The Future of Cardiovascular Medicine: From 2022 to 2033

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In a session presented at this year's European Society of Cardiology (ESC) Congress, which was held in-person in Barcelona, Spain, and virtually, experts discussed their future predictions for cardiovascular health and innovations that will enter this field. The session was chaired by Roxana Mehran, Icahn School of Medicine at Mount Sinai, New York, USA, and John J. V. McMurray, Institute of Cardiovascular and Medical Sciences, University of Glasgow, UK.

CARDIOVASCULAR DISEASE PREVENTION IN 2033

Brian Ference, University of Cambridge, UK, began the session by reflecting on the last two decades in cardiovascular disease prevention. "The easiest way to change the future is to shape it," they continued. Firstly, Ference emphasised the importance of having a clear and bold vision of how cardiovascular medicine should be in 2033. In their bold vision, Ference hoped that healthcare professionals would be able to completely eliminate heart attacks, strokes, hypertension, and Type 2 diabetes by 2033 by using precision medicine methodology. By accurately targeting modifiable causes of a disease that an individual may be vulnerable to due to cumulative factors, a specialist could put in place preventative measures.

Ference emphasised that cardiovascular diseases such as atherosclerosis and hypertension are completely preventable. With precision medicine methodology, they believe that cardiologists should be able to predict which patients are at risk and intervene at the right time. The prediction of a vulnerable patient, according to Ference, involves collating electronic health records of the patient, genomic data, and imaging, combined with the understanding of the biology of the disease to precisely prognosticate if the patient is at risk of developing cardiovascular disease. They proposed using a digital platform for a more

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personalised approach to each patient, that not only empowers the patient to manage their own health, but also provides a database that will allow the healthcare professionals to deliver the right therapy at the right dose and at the right time.

HOW WILL WE APPROACH CORONARY ARTERY DISEASE IN 2033?

Patrick W. Serruys, National University of Ireland, Galway, Ireland, began the

presentation by reiterating their belief that in 2033 lipid abnormalities will be under control. This is due to the novel, emerging low-density lipoprotein cholesterol-lowering therapies. Serruys highlighted that in 2033, conventional invasive fluoroscopic angiography will no longer be the dominant diagnostic tool and believes that a non-invasive coronary CT angiography would be the 'one-stop shop', as it can be used to detect several cardiovascular conditions.

Other remarkable innovations presented by Serruys include a 3D visualisation of a heart hologram, which his team uses to discuss strategies before heart surgery. Serruys believes that combined intravascular imaging will complement non-invasive coronary imaging in the future. Furthermore, they predict that physiological pressure-derived parameters will be replaced by physiological-derived imaging parameters. Additionally, Serruys is hopeful that biofabrication will be available in the field of cardiology, whereby stem cells could be used to recreate the heart's helical structure. "If the future is unrealistic, it will remain the future; however, if the future is realistic, it will become swiftly the past," said Serruys as they concluded their presentation.

MANAGEMENT OF VALVULAR HEART DISEASE

Martin B. Leon, Department of Cardiology, Columbia University Medical Center, New York, USA, began the presentation by highlighting the valvular heart disease growth and access to care issues. Leon and their team predict over 150 million cases of moderate or severe aortic stenosis or mitral regurgitation by 2040. Currently, there is a crisis in access to care due to either underdiagnosis or undertreatment. A study presented by Leon, which involved over 80 million people, demonstrated that over 60% of diagnosed, symptomatic patients with severe aortic stenosis went untreated in 2016. This study showed that racial and socioeconomic disparities are a factor in this, as Black and Hispanic ethnic groups are not provided with proper care and intervention compared with White ethnic groups.

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Leon proposed that the future management of valvular heart disease includes early treatment consideration before the progression of the disease. Some of the proposed methods for early treatment include early diagnosis through the use of emerging biomarkers, improving patient access to care, considering pre-emptive treatment before symptoms occur, and delaying calcific aortic valve disease. Leon emphasised that the current staging in moderate aortic stenosis is not accurate, as most of the patients are being treated when the disease has already progressed, meaning a higher mortality rate. In their concluding remarks, Leon stated the importance of reinventing the management of patients with aortic stenosis and highlighted that early management, in both diagnosis and treatment, and a thorough follow-up leads to optimal clinical outcomes.

DIGITAL CARDIOLOGY AND ARTIFICIAL INTELLIGENCE IN 2033

Martin R Cowie, King's College London, UK, opened their presentation by exploring the influence that the COVID-19 pandemic has had on digital health. It was clear that digital healthcare, especially remote care, boomed during the period. A number of artificial intelligence (AI) technologies such as apps and wearables were approved for medical use by regulators. Due to social distancing and isolating, most in-person events were held virtually. Therefore, healthcare professionals have become more familiar with remote consulting and with monitoring their patients.

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Cowie presented ongoing studies on how AI is used in cardiology, including the detection of heart failure. Additionally, deep learning is currently being used to define baseline characteristics for prognosis and diagnosis in cardiovascular medicine. There are several U.S. Food and Drug Administration (FDA) machine learning products for cardiology such as the Apple Watch (Apple, Cupertino, California, USA). Some of the products are not specifically for cardiovascular medicine but provide basic information for image clarity. Cowie emphasised the importance of AI in cardiology, highlighting that machine learning would make the job of healthcare professionals easier and provide better outcomes for the patient. Furthermore, AI could be useful in managing workflow such as continuous data collection with improved quality, remote monitoring, and even pre-visit testing. "The best way of predicting the future is creating it," Cowie concluded. ●