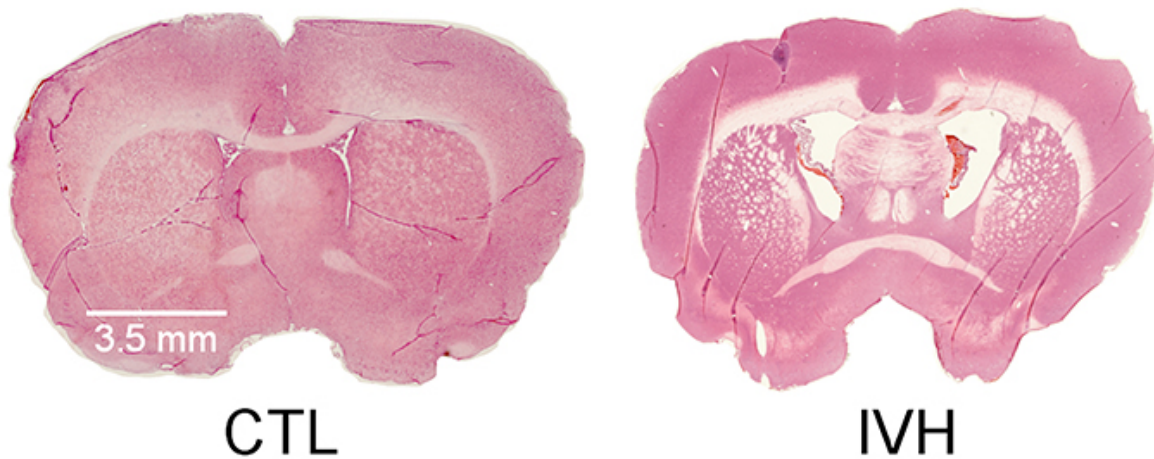


Spare the surgery—drugs may combat hydrocephalus, study finds

July 18 2017, by Bill Hathaway



Credit: Yale University

Clinically available drugs may help combat a potentially lethal form of hydrocephalus now treated mainly by brain surgery, a new Yale-led study has found.

Post-hemorrhagic hydrocephalus (PHH), characterized by a buildup of

cerebrospinal fluid (CSF) following hemorrhage of blood vessels in the brain, affects one in a thousand children and is currently treated almost exclusively by the surgical insertion of shunts in the brain.

"Shunts, like any hardware implant, are particularly susceptible to malfunction and infection, and therefore often require patients over the course of their lives to go back to the operating room numerous times," said Dr. Kristopher T. Kahle, assistant professor of neurosurgery, pediatrics, and cellular & molecular physiology and senior author of the study published July 10 in the journal *Nature Medicine*. "This is really a devastating problem for kids and their families so there is a great need for a pharmacological solution for a condition historically treated only by invasive neurosurgery."

The most common explanation for this form of hydrocephalus is a failure of the brain to reabsorb [cerebrospinal fluid](#) due to clotting of blood or scarring of tissue. However, this model was based on little experimental evidence and new research shows that blood buildup triggers inflammation of the choroid plexus, a group of cells that produce CSF, and can cause an increase in CSF secretion. This can result in an increase in both CSF volume and intracranial pressure.

In work with an animal model of PHH, the Yale team—led by Kahle, also the director of Developmental Anomaly Neurosurgery at Yale-New Haven Hospital, and student Jason Karimy—showed that an approved diuretic and another drug originally designed to treat sepsis can mitigate this immune system response and reduce the secretion of CSF in the brain.

Researchers plan to pursue further pre-clinical studies and then launch a small clinical trial to see if a drug regimen can help reduce need for surgical interventions in patients with PHH due to [brain](#) bleeding after aneurysm rupture.

More information: Jason K Karimy et al. Inflammation-dependent cerebrospinal fluid hypersecretion by the choroid plexus epithelium in posthemorrhagic hydrocephalus, *Nature Medicine* (2017). [DOI: 10.1038/nm.4361](https://doi.org/10.1038/nm.4361)

Provided by Yale University

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