

Indigenous Flow Diverter Stents Technology

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Source: *PIB*

The research team of Sree Chitra Thirunal Institute of Medical Science and Technology (SCTIMST), Thiruvananthapuram, an Institute of National Importance under the Department of Science and Technology has developed an innovative intracranial flow diverter stent for the treatment of aneurysms of the blood vessels of the brain.

What is Brain Aneurysms?

- An aneurysm is the enlargement of an artery caused by weakness in the arterial wall. Often there are no symptoms, but a ruptured aneurysm can lead to fatal complications.
- An aneurysm refers to a weakening of an artery wall that creates a bulge, or distention, of the artery.
- Aneurysms often occur in the aorta, brain, back of the knee, intestine or spleen. A ruptured aneurysm can result in internal bleeding and stroke.
- Aneurysms often have no symptoms until they rupture.
- Intracranial aneurysm is a localized ballooning, bulging or dilation of arteries in the brain caused by progressive weakening of the inner muscles of the wall of the blood vessels.
- Spontaneous rupture of the aneurysm can result in bleeding into the space around the brain resulting condition called a subarachnoid hemorrhage (SAH). Subarachnoid hemorrhage can lead to paralysis, coma or death.
- Treatment varies from watchful waiting to emergency surgery.

- The choice depends on the location, size and condition of the aneurysm.



What are the advantages of the new stent? & How does it work?

- Flow diverters stents when deployed in the artery in the brain bearing the aneurysms, divert blood flow away from the aneurysm, thus reducing the chances of its rupture from the pressure of blood flow.
- Flow diverters have the advantages of being flexible and adaptable to the shape and course of the vessel. Also flow diverters promote healing of the vessel wall by removing the constant stress of blood flow on it.
- The Chitra flow diverter is designed to have better grip on the walls of arteries of complex shapes in order to reduce the risk of migration of the device.
- The unique design is in its weave also makes this stent resistant to kinking or twisting, when it is placed in tortuous arteries and those with complex shapes.
- Even a 180 degrees bend does not occlude the lumen of the stent. The portion of the wires is made radio-opaque for better visibility in X –Rays and fluoroscopy thus aiding accurate delivery of the diverter in the blood vessel.
- Nitinol, a superelastic alloy with shape memory was acquired from National Aero Space Laboratories, Bengaluru (CSIR-NAL). When the device is deployed at the site, it is released from its crimped locked position and assumes the desired and originally designed shape because of the shape memory property of Nitinol. The flow diverter is delivered to the aneurysm in the brain using a delivery system

Nitinol

Nitinol is a nickel-titanium alloy distinguished from other materials by its shape memory and superelastic

characteristics. Nitinol is a trade-name taken from the elements it's composed of—nickel (Ni) and titanium (Ti)