

New device can bring down cost of tracking open-heart surgeries

Tracking the results of open-heart surgeries may soon become easier and low cost—thanks to a simple, cost-effective blood flow meter that scientists have developed.

India is currently fully dependent on imported blood flow meters for precise measurement of blood flow rates – a critical parameter to measure the outcome of open-heart surgeries. However, this becomes expensive, with each unit costing upto Rs 25 to 30 Lakhs and can be afforded only by very few super-specialty hospitals in India.

The team of researchers at the Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), an autonomous institute of the Department of Science and Technology, Government of India, has developed a simple, advanced, and cost-effective blood flow meter. This palm-sized device measures the flow rate of blood using a novel magnetic method and a signal conditioning technique.

The device has a mechanism to produce a magnetic field, an electronic measurement system, and a disposable biocompatible tube fitted with electrodes which are kept over the magnetic field. When blood passes through the tube, under the influence of this magnetic field, a voltage is generated across the electrodes, which is proportional to the rate of blood flow. The novel method of generation of the magnetic field and detection of the voltage gives the device better accuracy of measurements.

The technical know-how of this portable battery device, which can be operated with battery, has been transferred to EnProducts, a company based in Kochi, Kerala, for commercial production. Its novel concept can reduce the cost of production of the device considerably to a few thousands of rupees. In addition to its application in bypass surgery, this device can be used for measuring flow of conductive fluids for various industrial applications.

“This indigenous technology of blood flow meter will considerably reduce the cost of the device to a few thousand from around Rs 25 lakhs and make it available to public hospitals for safer and less expensive cardiac surgeries. SCTIMST has developed technologies for many devices used for cardiac surgeries, and this is the latest of them,” said Dr. Asha Kishore, Director, SCTIMST.

The device developed by the engineering team comprising of Mr. Sarath S Nair, Mr. Vinod Kumar V, Ms. Sreedevi V, and Mr. Nagesh DS of the Department of Medical Devices Engineering in Biomedical Technology Wing of the Institute has undergone laboratory tests and preclinical animal evaluations and has all the essential features to perform the necessary functions. It is compliant with national and international standards and guidelines and is manufactured using components sourced from established supply chains within the country. The Institute has applied for a patent.

The preclinical evaluations have been conducted by a clinical team comprising of Dr. Vivek V Pillai and Dr. Bineesh K R of the Department of Cardiovascular and Thoracic Surgery and Dr. P R Umasanker and Dr. Sachin J Shenoy of the Division of In Vivo Models and Testing Divisions.

