Researchers at the University of South Florida have developed a novel proximal shunt design that has the potential to reduce the malfunction rate of ventricular shunts to zero.

Hydrocephalus is one of the most common pathologies encountered in neurosurgery. It is characterized by the build up of cerebrospinal fluid (CSF) in the ventricles of the brain. Primary treatment for this condition is CSF diversion with a ventricular shunt. This device drains the excess fluid into other body cavities, from where it can be reabsorbed. Shunts are life-saving devices, but are notorious for high failure rates, difficulty of diagnosing failure, and limited control options. The malfunction rate of these shunts can be over 40% with the majority of problems caused by obstruction of the proximal catheter by choroid plexuses, blood clots, or proteins.

Our inventors have proposed improvements to the proximal shunt catheter design that will address these common malfunctions. Unlike conventional catheter systems that have close-tube configurations with small drainage holes on the distal end, this invention has a unique open-tube structure with significantly enlarged drainage holes. It also incorporates the use of safety valves built within the catheter to allow influx of fluid if the drainage holes become occluded. An open ended structure significantly increases the surface area for drainage while allowing a user to flush the catheter clean, when needed. To prevent brain matter from entering the tube during insertion, a stylet is included that occludes the open distal end and can be withdrawn once the catheter is in the appropriate position. Additionally, an inline filter is included to keep large particles from blocking the shunt valve, while acting as a pumping reservoir. These many improvement are capable of significantly reducing the malfunction rate of ventricular shunts.

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