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How tech innovations impact cardiac care

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Cardiac care has seen a transformation over the years with technology playing an important role. Armed with Artificial intelligence (AI) and machine learning (ML), cardiac care providers, with the right technology, have received the right impetus to revolutionise treatment mechanisms. Let us delve into the new technologies which the industry is offering to mankind and decipher the way forward



Cardiovascular diseases (CVD) have been on the rise across the globe and have seen exponential growth due to lifestyle disorders. To address this growing concern, the World Heart Federation observes September 29 as 'World Heart Day', every year. This year the primary goal for World Heart Day 2021 is 'Globally harnessing the power of digital health to improve awareness, prevention and management of CVD'.

Cardiovascular diseases such as ischemic heart disease and stroke account for 17.7 million deaths in India and a significant patient pool involves younger population, according to the World Health Organisation (WHO). COVID-19 pandemic has added fuel to fire as it has been found that the virus can act as an independent driver for heart attack. Having said that, the world is witnessing a plethora of technological innovations in this space, saving numerous lives. India is not far behind and the country has witnessed significant improvements in heart care in the past decade.

According to a recent report by Mordor Intelligence, the market for cardiovascular devices in India consists of several global players along with the local players. However, the number of local players in the country is less and the market is dominated by global companies such as Abbott, Boston Scientific, Medtronic, etc. Since India is a growing economy, more global companies are expected to penetrate the market in the coming years.

New age technological advancements

Healthcare across the world has witnessed transition to new business models in order to improve patient care and operating efficiencies. Some of the recent advancements include Artificial intelligence (AI), advanced algorithms, and predictive analytics facilitating early detection and treatment of critically ill patients, in improving outcomes and providing value-based care. Then comes remote connected care that allows electrocardiogram (ECG) diagnosis using cloud technology and bluetooth-enabled cardiac devices which measure the parameters and transmit them back to healthcare providers without physically visiting the clinic.

American medical device firm Abbott has recently launched its Amplatzer Piccolo Occluder in India, the world's first medical device that can be implanted in tiniest babies (weighing as little as 700 gms) using a minimally invasive procedure to treat patent ductus arteriosus, or PDA. The Amplatzer Piccolo, a device even smaller than a pea, now offers hope to premature infants and newborns who need corrective treatment, and who may be non-responsive to medicine and are at high risk to undergo corrective surgery.

Last year, Abbott also launched clip delivery system, a minimally invasive heart valve repair device to treat mitral regurgitation in India. The clip device repairs leaky mitral valves without open-heart surgery and is delivered to the heart through a vein in the leg.

Apart from this, the company has introduced implantable cardioverter defibrillator (ICD) and cardiac resynchronisation therapy defibrillator (CRT-D) devices in India, bringing the most advanced heart rhythm management capabilities.

"Abnormalities of the heart's valves and chambers, known as structural heart conditions, affect millions of lives around the world. We believe that innovative heart treatments have the potential to change the standard of care for patients. Our transcatheter clip-based therapy can help make a difference as it is associated with less trauma for a patient. Further, we have developed Piccolo as a critical advancement in the standard of care for the most vulnerable of premature babies who may not be able to undergo surgery to repair their hearts", says Payal Agrawal, General Manager, Abbott, Structural Heart business- India and the Subcontinent, Mumbai.

Similarly, Ireland-headquartered Medtronic has been at the forefront when it comes to transform healthcare especially in the cardiac sector. The company has recently launched the world's smallest pacemaker to treat heart block in India. Micra AV is a miniaturised, fully self-contained pacemaker that delivers advanced pacing technology to atrioventricular (AV) block patients via a minimally invasive approach.

While the market is dominated by global players, one prominent domestic stent specialist Sahajanand Technologies (SMT), based in Surat, has recently entered into the structural heart segment with an acquisition of medical device firm Vascular Concepts. Vascular Concepts Group, comprising of two entities based in India and Thailand, has developed and launched the Hydra transcatheter aortic valve system, which received Indian regulatory approval in 2020. It is used for the treatment of high-risk patients suffering from severe and symptomatic aortic valve stenosis.

Adding on, Chennai-based heart surgeon, Dr Sanjay Cherian has designed and developed India's first 3D printed heart valve. According to Dr Cherian, the new 3D printed heart valve could be the future of cardiac surgery, since it overcomes most of the disadvantages/ complications associated with the currently available artificial heart valves that are in use today. The list is long and there are various research being conducted in technology-assisted cardiac care.

Cardiac care evolution in India

In particular, treatment of coronary artery disease (CAD) has evolved over the years and innovation in the cardiovascular space across the value chain in the areas of product, process, health systems, will help in expanding access to healthcare to more people. This will eventually result in better clinical outcomes, less invasive procedures, lesser complications, and shorter recovery times, thus improving overall health of people.

"In India, 272 people / 1 lakh population (higher than the global average of 235 per 1 lakh) suffer from coronary artery disease. With the advancement in medical technology, we now have procedures such as Intravascular Ultrasound (IVUS) which uses less dye but still helps in visualising the blocked artery even more precisely and in a more complete manner, further even allowing even identification of early (not as yet occlusive) plaque and other complications which might be otherwise missed in plain coronary angiography", says Dr Sundeep Mishra, Professor of Cardiology, All India Institute of Medical Sciences (AIIMS), New Delhi.

Adding his opinion Ganesh Sabat, CEO, SMT, Mumbai says, "Angioplasty has become a standard care of practice with substantial investment over the last 20 years. There is a huge scope for further improvement as cardiac death still remains the number one reason for death in India. Other high end medical devices in cardiac care are yet to be developed and minimally invasive procedure for transcatheter aortic valve replacement (TAVI) is at infant stage. The government's reimbursement programme will play a major role for faster adoption."

Advancements in the era of COVID-19

The SARS-CoV-2 virus can directly impact the heart, causing myocarditis and pericarditis — inflammation of the heart muscle or outer lining of the heart. Besides, it can cause abnormal heart rhythms, blood clots in the legs and lungs, and heart failure. To counter these issues, companies launched a new range of products. The evolution of telemedicine during COVID-19 pandemic is worthwhile. Like any other specialty, the Outpatient Department (OPD)'s/follow-ups in cardiac care has also moved to tele-medicine, with patients utilising telephonic or video conferencing services. Only when a procedure (tertiary care) is required on the basis proper perusal of symptoms, a patient is called to the hospital.

Remarks Nitin Wadhwa, Director, Coronary and Renal Denervation (CRDN), Aortic Peripheral Vascular (APV) & Endovenous, Medtronic India, New Delhi, "Connected, and remote monitoring healthcare enables physicians to get timely notifications of changes in their patient's heart condition to make necessary interventions, thus adding value by ensuring patient safety and reduced healthcare costs while reducing the risk associated with COVID-19 exposure."

According to ResearchGate, in the era of remote, decentralised and increasingly personalised patient care, catalysed by the COVID-19 pandemic, the cardiovascular community must familiarise itself with the wearable technologies on the market and their wide range of clinical applications.

The way forward

According to a 2021 report in Invest India, the market size of the medical devices industry as a whole is estimated to be nearly $10 billion in India. With a huge population base, there remains a huge opportunity for the cardiac care market and technology innovations are likely to boost the market. The India Cardiovascular Devices Market is growing at a CAGR of 5.9 per cent over the next five years (2021-2026), as per Mordor Intelligence report.

Wadhwa states, "We need partnerships with different stakeholders i.e., government, hospitals, doctors, and the industry to address the existing challenges as the market is under-penetrated with inadequate access, low insurance penetration and an

ever-increasing cardiac disease burden coupled with lack of disease awareness and timely diagnosis. Through initiatives like Ayushman Bharat, the government is taking strong strides in making healthcare affordable and accessible to all and medical technologies will have a huge role to play in improving clinical outcomes."

In the future, the world is going to witness more research in this arena. An array of new launches in cardiac care is imminent with technology evolving at a faster pace. How these devices will be able to reach the rural hinterlands and how cost effective these products can be, is what needs to be looked into. Only then can we have a healthy and hearty nation.

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