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RAPID DIAGNOSTIC METHODS AND TECHNOLOGIES IN THE MANAGEMENT OF CARDIAC DISEASE

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Abstract
To assure ideal outcomes for patients with heart disease care relies primarily on precise and fast diagnosis. Rapid diagnostic technology and methodologies have become known as critical aids for this endeavour. This summary presents an overview of quick cardiac diagnostic methods and technology that have changed the state of coronary artery disease care. Diagnostic techniques are frequently lengthy, resulting in difficulties in implementing relevant therapies. However, recent advancements have resulted in the implementation of novel procedures that speed up the identification of heart disorders. These technologies include imaging techniques, biomarker analysis, and point-of-care testing. Echocardiography, cardiac Magnetic resonance images, and computed tomography scans have been developed to provide quick and comprehensive visualization of heart structures and functions. These non-surgical procedures allow doctors to quickly examine cardiac problems, allowing for faster decision-making. Biomarker examination has transformed coronary artery disease detection by allowing the recognition of particular molecules indicative of cardiac damage or malfunction. High-sensitivity cardiac troponin tests along with additional biomarkers have significantly decreased the time necessary to diagnose illnesses like acute myocardial infarction and heart failure. Point-of-care testing equipment has developed as a critical instrument for quick cardiac diagnosis, which permits immediate time examination at the patient's bedside. These gadgets provide immediate data for cardiac biomarkers, coagulation factors, and electrolyte levels, allowing for faster assessment and a diagnosis start.

Keywords: Computed tomography scans, Magnetic resonance imaging, Electrocardiography, Coronary artery disease, Point-of-care testing.

Introduction:

Humans need their hearts more than any other creature. As the primary component of the body's cardiovascular system, it is a type of muscular organ that pumps blood into the body. The cardiovascular system is made up of all blood vessels, including veins and arteries, and the capillaries, which together make up the intricate system of circulatory tracts that circulate blood throughout the body. [1] Heart disease is a lethal condition that affects people worldwide and is increasing both in industrialized and underdeveloped nations. As a result, it is a major cause of mortality. The heart often struggles with such a scenario to supply adequate blood to other body parts so they can perform their regular activities. [2]

Currently, people's lives and health are threatened by cardiovascular diseases (CVD). Although there are many drugs with different types of activity marketed as conventional agents in the treatment of heart disease, these drugs are still below expectations due to problems such as water solubility, bioavailability, non-targeting and drug resistance. [3] The World Health Organization (also known as WHO) estimates that heart disease kills millions of people each year. [4] Heart disease is essentially any heart problem that affects the function of the heart. With the development of nanotechnology, the Nano drug delivery system (NDDS) is showing remarkable results in solving the above problems by providing a new drug delivery method for the treatment of cardiovascular disease. [3]
There are many types of heart diseases; some of these are shown in fig. 1: [1]

a. Cardiomyopathy: Cardiomyopathy refers to a set of disorders affecting the heart muscle. These disorders involve anatomical as well as physiological changes in the cardiac muscle, that can affect the circulation of blood and may contribute to heart failure, arrhythmias (irregular heartbeats), and other consequences.
b. Ischemic heart disease: Also known as coronary artery disease (CAD), ischemic heart disease is a disease that occurs when blood flow to the heart muscles is reduced due to narrowing or blockage of the coronary arteries. Coronary arteries deliver more oxygen-rich blood to keep the heart muscle working properly. When these arteries become narrowed or blocked, it can cause a variety of symptoms and serious complications.
c. Valvular heart disease: Valvular heart disease describes disorders that damage the heart's valves. The heart contains 4 valves which keep blood flowing in the right path through the chambers and into the arteries. They are the mitral, tricuspid, aortic, and pulmonary valves.
d. Cardiovascular disease: Coronary heart disease (CHD), also known as coronary artery disease, is a condition that affects the blood vessels in the body that carry oxygen and nutrients to the heart wall. It affects heart disease caused by the slow buildup of fat, cholesterol, and other substances in the arteries, known as atherosclerotic plaques, these plaques can clog arteries and limit blood flow to the heart wall over time.
e. Heart failure: Congestive heart failure represents a serious illness that compromises the heart's capacity to circulate blood and supply oxygen to the body's tissues. It generally happens once the heart's muscle gets weaker or injured, resulting in its inability to pump blood adequately through the body. As a consequence, the organs and tissues of the body cannot get sufficient nourishment and oxygen, which may result in a variety of signs and complications.
f. Inflammatory heart disease: Inflammatory cardiac disease (myocarditis) is a disorder that occurs when the heart muscle (myocardium) develops swollen, usually as a result of an immunological response provoked by infections, autoimmune illnesses, or other reasons. This condition may damage the cardiovascular system, impair its capacity to circulate blood properly, and ultimately trigger a variety of problems as well as consequences.
g. Hypertensive heart disease: A set of anomalies in the left ventricle, left atrium, and coronary arteries brought on by high blood pressure are collectively referred to as a chronic cardiovascular condition. The burden on the cardiovascular system is increased by high blood pressure, causing anatomical and physiological alterations in the myocardium.
Coronary artery disease is becoming more common, which hurts people's well-being and longevity. Reduced blood flow, hypoxia, and aberrant lipid metabolism all contribute to CAD, which causes the heart to go through pathophysiological processes including cell death, autophagy, and fibrosis. Angina pectoris, myocardial infarction (MI), and ischemic coronary artery disease are some of the several types of CAD that can develop from either chronic or acute myocardial ischemia.[5] Among the biggest causes of death globally continues to be heart disease. Circular RNA has yet to be fully studied in terms of its effects on the circulatory system. A deeper comprehension of circular RNA will establish the groundwork for the creation of heart illness therapies and diagnostic methods utilizing circular RNA. The process of biogenesis of circular RNA, its techniques of identification, their many uses, and our present knowledge of circular RNA in certain cardiac diseases. [6]

Coronary computed tomography angiography is a trustworthy diagnostic method that is gaining popularity in the identification of heart disease. It also has prospective consequences for the care of patients. When treating lymphomas and thoracic cancers, radiation therapy is usually applied in addition to surgical treatment and chemotherapy. The irradiation of healthy tissues nearby has long-term negative effects, even though radiation therapy considerably increases cancer patients' probabilities of survival. [7] In both men and women, cardiovascular disease is the most frequent diagnosis, and it is responsible for 30% of fatalities globally. Acute myocardial syndrome, coronary artery disease, coronary heart disease, and other illnesses are all included in the category of cardiovascular disease (CVD), which affects both arteries. Coronary artery blockage and narrowing cause heart failure. The blood flow to the heart itself is controlled by coronary arteries. According to a recent poll, the United States is the nation with the highest prevalence of heart disease and is also the most impacted by the condition. [8]
Coronary artery heart disease (CAHD) has several characteristics that might impact the structure or operation of the heart. To accurately and quickly identify cardiac disease, doctors and medical professionals encounter several challenges. Making an intelligence CAHD model for forecasting is crucial to accurately forecast the early stages of cardiac disease at a reasonable cost. Ischemia, or the reduction in oxygen delivery to the cardiac tissue, is the core definition of acute chronic syndrome. This can be seen in myocardial infarction (MI), where damaged or destroyed heart tissue results from the death of cells. [9] The estimated number of people with congenital heart disease in Europe and North America currently surpasses 3.5 million as a result of improvements in the care of both children and adults with CHD. Arrhythmias ranging from sinus node dysfunction to ventricular fibrillation become more common as persons with CHD get older. [10]

Diagnostic methods for cardiac diseases:
There are different types of diagnostic methods for cardiac disease are shown in Fig. 2:

Electrocardiography: Cardiologists and non-cardiologists alike use an electrocardiogram (ECG). It has become a widely used medical device. Electrocardiography is a fast, easy and inexpensive diagnostic method that can be performed even in low areas. The test can check the body of the body and the heart, as well as make recommendations for diseases that affect the whole body. [11] In cardiology, electrocardiography is the most often performed diagnostic procedure. While fully recognized, it significantly aids in the identification and care of people with cardiac disease. It is also essential for the identification of ventricular fibrillation and cardiac arrest disorders. [12] Based on the electrical signals of the heart, an ECG signal is important for investigating the physiological modifications of the cardiovascular system in various scenarios. It is commonly used to identify several illnesses, which include cardiac conditions, cardiac arrhythmia and epilepsy. ECG has also been used to assess mental and emotional issues. [13]

The method of capturing the electrical signals of the heart by applying devices connected to the skin is called electrocardiography. These electrodes pick up the little electrical alterations in the outer layer of the skin caused by each heartbeat's contractions and relaxations of the heart muscles, over the chest. They enable monitoring of cardiac activity in both the vertical and horizontal electrical planes from various angles. A healthy heart has an organized series of specific events that characterize the mechanics of cardiac muscle activation throughout each pulse. Modern cardiology refers to these occurrences as P, Q, R, S, and T points are shown in Fig. 3. [14]

The term ECG refers to a measuring system that continuously records the electrical signals of the cardiovascular system. Three primary waves typically make up ECG signals. The P wave, which is the initial wave, shows that the atrium has depolarized. The QRS wave, known as the second wave, marks the beginning of ventricular contractions. The third wave T arrives a few milliseconds after the ventricles have continued to contract. When the ventricular repolarizes, this wave is produced. One of the characteristics of an ECG is cardiac variation, which is determined via QRS detection,

which takes the R peak and R-R interval out of the ECG data. The value of the threshold of the heartbeat signal, which is established utilizing the entire number of R peaks, has been demonstrated to have a QRS error identification rate of 0.46%.[13]

Echocardiography: A non-invasive test called an echocardiogram can be used to look at the structure of the heart, including its number, size, wall, mass, pericardial effusion, and other findings.[15] Echocardiography is the best test for diagnosing coronary artery disease because in people with sleep apnea or heart failure symptoms, activity abnormalities, systolic dysfunction, diastolic dysfunction, or a combination of these should be considered for diagnosis. Accurate diagnosis of heart failure.[16] Echocardiographic evaluation in radiation associated with heart disease is important, including identifying functional abnormalities, measuring ventricular function, and assessing the severity of valve disease.[8]
Heart failure due to systolic dysfunction is often easily detected by echocardiography showing an enlarged left ventricle with a low ejection fraction. However, in the diagnosing of heart failure, echocardiography has some additional functions besides the diagnosis of heart failure; because left ventricular dilation alters intracardiac morphology and blood flow, causing pain, weight gain, and death. Echocardiography is an important technique in the evaluation of wall motion abnormalities in patients with heart disease. Demonstration of regional wall irregularity is a technique that provides rapid diagnosis of myocardial infarction. Evaluation of ejection fraction is important in the follow-up and follow-up of patients with heart failure.[16] However, motion-based (M-mode) echocardiography existed before the development of the two-dimensional echocardiography that is used often today. The age of diagnostic non-invasive echocardiography began with the introduction of M-mode devices in 1953 by Inge Edler, known as the father of echocardiography. [17]

Cardiac biomarker: Biomarkers known as cardiac markers are evaluated to assess heart function. They may be helpful for early illness detection or prediction. Other illnesses can cause an increase in cardiac marker levels, even though they are frequently mentioned about myocardial infarction. [18] A stage in evaluating an illness is measuring cardiac biomarkers. While cardiac imaging frequently confirms a diagnosis, easier and less expensive cardiac biomarker measures might help a doctor decide if more invasive or complicated treatments are necessary. Medical societies frequently encourage clinicians to use biomarker assessments as a first round of testing, particularly for individuals with a low risk of cardiac mortality. [19] The definition of a biomarker is a "feature that is objectively measured and quantified as a marker of biological processes that are normal, pathogenic, or pharmacological response to a therapeutic intervention." [20]
Myocardial indicators are utilized to diagnose and stratify individuals who have chest discomfort and probable acute coronary syndrome (ACS), as well as to treat and prognostic individuals suffering acute heart failure, pulmonary embolism, and other disease states. [19] Because the heart is the only organ that produces troponin, the main diagnostic tool performed by medical professionals to diagnose cardiac injury caused by cardiac arrest or the ACS involves a diagnostic test of the development of this enzyme. Troponin levels may increase for up to 12 hours following a heart attack. They can remain raised for two weeks. To detect these indicators, you may have many cardiac enzyme tests spaced several hours or days apart. [20] Cardiac biomarkers are chemicals or compounds found in blood vessels that provide information about the heart's health and function. These biomarkers are used to diagnose, prognostic, and control a variety of coronary illnesses, such as heart attacks (myocardial infarction), heart failure, and other cardiac problems. Some commonly used biomarkers are troponin, creatine kinase, D-dimer, lactate dehydrogenase (LDH), and myoglobin. [18] A highly precise and accurate treatment for cardiac injury. Troponin is made up of three protein molecules: Troponin T. It exhibits a greater affinity than CK-MB. Troponin I, in particular, has a strong ability for coronary artery disease. [19]

Coronary angiography: A diagnostic procedure called coronary angiography is performed to see the arteries that provide oxygen and nutrients to the heart muscles. It is frequently used to identify

and evaluate several cardiac problems, such as coronary artery disease, which is characterized by a narrowing or blockage of these arteries. [21] The diagnosis of coronary artery disease by coronary computed tomography angiography (CCTA), an effective imaging technology that is becoming more widely used, has prognostic consequences for patient care. [7] The most common test used for determining the existence and severity of atherosclerotic coronary artery disease is coronary angiography. [22] Angiograms or arteriograms are diagnostic imaging tests used to see the interior, or lumen, of the circulatory systems or organs, with a focus on the arteries, veins, and heart chambers. Modern angiography is carried out by injecting a radio-opaque contrast agent into the blood artery and imaging with X-ray-based methods like fluoroscopy. [21]
Computed tomography (CT) provides an accurate, non-invasive alternative to invasive coronary angiography (ICA) in determining the presence of obstructive coronary artery disease in patients with stable chest discomfort and moderate pretest risk for obstructive CAD. In addition to allowing coronary revascularization to occur concurrently, ICA is the gold standard for the identification of obstructive CAD. [23] The severity of CAD, congestive heart failure with poor ejection fraction, recent stroke or myocardial infarction (MI), and bleeding proclivity merely represent just some of the cardiac features that could aggravate coronary and vascular problems. Moreover, the operation type, whether diagnostic coronary angiography or coronary artery bypass influences the possibility of complications. [22]

Rapid diagnostic methods for cardiac disease:
There are different types of rapid diagnostic methods for cardiac disease are shown in Fig. 4:

High-sensitivity troponin assay: The high-sensitivity cardiac troponin test (hs-cTnT) is the most recent version of cardiovascular enzymatic screening that enables the identification of extremely low levels of troponin T, assisting in the quicker diagnosis of heart failure. When a test results in a negative result, heart disease-related heart disease is not necessarily "ruled out" as the cause. To increase the ability to identify a myocardial infarction, a high-sensitive troponin test is being developed. [24] Cardiac troponin (cTn), which has been commonly utilized in medical facilities, has emerged as the most reliable biomarker for assessing individuals who may have suffered acute myocardial damage. An increase or decrease in cTn with at least one measurement over the ninety-ninth percentile of healthy people is essential to the detection of coronary artery disease. [24]

Cardiac troponin I and T as well, as the myocardium cells' electrical device. [25] It has not been recorded that after harm to non-cardiac tissues, cTnI levels increase. For cTnT, the situation is more complicated. Biochemical studies show that damaged skeletal muscle produces proteins that can be identified by the cTnT test, suggesting that in some circumstances, skeletal muscle may be the source of elevated cTnT. [26] The incidence of these increases without ischemic heart disease may be more common than previously beloved, according to recent evidence. The ideal biomarkers for assessing myocardial damage are cTnI and cTnT and high-sensitivity cTn tests are advised for application in regular medical procedures. [27]
A small amount of troponin T may be found in the circulation and this can be detected by cardiac troponin sensitivity testing. The high-sensitivity cardiac troponin T test (hs-cTnT) is usually fourteen ng/l. Threshold levels for the "normal" troponin T levels were established by reviewing several studies of recommended healthy " subjects with blood troponin T levels at baseline. In other words, when the hs-cTnT test shows a value around fourteen ng/l, heart damage or heart attack may occur. As the hs-cTnT test is used more frequently, further improvements in troponin T detection may be possible depending on the patient's age, sex, medical condition, and genetic history.[25]

Point-of-care testing (POCT): Point-of-care testing (POCT) is an alternative to diagnostic testing. Several other names and abbreviations are now used to refer to it, including near-patient examination, side-by-side examination, physician-exam examination, out-of-office laboratory, satellite communication "hot laboratory", decentralized laboratory, additional laboratory, and other

onsite monitoring. The goal of POCT analysis is to complete diagnostic tests with a faster turnaround time (STAT) compared to central laboratories. [28] This quick method is less resources-intensive than laboratory testing and depends on the accessibility of highly sophisticated point-of-care (POC) technologies to allow for precise biomarker identification robustly and straightforwardly. These devices may consist of just one biodegradable component or a platform that may accommodate many biodegradable inserts. [29] POCT is the prompt administration of a test at the point of care when the outcome can be taken advantage of to determine what to do and how to proceed in a way that improves the patient's health. [28]

Portable ECG devices: Portable electrocardiograms (ECGs) include the Holter monitor. It continuously tracks the electrical signals of the circulatory system for at least twenty-four hours while being far from the physician's office. One of the most straightforward and quick procedures performed to assess the pulse was a conventional or "resting" ECG.[29] On the chest and belly, several locations have electrodes. A wired connection exists between the electrodes and the ECG device. The heart's electrical activity may then be monitored, written down, and printed. The body receives no electrical energy. [30]

Handheld echocardiography devices: Recently, portable echocardiographic equipment has become accessible. Our goal was to as certain if hand-held gadgets provide new information that is relevant and not already offered through the first cardiac diagnostics via medical information as well as fundamental diagnostic methodologies.[31] Continuous pulse doppler is absent from the portable instruments. A huge number of portable gadgets do not have spectral doppler since it causes their temperature to rise more quickly. [32] For the diagnosis and assessment of cardiac a narrowing of Echocardiography is crucial. Additionally, pulse wave doppler is required in echocardiography to enable quantitative evaluation of left heart ventricular rates. [33]

Cardiac biomarker (POCT): The potential to evaluate cardiac biomarkers faster in the setting where therapeutic choices regarding patient treatment are made is provided by point-of-care (POC) diagnostics. POC testing uses the entire bloodstream to assess one or more chemical compounds, which includes cardiovascular markers like creatinine kinase-MB isoenzyme, myoglobin, coronary troponins T and I, as well as B-type natriuretic peptides. [34] Biomarkers known as cardiac markers are assessed to determine cardiac activity. They may be helpful for early illness detection or prediction. [35] A step towards reaching a diagnosis of a problem is measuring cardiac biomarkers. While cardiac imaging frequently confirms a diagnosis, quicker and cheaper cardiac biomarker measures might help a doctor decide if more involved or invasive treatments are necessary. Medical societies frequently recommend that physicians use biomarker assessments as a first testing approach, particularly for individuals with minimal risk of cardiac mortality. [36][37]

Wearable and remote monitoring devices: Wearable technology advancements have opened up new possibilities for the detection and management of cardiovascular illnesses and related risk factors. Devices that are often used in clinical settings, like blood pressure devices and cardiac watches, have become easily accessible to users. Innovations in hardware and software have resulted in the creation of new, practical, as well as cost-effective devices that allow over-monitoring of vulnerable populations from the comfort of their houses while also sending out life-saving alerts for situations that call for immediate medical attention or hospitalization. [38]
To close the gap in access to healthcare between urban as well as rural settings, wearable technology may additionally offer online or distant treatment. [39] Any item that requires wear is considered wearable. Smart watches and smart glasses are two popular examples of technology products. Wearable electronic devices, usually placed on the side or directly on the skin, can collect, process and transmit signals such as blood glucose or related information, and sometimes provide immediate biofeedback to the wearer. [38] Wearable and remote monitoring devices have become popular and

important in medicine, fitness and many other fields. These devices use technology to monitor and transmit information about human health, activity or the environment. [39]

Continuous ECG monitoring devices: The technique of electrocardiographs involves creating an electrocardiogram, a recording of the electrical impulses of the cardiovascular system over repeated cardiac cycles. This refers to an electrogram of the heart, which is a graph of voltage against the duration of the electrical activity of the cardiac muscle employing devices inserted into the skin. [40,41] When the heart muscle depolarizes and repolarizes throughout each heartbeat, those electrodes pick up on the minute electrical alterations that result from these processes. [42]
Numerous cardiac disorders, such as irregular heartbeat, insufficient cardiac blood flow, and electrolyte problems, cause modifications to the typical electrocardiogram signal.[43] An example of a portable ECG device is the Holter monitor. It continuously tracks the electrical rhythm of your heart for a whole day or more when you are far from a healthcare provider. A conventional or "resting" ECG is a single one of the simplest and fastest methods used to evaluate the heart. Electrodes, which are tiny plastic strips that stick to the skin, are put in certain places on the upper part of the body and belly. The devices are connected to the ECG gadget by cables. The electrical signals of the heart may then be seen, recorded, and presented. No electrical power is sent to the body. [40]

Implantable loop recorders: The cardiac rhythms are recorded using leadless, semi-invasive gadgets called placed-in-the-body loop recording devices, which are inserted subcutaneously. The gadget may be programmed to recognize cardiac pacemakers over a given period. This device has an average lifespan of two to three years depending on use. [44] Programs that are manually initiated continuously activated or a mix of the two can be stored on an implanted loop recorder. [45] An ECG, which is continually recorded within the implantable loop recorder's circular memory (hence the name "loop" recorder), is used for tracking the electrical signals of the cardiovascular system. Arrhythmia, a form of irregular electrical signals, is documented by "freezing" a section of memory for subsequent analysis. Irregular activity events can only be kept in a finite number, with the most latest episodes displacing the previous one. [46]
A conventional loop recording devices report contains details regarding the recorded ECG tracings, the expert's analysis of the ECG determining any observed symptoms, and the period of those problems. This data may help a medical professional identify the root cause of the issue. [44] The implantable loop recording device is a tiny leadless box. This is roughly the size of a USB memory device, containing 2 autonomous sensors. As mentioned before, the batteries in modern implanted loop recording gadgets may last up to three years. [47] There are 2 techniques to start recording, Initially based on cardiac rate limits that the healthcare provider has already specified or configured within the implantable loop recorders, monitoring might be triggered immediately. The implantable loop recorder will record without the individual's awareness that their cardiac rate increases or decreases over the predetermined levels. Another way of collection using the implantable loop recorder involves a portable "patient stimulator" that the individual uses to start a recording by pressing an icon whenever the experience indications like delayed rhythms, drowsiness, or nausea. [44]

Imaging advancements:

Cardiac CT angiography: Coronary artery disease represents a serious subtype of cardiovascular disease that necessitates rapid, precise, and inexpensive diagnostics. According to their current signs and symptoms, history, physical exam findings, ECG alterations, and coronary characteristics, persons might be organized as having a low, middle, or significant initial test risk of coronary artery disease. [48] The assessment of the blood vessels in the heart through CT imaging is known as cardiac CT angiography (CCTA). A high-speed CT scan is used to scan the cardiovascular system of a patient after receiving an IV contrast injection. The development of CT technology has made it possible for individuals to be scanned without the use of any medications just merely holding their

inhalation through the procedure. The position of implants and the possibility that these are still open, anomalies in the circulatory system or blood vessels, and occasionally the detection of atherosclerotic disease are all assessed with CTA. [49]
Once a heart attack is checked away the physician is given a variety of diagnostic tools to select from when attempting to establish the possibility of CAD along with quantifying its degree in these individuals. [50] Coronary computed tomographic angiography (CCTA) is an anatomical technique that may be utilized in intermediate-risk individuals to offer the results promptly to a healthcare diagnostician. [48,51] CCTA is another way to diagnose cardiovascular disease. Conventional coronary angiography, like CAD, is considered to be the gold standard for diagnosis. Still, using the current spatiotemporal and spatial resolutions provided by contemporary CT scans, CCTA has come to be a potential non-invasive substitute method for evaluating cardiac morphology. [52] A ring-shaped device with a radiation source revolving around a circular path is used in CCTA, a diagnostic technique, to provide the circumference by a consistent and known X-ray frequency. The remarkable advancements in CT technology have increased the usefulness of cardiology. Nowadays, cardiovascular tests using multidetector CT, particularly the 64-detector, may be completed in only a few seconds (less than 10 seconds, depending on the tools and methodology employed). With the use of software and algorithms, these pictures are rebuilt. [49]

Cardiac MRI: Cardiac electromagnetic resonance imaging (MRI), commonly referred to as cardiac magnetic resonance imaging (CMR), was a type of MRI method utilized to effectively examine the internal and external structures of the cardiovascular system. [53] Cardiovascular magnetic resonance, also known as CMR, is a group of MRI methods used to evaluate cardiac morphological atrioventricular activity, perfusion of the myocardium, tissue characterization, circulation measurement, and CAD. [54] Magnetic resonance imaging (MRI) is a medical imaging method that uses electricity to provide images of the body and physiological processes. MRI scanners create images of a patient's vital organs using powerful magnets, magnetic fields, and electric currents. [55]

Conclusion:

In conclusion, rapid diagnostic methods and technologies in the management of coronary artery disease have revolutionized the area of cardiology, permitting simpler and more precise detection, evaluation, and diagnosis of diverse heart ailments. These innovations have considerably improved patient results, lowered healthcare expenditures, and increased the overall standard of treatment delivered to those suffering from cardiac problems. The utilization of quick diagnostic procedures such as high-sensitivity cardiac biomarkers, point-of-care testing, and improved scanning methods including echocardiography and myocardial CT scans are resulting in the diagnosis of heart disorders at an earlier stage. This early diagnosis enables healthcare providers to respond quickly, commence suitable therapies, and avoid the occurrence of problems such as heart attacks, heart failure, and arrhythmias.
Additionally, the incorporation of technology such as wearable devices, remote monitoring systems, and portable ECG devices has made continuous monitoring of individuals with heart illnesses possible. This continuous data collection enables medical professionals to make informed decisions, modify treatment plans, and take prompt actions, lowering the likelihood of complications and rehospitalizations. Finally, advances in quick diagnostic procedures and technology have transformed the landscape of cardiac disease care, giving doctors new tools to improve early identification, personalized therapy, and continuous monitoring. As studies and developments progress, the possibility for progressively more efficient and readily available treatments in the management of cardiac disorders offers great promise for improving the lives of countless people worldwide.

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Competing Interest
The authors have declared that no competing interest exists.

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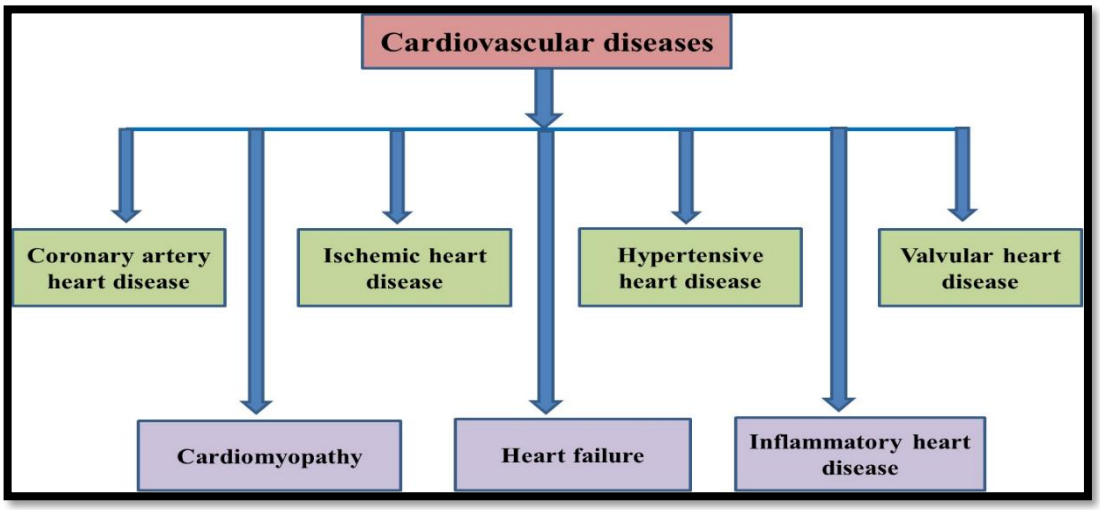

Fig. 1: Several types of cardiovascular diseases.

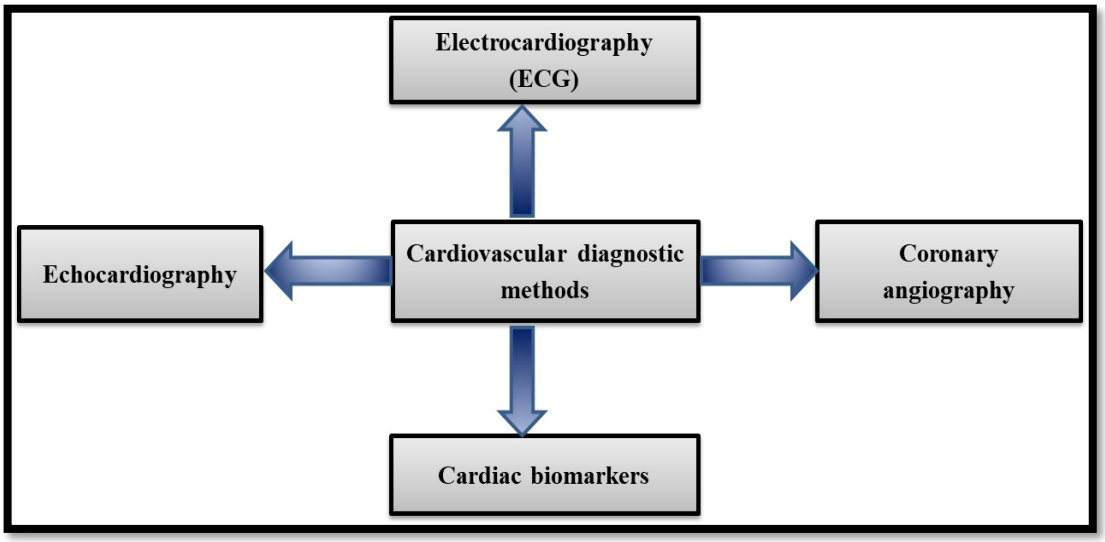

Fig. 2: Several types of cardiovascular diagnostic methods.

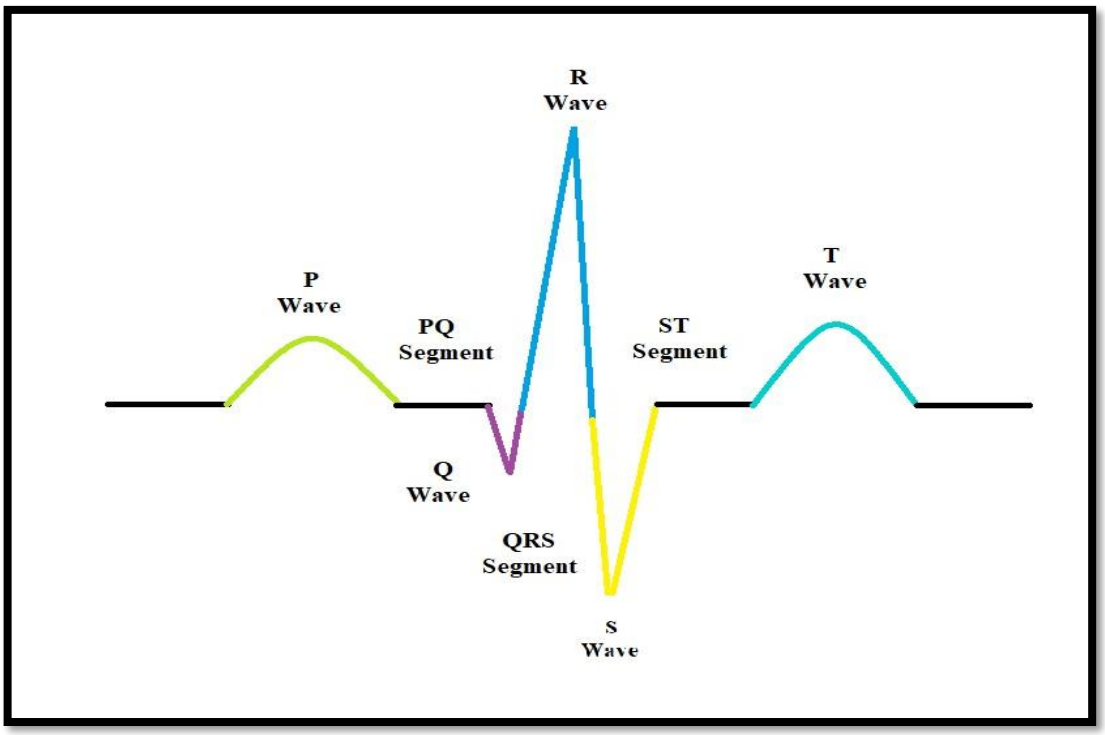

Fig. 3: Electrocardiography

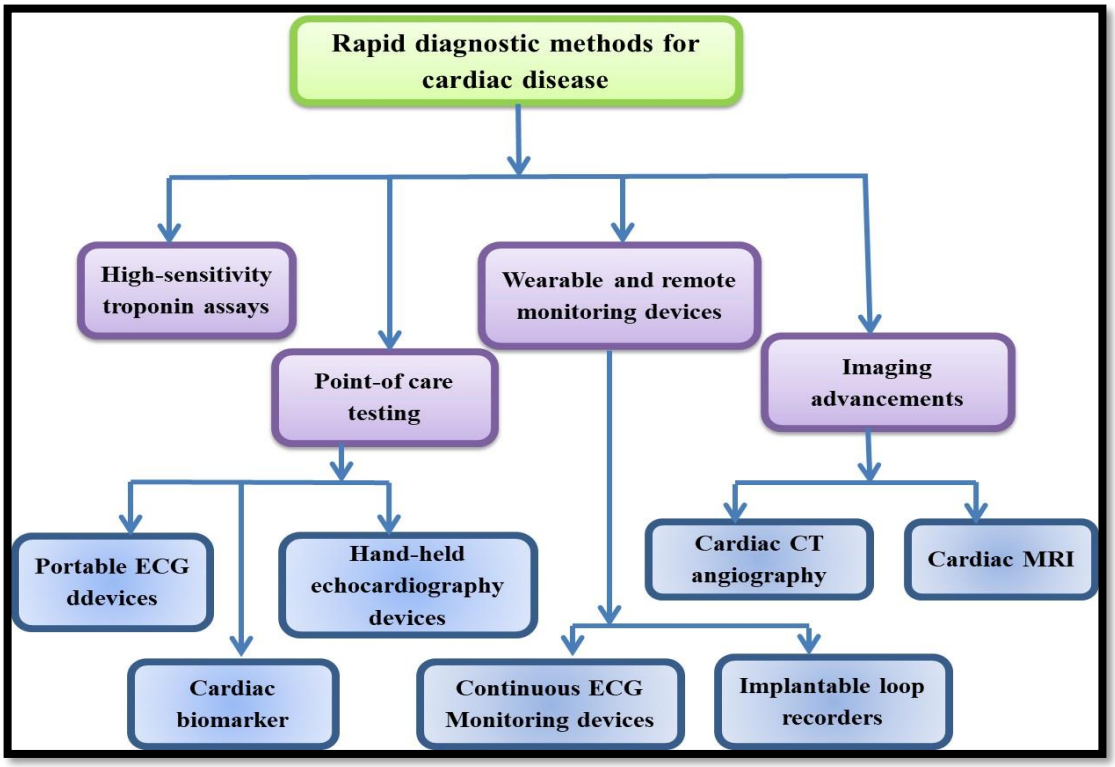

Fig. 4: Rapid diagnostic methods for cardiac diseases

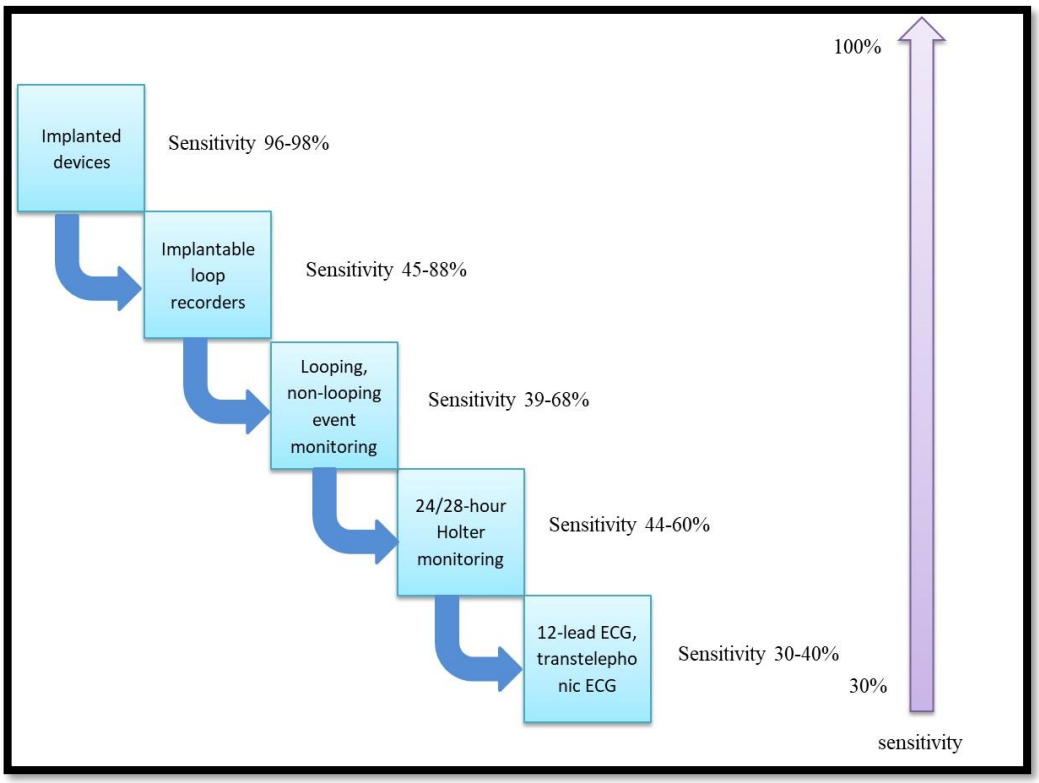

Fig. 5: Mobile devices electrocardiogram (ECG) recording having recognized level of accurate diagnosis.