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P115 - PARAMETRIC STUDY OF THE DESIGN OF VENTRICULAR CATHETERS FOR HYDROCEPHALUS

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Resumen

Hydrocephalus is medical condition consisting of an abnormal accumulation of cerebrospinal fluid within the brain. A ventricular catheter is inserted in one of the brain ventricles and then connected to an external valve to drain the excess of cerebrospinal fluid. Three-dimensional computational fluid dynamics studies show that most of the total fluid mass flows through the most proximal holes in ventricular catheters used for hydrocephalus. This fact increases the possibility that those holes and the lumen of the ventricular catheter get clogged by the cells and macromolecules present in the cerebrospinal fluid. To uniformize the flow pattern, we have carried out a parametric study of the cerebrospinal fluid flow through many ventricular catheters. The parameters chosen are the distance between hole rings, their relative angular position, as well as the number of holes in each ring and the radius of the holes. As a result of this study, we postulate some basic principles for ventricular catheter design. The parametric principles may help to develop new catheters with better flow circulation, thus possibly extending their lifetime.