Intracranial pressure (ICP) pump (Ramot)

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The Technology

Cerebral Intraventricular Balloon Pump : A Novel Application to Maneuver and Augment Cerebral Perfusion Pressure and Cerebral Blood Flow

The Need

A cerebral hemodynamic assist device for augmentation of blood flow in brain pathologies such as edema ,trauma or stroke, where increased intracerebral pressure diminishes blood flow to brain tissue.

The Method

An inflatable balloon catheter that is driven by a computer-controlled pump, is placed in the cerebral ventricle. The balloon is controlled to pulsate in synchrony with the cardiac cycle. It is inflated late in diastole to squeeze out blood from the veins and deflaited just before systole to decrease ICP and increase CPP (cerebral perfusion pressure) thereby augmenting blood flow. The ICBP approach is based on alteration of the CSF flow dynamics in order to recruit the ventricular potential volume, and accentuate forces that assist blood flow into the brain.

Development Status

Working prototype completed.

Mathematical models and preliminary in-vivo studies in pigs demonstrated high potential of this novel approach. Properly timed periodic volume changes augment blood flow in the brain.

Preliminary in-vivo study demonstrated significant improvement in Flow augmentation and ICP burden reduction.

A device for further in-vivo studies in being constructed.

Patents

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