Extraordinary Edition of the Kauverian

Proceedings of the Kauvery hospitals international symposium on Cardiogenetics-2024: Key take home messages

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Background

This is the second year in a row that Kauvery Hospital (Alwarpet, Chennai) has conducted the International Cardiogenetics Symposium.

The Symposium has succeeded in bringing together healthcare professionals from various disciplines such as Adult and Pediatric Cardiology, Sports Cardiology, Cardiac Electrophysiology, Cardiothoracic Surgery, Genetics, Genetic counseling, Cardiac nursing, Medical researchers and Fellows in training, to build capacity within the field of Cardiology in India to address the issue of sudden cardiac death in young individuals due to underlying genetic cardiac conditions.

The theme of this year's Symposium was "Actionable Insights in the Management of Inherited Heart Diseases".

The main aim of the Symposium was to improve knowledge and awareness about the genetic underpinnings as well as the diagnostic protocol, prognostic schema and therapeutic implications of inherited heart diseases such as familial cardiomyopathies and channelopathies.

Various experts in the field from Kauvery group of hospitals, Omandurar Superspeciality Hospital, Velammal Multispeciality hospital, AIMS, CCMB, JIPMER, PGI Chandigarh, SCTIMST, AIG Hospital, University of Amsterdam (Netherlands) and St. George's Hospital (UK) shared their data and experience and addressed queries from the audience.

Key take home messages

Who needs a genetic test?

As per the most recent global consensus document on the state of genetic testing for cardiac diseases, genetic testing impacts diagnostic, prognostic and therapeutic aspects of the majority of familial cardiomyopathies and arrhythmia syndromes (also known as channelopathies) and should become mainstay in the management of the proband with suspected inherited heart disease. (Arthur A M Wilde et al., 2022).

Table 5 Impact of genetic testing for the proband

Disease	Diagnostic	Prognostic	Therapeutic
Arrhythmia syndromes			
Long QT syndrome	+++	+++	+++
CPVT	+++	+	+
Brugada syndrome	+	+	+
Progressive cardiac conduction disease	+	+	+
Short QT syndrome	+	+	+
Sinus node disease	–	+	–
Atrial fibrillation	–	+	–
Early repolarization syndrome	–	–	–
Cardiomyopathies			
Hypertrophic cardiomyopathy	+++	++	++
Dilated cardiomyopathy	++	+++	++
Arrhythmogenic cardiomyopathy	+++	++	++
Left ventricular non-compaction	+	+	–
Restrictive cardiomyopathy	+	+	+
Congenital heart disease			
Syndromic CHD	+++	+	–
Non-syndromic CHD	+	–	–
Familial CHD	++	–	–

+++: is recommended/is indicated or useful.
++: can be recommended/can be useful.
+: may be considered/may be useful.
–: is not recommended/is not indicated nor useful.

Fig (1). Impact of genetic testing for the proband with inherited heart disease

Which type of genetic test to call for?

The decision on the nature of genetic test to be performed in a given proband should be guided by the phenotype at hand. In other words, proper clinical evaluation using the established diagnostic modalities should pave the way for choosing among the genetic testing options such as disease-specific gene panel, whole exome sequencing or whole genome sequencing. It is imperative to elicit a multigenerational family history and provide genetic counseling prior to the genetic test (Pre-test counseling) and after the genetic test result becomes available (Post-test counseling). Cascade screening or screening of family members for the disease should be performed based on the clinical and genetic findings in the proband.

Which specialists are to be involved?

Cardiogenetics is a true example of how a multidisciplinary team approach is critical to the appropriate management of the patients and their family members. The general physician or pediatrician to whom the patient first presents will work closely with the cardiologist, cardiac electrophysiologist, radiologist, geneticist and genetic counselor to address the varied concerns of the affected individuals.

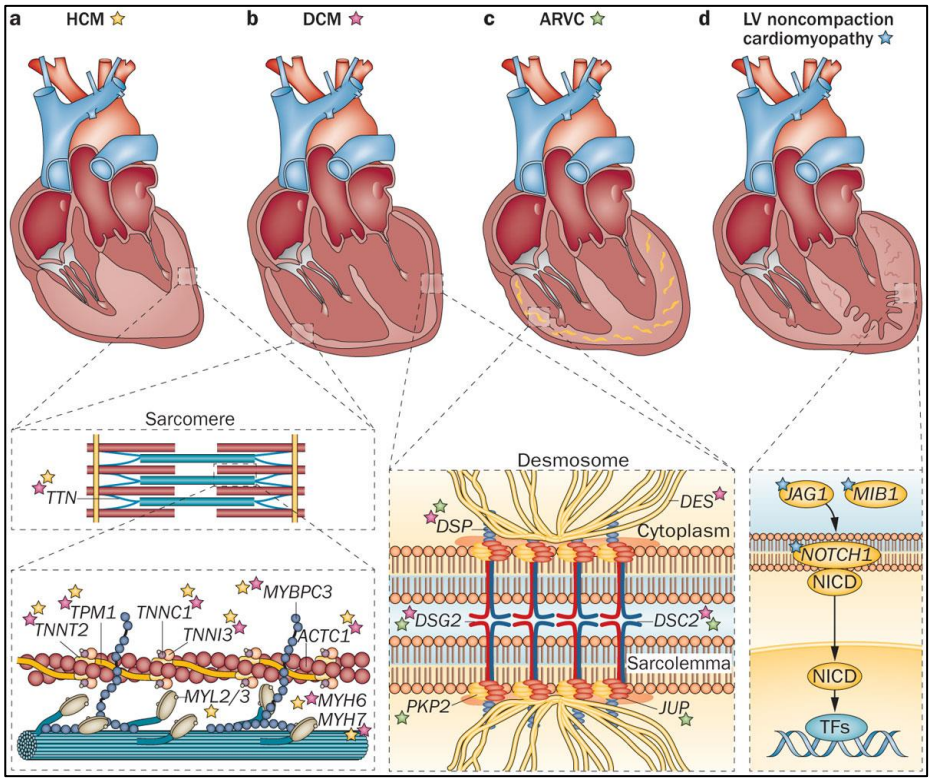

Fig (2). The familial cardiomyopathies and their genetic underpinnings

Hypertrophic cardiomyopathy (HCM) action points

- The mortality and morbidity due to undiagnosed HCM is high, especially in young and athletic individuals. This health burden can be reduced by systematic screening of symptomatic individuals and pre-participation screening of athletes using electrocardiogram (ECG), echocardiogram and cardiac magnetic resonance test, followed by genetic testing.
- Appropriate risk-stratification tools and risk-based treatment are now available for HCM, leading to a significant improvement in the lifespan of affected individuals.
- Cardiac magnetic resonance imaging complements an echocardiogram in understanding the nature of hypertrophy and in prognostication. An experienced radiologist should perform the test once in 4-5 years to assess the disease progression in HCM patients.
- Genetic testing is a key step in the diagnostic evaluation of patients with HCM and the results are known to help in risk stratification and family screening.
- Pharmacotherapy, surgical and non-surgical septal reduction therapies, electrophysiological ablation techniques and heart transplant in end stage disease are the mainstays of treatment. The more recent addition is the cardiac myosin inhibitor Mavacamten, which appears to be a promising drug for hypertrophic obstructive cardiomyopathy (HOCM).

Dilated Cardiomyopathy (DCM) Action Points

- The etiopathogenesis of DCM is complicated with almost every systemic disease condition being a potential cause. A thorough evaluation protocol should be followed in young unexplained DCM cases and genetic testing employed when no obvious cause can be ascertained and / or the presence of family history.
- The genetic underpinnings of DCM are getting unearthed at a rapid pace but there is a long way to go before population specific data becomes available for Indians and South Asians.
- Treatment of heart failure in DCM patients is based on latest guidelines for medical and device based therapies as well as heart transplantation when indicated.
- As there could be a significant overlap between the different cardiomyopathies (HCM, DCM, arrhythmogenic cardiomyopathy or ACM and left ventricular

noncompaction cardiomyopathy or LVNC) in the same patient and also as different family members with the same genetic abnormality could present differently, it is important to have a high degree of suspicion for this group of diseases.

- As life-threatening as well as benign arrhythmias are part of the spectrum of DCM presentation, the electrophysiologist is often an integral part of the management team. Advanced rhythm monitoring devices are being employed nowadays to pick up occasional arrhythmias and cutting edge therapies provided to cure the electrical disturbance.

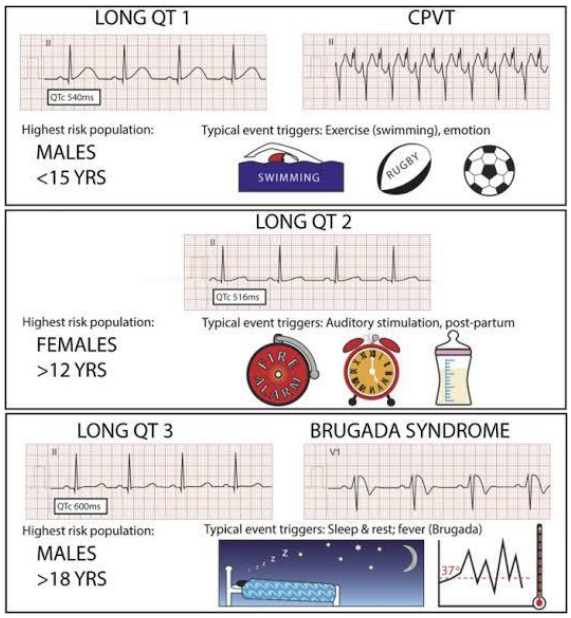

Fig (3). ECG pattern and arrhythmia triggers in cardiac channelopathies

Cardiac Channelopathies Action Points

- In his keynote lecture on Evolution of Channelopathies in Clinical Cardiology, Professor Arthur Wilde from Amsterdam UMC, Netherlands, highlighted the importance of a multidisciplinary team in setting up a Centre of Excellence in Cardiogenetics in India. He emphasized the fact that they were one of the first institutions globally to establish one in The Netherlands and that the centre has grown in capacity remarkably over the past few decades.
- Channelpathies are an overt cause of sudden cardiac death (SCD) or arrest in children and young adults and should be actively searched for when dealing with unexplained SCDs in apparently healthy individuals.

- The diagnosis of a long QT syndrome or CPVT is often delayed due to incorrect diagnosis and mismanagement, as they are often confused with epilepsy or drowning deaths. A 12-lead ECG, a clear history of the presenting symptom with associated triggers if any and a detailed family history are often the clues to diagnosing these conditions.
- The prognostication and management of diagnosed probands depends on the type of genetic mutation, hence a genetic test is mandatory in these patients.
- Pharmacotherapy is the first line treatment, sympathetic denervation is deployed in certain cases and an implantable cardioverter defibrillator (ICD) should be reserved for specific cases only. Electrophysiological ablation therapy is proving to be promising in Brugada Syndrome, in addition to ICD treatment.
- As SCD can be the very first symptom, cascade screening of family members is an important task of the cardiogenetic team, as it is the only way to detect the mutation carriers and treat them prophylactically to prevent SCD.
- Professor Sanjay Sharma, head of Sports Cardiology at St. George's Hospital, London addressed the gathering virtually and impressed upon them the relevance of an expert management team in addressing cardiovascular diseases in athletes. He has published several scientific papers on the screening of young individuals who play competitive sports and elite athletes who compete at national and international levels.
- While the demise of a young and apparently healthy person shocks the entire community, it is often forgotten within a short span of time. Neither is systematic evaluation of SCD of the deceased individual taken up nor is the family counseled on the importance of medical assessment to uncover a potentially genetic cause of sudden death.

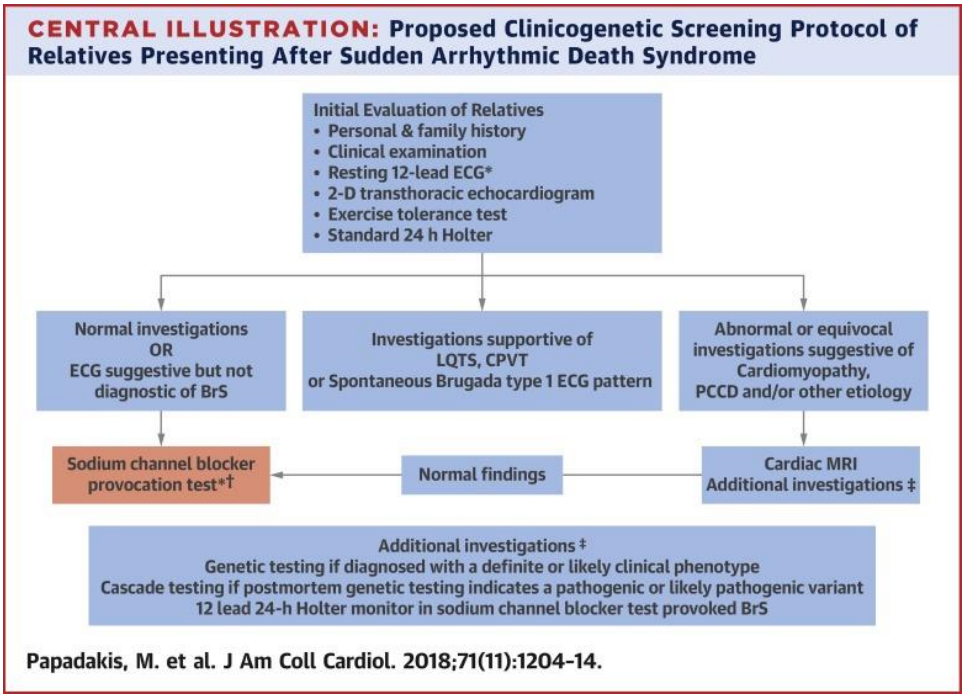

Fig (4). Steps to follow while evaluating relatives of SCD victims

Conclusion

This scientific symposium focused on providing an in-depth understanding on cardiomyopathies and channelopathies and the latest updates on preventing young SCD. In addition to these, there are other cardiac conditions like familial hypercholesterolemia, aortopathies, rarer syndromic afflictions of the heart and multifactorial diseases with a strong genetic etiology like early onset coronary artery disease and congenital heart diseases which should be managed comprehensively by an expert cardiogenetic team.

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