

Applications

- Regulation of cerebral blood flow and intracranial pressure following brain injury
- Potential use for regulating systemic blood pressure
- Couples with temperature modulated gas to regulate systemic temperature

Advantages

- May improve blood flow to the brain via positive pressure created in neck chamber
- May increase intracranial drainage via negative pressure created in neck chamber
- Non-invasive
- Increases production of nitric oxide, a known vasodilator and blood flow modulator

Inventors

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Market Need

Brain injury due to trauma or stroke often results in a decrease in cerebral blood flow. This decrease may be attributed to swelling of the brain, which results in increasing intracranial pressure. Currently, pharmaceutical agents are used to reduce the swelling and enhance blood flow. Additionally, catheters may be placed within the brain to allow for drainage of spinal fluid, thereby decreasing pressure on the brain. A less invasive method would offer an improvement over current practices in the modulation of blood flow and intracranial pressure following brain injury.

Technology Summary

A VCU researcher has developed a non-invasive method for the regulation of cerebral blood flow and intracranial pressure. By controlling the displacement and rate of air moving in and out of a neck collar, positive or negative pressure could be created in the collar. Positive pressure within the collar could result in an increase in blood flow when timed with the heart beat. On the other hand, negative pressure could result in expansion of the jugular vein, which would allow for intracranial drainage. Additionally, modulation of collar pressure, and subsequent expansion or contraction of carotid arteries, may take advantage of the body's natural baroreceptor response by increasing production of nitric oxide, a known modulator of blood flow. If coupled with a modulated gas source, the neck chamber could be applied to the modulation of brain and systemic temperature. Also, the neck collar could be used to regulate systemic pressure.

Technology Status

Prototypes are currently being built and will be tested on animals.

U.S. Patent Pending: 13/990,817

This technology is available for licensing to industry for further development and commercialization.