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Control volume based hydrocephalus research BENJAMIN COHEN, RPI, ABRAM VOORHEES, Siemens Medical Imaging, TIMOTHY WEI, RPI — Hydrocephalus is a disease involving excess amounts of cerebral spinal fluid (CSF) in the brain. Recent research has shown correlations to pulsatility of blood flow through the brain. However, the problem to date has presented as too complex for much more than statistical analysis and understanding. This talk will highlight progress on developing a fundamental control volume approach to studying hydrocephalus. The specific goals are to select physiologically control volume(s), develop conservation equations along with the experimental capabilities to accurately quantify terms in those equations. To this end, an *in vitro* phantom is used as a simplified model of the human brain. The phantom's design consists of a rigid container filled with a compressible gel. The gel has a hollow spherical cavity representing a ventricle and a cylindrical passage representing the aquaducts. A computer controlled piston pump supplies pulsatile volume fluctuations into and out of the flow phantom. MRI is used to measure fluid velocity, and volume change as functions of time. Independent pressure measurements and flow rate measurements are used to calibrate the MRI data. These data are used as a framework for future work with live patients.

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