Various Approaches to Braided Asymmetric Neurovascular Stent Design

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In the United States, stroke is the largest cause of long term disability and is the third largest killer among medical conditions, behind heart disease and cancer. Hemorrhagic stroke, when the vessel wall bursts, is the type of stroke this research is primarily concerned with. The use of certain interventional devices and procedures have proved beneficial to the treatment of the mechanism of hemorrhagic stroke, the bursting of an aneurysm.

More specifically asymmetric neurovascular stent design was more thoroughly examined and analyzed to determine the potential for clinical applications. An asymmetric stent reduces blood flow into the aneurysm by reducing the porosity at the orifice or neck of the aneurysm, thereby reducing the shear caused by turbulent blood flow on the vessel wall. To better understand the practical applications of asymmetric stents it is useful for models to be made in order to analyze and develop the necessary techniques for making and deploying the stent. Additionally, several models were made using various techniques to reduce the porosity in a desired area, which could later be developed into possible treatment avenues for interventional procedures. Another portion of the research conducted was the development of mathematical models and equations that described crucial aspects of the design of the braided stent. The mathematical models could also be later used in the development of a higher order optimization analysis in order to determine an optimal design for a given set of various parameters and desired outcome.

The primary conclusion of the research is that braided asymmetric neurovascular stents seem to be a practical way of treating hemorrhagic stroke. More research is needed in order to determine the true feasibility and applicability of the braided stent, but it seems to be a promising possibility.