



# Helyxon

NEWS BEADS

## SCD and CVM *focus*

- ❖ Sudden cardiac death (SCD) and continuous vital monitoring (CVM)
- ❖ Global burden and Indian insights
- ❖ Assessing risk of SCD
- ❖ Current Evidence for Continuous Vital Signs Monitoring

### Continuous Vital Monitoring in Sudden cardiac death

#### Causes of Sudden death

Sudden unexpected deaths though rare are not unheard. Five important causes such sudden deaths are fatal arrhythmias, acute myocardial infarction, intracranial hemorrhage or massive stroke, massive pulmonary embolism and acute aortic catastrophe.<sup>1</sup> Though cardiac problems predominate in such sudden deaths, other causes cannot be ruled out. Sudden cardiac death (SCD) is defined as death due to cardiovascular pathology occurring within one hour of the onset of symptoms.<sup>2</sup>

Ischemic
<ul style="list-style-type: none"> <li>• Myocardial infarction</li> <li>• Anomalous coronary origin</li> <li>• Coronary spasm</li> </ul>

Channelopathies
<ul style="list-style-type: none"> <li>• Long QT syndrome</li> <li>• Short QT syndrome</li> <li>• Brugada syndrome</li> <li>• Early repolarization syndrome</li> <li>• Catecholaminergic polymorphic ventricular tachycardia</li> </ul>

Cardiomyopathies
<ul style="list-style-type: none"> <li>• Alcoholic</li> <li>• Hypertrophic</li> <li>• Idiopathic</li> <li>• Obesity-induced</li> <li>• Fibrotic</li> <li>• Arrhythmogenic right ventricular cardiomyopathy</li> <li>• Myocarditis</li> </ul>

Heart Failure
<ul style="list-style-type: none"> <li>• Nonpreserved ejection fraction (EF) systolic heart failure (EF less than 35%)</li> </ul>

Valve disease
<ul style="list-style-type: none"> <li>• Aortic stenosis</li> </ul>

Congenital conditions
<ul style="list-style-type: none"> <li>• Tetralogy of Fallot</li> </ul>

In such situations the ejection fraction is so low that heart is not able to maintain the required perfusion of essential organs. Among all causes of SCD, acute coronary event is the most common and account for more than 80% of deaths.

Cardiomyopathies and channelopathies lead to death in other cases. Cardiomyopathies, alcoholism and fibrosis are other non-ischemic SCD causes.<sup>3</sup>

#### Global burden and Indian insights

Currently published medical literature is almost entirely from North America, Western Europe and few countries of Asia

pacific.<sup>4</sup> Epidemiological methods of data collection regarding prevalence and disease burden from community is far from



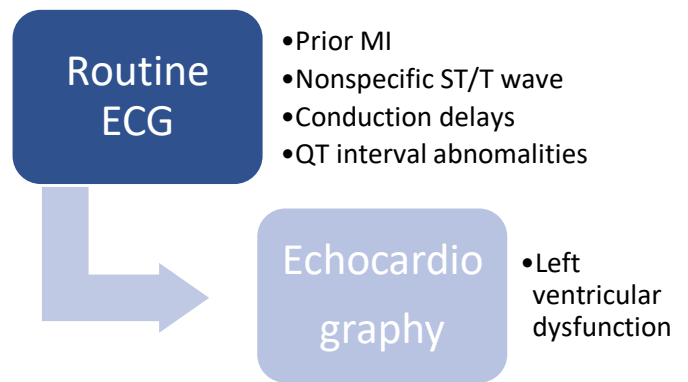
Remote vital monitoring can be used for the prediction and prevention of fatal cardiac events in high-risk individuals, especially during conditions with enhanced cardiac functional requirement and the clinical or applicative validation of the monitoring can bring compelling changes in the universal recommendations.

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complete and influenced by multitude of biases. From available numbers the burden of disease cannot be universally represented. Design and development of innovative methods of data collection especially suited to Indian scenario provides deeper insights into the occurrence of SCD.<sup>5</sup> There is growing incidence of clinical and subclinical coronary artery disease (CAD) making large populations vulnerable for SCD. Immediate focus among the high-risk individuals can provide primary and secondary incidence numbers of SCD.<sup>4</sup> Implementation of focused health policies with cost specific effective strategies provides higher understanding of SCD burden in India.

Death of well-known Kannada actor, Puneeth Rajkumar, at the age of 46 while working out,<sup>6</sup> has not only increased the awareness of masses about SCD, but also, researchers to apply critical thinking into the prediction and prevention of SCD. Adding to this, legendary Australian spinner, Shane Warne, died at the age of 52, due to massive heart attack and his strict

fitness program coupled with weight reduction diet is blamed for this fatal event.<sup>7</sup> The death of these two public figures reinforced interest in evaluating the causes and early detection of danger signs of not only CAD but other related cardiac ailments. In this regard, remote continuous vital monitoring has acclaimed renewed importance.



## Assessing risk of SCD

Usual goal of risk assessment is to provide information to an individual about prognosis of cardiac risk factors and possible use of implantable cardiac monitors in those who require continuous monitoring. However, majority of SCD occur in individuals who are not known to have any cardiac disease.<sup>8</sup> ECG screening may be the only test that could be used to evaluate the individuals. However, poor sensitivity of ECG to identify SCD risk is the major shortcoming.

Following risk-stratification of SCD and the measures available for managing the risk of SCD in India, following measures are proposed.<sup>9</sup> For those with ECG abnormalities

echocardiography may be done to assess the left ventricular dysfunction and later followed up with stress tests. However, this approach is limited effectiveness considering the huge population to which this has to be applied. Currently, the most effective long-term treatment that is currently available for SCD is the Implantable Cardioverter Defibrillator (ICD). Patients with a prior history of cardiac arrest, or sustained ventricular tachycardia (VT) have demonstrable effectiveness of ICD. However, cost of ICD is the main hindrance for wide spread adoptability of ICDs. In addition, use of ICDs influence quality of life and not fully elucidated so far.<sup>9</sup>

## Current Evidence for Continuous Vital Signs Monitoring

A systematic review of 27 published articles from 2009 to 2019 evaluating 13 different wearable wireless devices conclude are mostly still in the clinical validation and feasibility testing phases.<sup>10</sup> In another review of 270 papers evaluating 30

wearable monitors conclude that most common clinical application was heart rate monitoring and authors suggest that there is a need for clinical validation studies in the outpatient setting to prove the potential of many of the

monitors identified.<sup>11</sup> Such studies are needed to help health care professionals and administrators in their decision-making regarding implementation of these devices on a large scale in clinical practice or in-home monitoring.

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