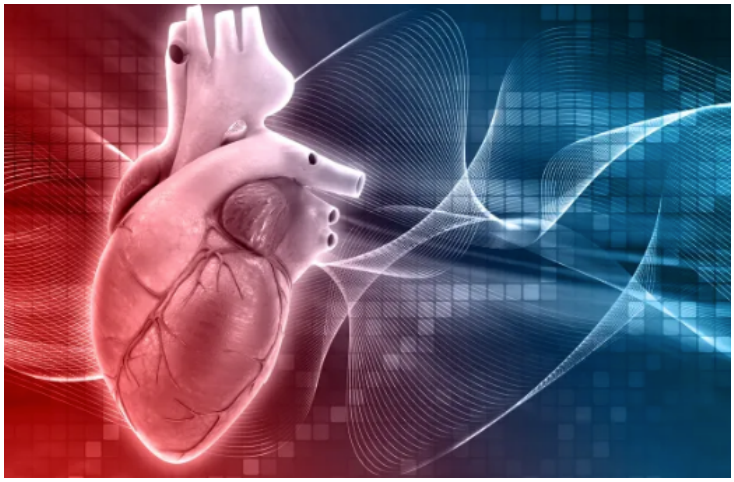
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Indigenous MedTech Innovations Drive Cardiac Care

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India has a long way to go when it comes to indigenously developing tools for cardiac care. Though there has been significant improvement in manufacturing and global players tying up with Indian players, it is a long journey ahead. Artificial Intelligence (AI) and Machine learning-based tools are being touted as the future of cardiac care devices in the country.



Medical technology in cardiac care is gaining traction in the Indian healthcare space. The benefits of robotic-assisted diagnostics and surgical procedures are being delivered to patients with positive results. It may be noted that 85 per cent of deaths result from a heart attack or a stroke and going by the alarming statistics, the need of the hour is intervention at a lightning pace, early identification and rapid preventive measures to avert mortality, something that precision devices are adept at doing. The day is not far when AI and machine learning-based tools and next-generation biomimetic implants will be indigenously developed and curated in India.

AI in cardiac diagnosis

With Artificial Intelligence (AI), a paradigm shift has been observed in cardiac diagnosis and delivering precise and timely care to those with cardiovascular disorders. For instance, AI-based applications have enhanced the understanding of various types of heart failures and congenital heart diseases. These, in turn, have led to newer treatment strategies for different types of cardiovascular diseases. In addition, AI can accurately predict cardiovascular outcomes, non-invasive diagnosis of coronary artery disease and outcomes for heart failure patients. The World Health Organisation's data indicate that cardiovascular diseases claim around 17.9 million people each year, translating to 31 per cent of all fatalities, globally.

Indigenous players

Indian companies and startups have been manufacturing medtech tools for cardiac care. Gurugram-based med tech startup SS Innovations manufactures the first and only Made-in-India surgical robot, which can be utilised for all major surgical specialities including cardiac. In 2021, the startup launched the first fully Made in India surgical robot SSI Mantra, a technologically advanced surgical robotic system that has more and better features and applications than existing systems.

Recently, the company acquired a controlling interest in Avra Medical Robotics, a Nasdaq-listed company in the US. SS Innovations International announced the successful completion of two cardiac surgical procedures utilising the company’s SSI Mantra surgical robotic system. The startup received its first international order unit that has been delivered to and will be installed in Aster Hospital, in Dubai, UAE.

Dr Sudhir Srivastava, CEO, Chairman and Founder, SS Innovations along with Dr Nitin Rajput, Senior Consultant Cardiac Surgery recently conducted two adult coronary artery bypass procedures at Narayana Hrudayalaya Institute of Cardiac Sciences in Bengaluru, Karnataka. Dr Srivastava has completed more than 1,400 robotic cardiothoracic surgical procedures, including 750 beating heart endoscopic coronary artery bypass (TECAB) cases. In May 2023, Dr Srivastava performed an additional robotic cardiac surgery using the SSi Mantra Surgical Robotic System at Continental Hospitals, Hyderabad.

Says Dr Srivastava, “We are committed to improving access for patients and optimising surgical outcomes with our accessible and cost-effective surgical system, the SSI Mantra. We believe there is an enormous opportunity to address the significant unmet need for safe, timely, and affordable cardiac surgical care in India and around the world.”

Meril, aVapi (Gujarat)–based medtech company, has a rich R&D portfolio and drives innovation across diverse business verticals. In interventional cardiology, the company is working towards calcium management in Percutaneous Coronary

Intervention (PCI) procedures. Similarly, it is also focusing on structural heart interventions in left atrial appendage closure, mitral valve repairs and replacements.

Meril Vascular Intervention has developed new concepts in engineering employing novel designs with a cleverly iterated diverse portfolio including devices ranging from drug-eluting stents, bioresorbable scaffolds, balloon catheters, peripheral vascular and transcatheter aortic valves replacement systems (TAVR).

Sanjeev Bhatt, Senior Vice President, Meril says, “India has come a long way in terms of indigenously developing technologies for diseases related to the heart and human vasculature, which are at present very high amongst our Indian population. India is developing the latest generation technologies which are either at par or even better than their western counterparts. The burden of cardiovascular and structural heart diseases is very high and until 10 years ago India was dependent on the import of medical devices. But today, we can proudly say India has indigenously developed technology such as transcatheter heart valves, manufactured by Meril which are not only responding to some of the unmet clinical needs but are also supplied globally to developed and emerging markets worldwide benefitting a large number of patients.”

Ghaziabad-based Innvolution**,** a group focussed on interventional cardiology with a comprehensive portfolio of imaging and consumable products, raised growth capital from OrbiMed, a global healthcare-focused investment firm. The funds will be used to ramp up the R&D efforts, develop new products, and expand into international markets.

Mumbai-based Sahajanand Medical Technologies (SMT), developer and manufacturer of minimally invasive cardiovascular devices including coronary, structural heart and closure devices products was recently selected as the exclusive distributor of US-based Penumbra’s peripheral and coronary vascular thrombectomy technologies in select domestic geographies in India.

Bengaluru-based startup Heartnet India has announced the launch of its groundbreaking telecardiology product, Asaan - an IoT-based solution, aimed at transforming the landscape of cardiac healthcare in India. It empowers physicians to do cardiac health checks at their clinics with the help of technology and specialist advice. Asaan is set to bridge the gap between urban and rural areas, ensuring access to top-tier cardiac care at affordable costs.

The initiative, slated to start in August 2023 from Karnataka, Maharashtra and West Bengal, has taken a pioneering step by integrating telecardiology into its services. Asaan will also empower cardiologists to monitor their patient's health in real-time, facilitating prompt recommendations for medications or lifestyle changes without the need for in-person office visits.

Noteworthy initiatives

Kauvery Heart Institute recently unveiled comprehensive cardiovascular healthcare at Kauvery Hospital, Radial Road, Chennai. The hospital has established the Centre for CHIP PCI and Mechanical Circulatory Support System (Impella, ECMO) for treating advanced coronary artery disease with heart failure/shock.

Dr Ankur Phatarpekar, Interventional Cardiologist and Director at Symbiosis Speciality Hospital Mumbai announced the integration of the latest Optical Coherence Tomography system (OCT), Optis Mobile Next, with Ultreon technology at the Symbiosis Speciality Hospital. The hospital has become one of the first healthcare facilities in India to equip itself with this state-of-the-art imaging system, revolutionising the diagnosis and treatment of heart disease.

In the north eastern region of the country, a research team from the Indian Institute of Technology Guwahati (IIT-G) has developed a ‘Recombinant Protein Toolbox’ consisting of six special proteins, which can be used to convert healthy skin cells or any somatic cells from an adult human body into heart cells, specifically cardiomyocytes.

The heart cells created using this tool box can have the same function as the original heart cells and can be used to regenerate damaged heart tissues. Importantly, this toolbox can facilitate the generation of autologous heart cells in a lab.

The team has collaborated with Dr Vishwas Kaveeshwar from the Central Research Laboratory at SDM College of Medical Sciences and Hospital in Dharwad, Karnataka, to validate the biological activity of the recombinantfusion proteins.

In addition to the active participation of private players, the public sector too is making efforts in cardiac care. The Government of Karnataka has launched STEMI programme in partnership with Tricog Health, a Bengaluru-based health AI company, to set up an end-to-end system of care for heart attacks. The aim is to enable rapid diagnosis of heart disease in all taluka and district health facilities in Karnataka along with timely treatment.

Apart from this, Lupin Digital Health (LDH) recently announced the launch of Lyfe Digital Heart Failure Clinic in India. The Lyfe Digital Heart Failure (HF) Clinic has been developed to address the growing burden on healthcare infrastructure due to increasing heart failure instances in India. It combines in-clinic consultation with at-home patient monitoring and care. A team of experts, including paramedics, nurses, cardiotherapists, health coaches and care managers, work together with the treating cardiologist to deliver improved patient health outcomes. The system is equipped with advanced technology, providing doctors with real-time updates and patients with personalised care pathways, emergency services and educational resources.

Also, Lupin Digital Health and the American College of Cardiology (ACC) have announced a collaboration to deliver in-home cardiovascular care with Digital Therapeutics (DTx) in India. This collaboration aims to accelerate the application and adoption of DTx in Cardiology in India. Lupin Digital Health's DTx platform, Lyfe, also aims to give patients and their healthcare providers tools to manage heart diseases at home and help to ensure patients stay healthy after hospital discharge and reduce rehospitalisation.

As part of this collaboration, Lupin Digital Health will leverage ACC's CardioSmart platform, guidelines, and workbooks to guide healthcare professionals and caregivers. These tools will be accessible to doctors, patients, and caregivers through Lupin Digital Health's Lyfe app and website.

Besides, Portea, AliveCor and NanoHealth - companies in healthcare technology and services - announced their collaborative initiative, HeartSmart, the cardiac care service at home. It is specifically designed to provide comprehensive and holistic care for high-risk cardiac patients. HeartSmart integrates smart devices, advanced software applications, and personalised services to enhance the well-being and cardiac health of individuals at home.

HeartSmart offers a wide range of tools and services to empower patients with high-risk cardiac conditions, providing them with the confidence and support needed to manage their health effectively. The key components of HeartSmart include AliveCor's KardiaMobile 6L device, NanoHealth's comprehensive and integrated technology platform, and Portea's exemplary healthcare services.

Changing healthcare landscape

With the government approving the National Medical Devices Policy, in 2023, things are looking positive for the Indian manufacturers of cardiac care devices. Indian cardiac device manufacturers need government support to enhance their manufacturing capabilities and later import the products. Right policy decisions like the approval of the policy are the right step in the direction.

However, one move by the FICCI's Medical Devices Division didn't go down well among the med devices players. **Gaurav Agarwal, Managing Director, Innvolution Healthcare** mentioned, "The utilisation of refurbished equipment under the guise of C-arms and advanced X-ray systems for performing catheterisation procedures is both misleading and potentially hazardous. Against the need for 500 Cath Labs a year to serve the Indian population, Indian Manufacturers can manufacture more than 600 indigenised Cath Labs which play a critical role in diagnosing and treating cardiovascular diseases, and these facilities must meet the highest standards of quality, reliability, and patient safety." He added, "By importing refurbished equipment, we miss the opportunity to nurture a robust ecosystem of innovation, research, and development in the medical technology sector."

The future of medical device technologies developed in India is promising as the innovation engine in India has triggered new developments. The global healthcare landscape is changing rapidly, developed nations are facing healthcare budget limitations and require next-generation technologies which are scientifically and clinically proven. Moreover, emerging markets also deserve the latest technologies at an affordable price point.

Sanjiv Das

(sanjiv.das@mmactiv.com)