

## EDITOR'S NOTE



### Dr Manoj Durairaj

Heart Transplant Surgeon, MS, MCh. (AIIMS, New Delhi), FACC.

Director, Marian Cardiac Centre and Research Foundation.

Program Director, Department of Heart and Lung Transplantation, Sahyadri Hospitals, Pune.

Dear Readers,

Greetings from the Editor's desk.

Our guest authors Dr Amit Vora and Dr Ansul Patodia have written a well researched article on the role of Intra-cardiac defibrillators and Cardiac re-synchronisation therapy pacemakers in the context of Indian heart failure patients.

Their insights into the challenges faced in India are worth reading. I thank Dr Vora and Dr Patodia for their contribution to the January 2023 issue of the Revival.

To our dear Readers, wishing you a Happy Reading and a great year ahead!

Dr Manoj Durairaj  
Editor "The Revival"

## SUB EDITOR



### Dr Talha Meeran

MBBS, MD, FACC, Consultant Cardiologist, Dept of Advanced Cardiac Sciences and Cardiac Transplant, Sir HN Reliance Foundation Hospital, Mumbai.

Dear Colleagues,

The first REVIVAL issue for the year 2023 features Dr Amit Vora and Dr Ansul Patodia discussing the role EP device implantations in heart failure patients from an Indian perspective.

This article brilliantly summaries the most contemporary indications for Defibrillators and CRT device implantation. Points worth noting are scenarios in which one must avoid such device implantations and shortcoming/challenges faced in an Indian scenario.

Sincerely,  
Dr Talha Meeran  
Sub Editor "The Revival"

## PRESIDENTIAL MESSAGE



### Prof. (Dr) V. Nandakumar

Director & Chief, Division of Cardio Vascular/Thoracic Surgery & Cardiac Transplantation, Metromed International Cardiac Centre, Calicut, Kerala.

Dear Colleagues,

In this January issue of 'The Revival' Dr Amit Vora and Dr Ansul Patodia, have beautifully presented the indications for device implantation in heart failure. They have briefly covered the entire topic including the challenges faced in Indian scenario.

This article gives an insight into the device therapy for the management of patients with heart failure in the current era.

Best wishes,  
Prof. (Dr) V. Nandakumar  
President

Please call or write to us:  
Call: 9822322072, 9167048815,  
[manojdurairaj@hotmail.com](mailto:manojdurairaj@hotmail.com),  
[talha.meeran@gmail.com](mailto:talha.meeran@gmail.com)

Link for membership,  
<http://www.sfht.org/application.html>

Special thanks to Dr Amit Vora and Dr Ansul Patodia for authoring this month's article.

Designed by Maithili Kulkarni



# Society for Heart Failure and Transplantation

Endorsed by



10<sup>th</sup>, 11<sup>th</sup>  
& 12<sup>th</sup> March  
2023

Radisson Blu  
Temple Bay,  
Mahabalipuram,  
Chennai

## Presents SfHFT 2023

### FIRST ANNOUNCEMENT

#### DAY 1 FRIDAY 10<sup>th</sup> MARCH 2023

- Scientific Workshops
- Pulmonary Hypertension
- Cardiomyopathy

#### DAY 2 SATURDAY 11<sup>th</sup> MARCH 2023

##### Heart Failure Management

- Cardiogenic Shock
- Devices in HF
- MCS
- Lung Transplant

#### DAY 3 SUNDAY 12<sup>th</sup> MARCH 2023

- RV Failure
- Transplantation debates
- Recent Advances

### INTERNATIONAL FACULTY



**Dr. SHIVANAND GANGAHANUMAIYAH,**  
M.S., M.Ch., FRACS  
Consultant Cardiothoracic and  
Transplant Surgeon, Alfred Hospital,  
Melbourne



**Dr. HARAN BURRI**  
DNP MBBCh MBBS MD PhD  
Director  
Cardiac Pacing Unit, Cardiology  
Department,  
University Hospital of Geneva,  
Geneva, Switzerland



**Dr. R. VENKATESWARAN,**  
MS MD FRCS-CTh  
Consultant Cardiac Surgery and  
Transplantation, Chair -CTAG Heart, UK,  
Clinical Director, Cardiac Surgery,  
Transplant and MCS Therapy, Manchester  
University -NHS Foundation Trust, UK



**Dr. TADASHI MOTOMURA, M.D., Ph.D**  
Chief Medical Officer (CMO)  
Evaheart Medical USA  
Pittsburgh, USA  
Japan

#### Scientific Committee Chair Persons;

**Dr. Ajithkumar.V.K.,  
Dr. Julius Punnen**

#### Jt. Chair Persons;

**Dr. Manoj Durairaj,  
Dr. P.P. Mohanan**

#### Organising Chairman

**Dr. Balakrishnan K. R**

#### Jt. Organising Secretaries

**Dr. Mulasari Ajit.S  
Dr. Vijit K Cherian**

#### Organising Secretary

**Dr. Rajan S**

Conference Secretariat  
**DR. RAJAN .S**

The Madras Medical Mission  
No.4-A, Dr. JJ Nagar, Mogappair, Chennai 600 037  
Tamil Nadu, India

P: 044 -26568000 / 26568070

M: 9566169333, F: 26568034

E mail : [secretariat@sfhft2023.org](mailto:secretariat@sfhft2023.org), Website : [www.sfhft2023.org](http://www.sfhft2023.org)

All participants International delegates and PG's are requested to register online and pay the registration fee as per the membership category. You are requested to fill the online registration form.

*Block your Dates. Hurry Up!*

For Online Registration and  
payment, kindly login to [www.sfhft2023.org](http://www.sfhft2023.org)

# INDICATION FOR DEVICES (ICD & CRT) IMPLANTATION IN 'HEART FAILURE' PATIENTS: AN INDIAN PERSPECTIVE



**Dr Amit Vora**

MBBS, MD (Medicine), DM & DNB (Cardiology)

Partner, Arrhythmia Associates & Glenmark Cardiac Center

Hon. Consultant cardiologist & Electrophysiologist at Sir HN Reliance Foundation Hospital, Breach Candy Hospital, Lilavati Hospital & S.R. Mehta Cardiac Institute

Past President, Indian Heart Rhythm Society (IHRS)



**Dr Ansul Patodia**

MBBS, MD (Medicine)

DM (Cardiology) (PGIMER)

Assistant Professor in Cardiology MG Medical College, Jaipur (2016-18)

Consultant Intervention Cardiologist, Narayana Hospital, Jaipur (2018-22)

EP Fellowship (2022-23)

Heart failure (HF) is rapidly emerging as the predominant cause of cardiovascular morbidity and mortality in India.<sup>1</sup> The management of heart failure essentially focuses on identifying the underlying heart disease, treating the risk factors and co-morbidities, correction of triggers and optimizing drug therapy for heart failure. Device implantations like intra-cardiac defibrillators (ICD) and cardiac re-synchronization therapy (CRT) pacemakers are reserved for patients with ventricular arrhythmias (VA) and heart failure with reduced ejection fraction (HFrEF). This article is a brief over-view of ICD and CRT implants in the Indian context. The device options expressed are personal opinions based on experience and understanding the socio-economic status of Indian patients vis a vis western guidelines (table 1).

Indication of ICD		Class
<b>Secondary prevention</b>	In patients with documented VF or hemodynamically not tolerated VT with absence of reversible causes or 48h after myocardial infarction with reasonable expectation of survival with a good functional status > 1 year	<b>IA</b>
<b>Primary prevention</b>	Severely impaired LV function ( $\leq 0.35$ ) with NYHA II-IVa, despite optimal medical treatment for $\geq 3$ months <ul style="list-style-type: none"> <li>• Ischemic cardiomyopathy</li> <li>• Non-ischemic cardiomyopathy</li> </ul>	<b>IA</b> <b>IB</b>
Indication of CRT		Class
	Severely impaired LV function ( $\leq 0.35$ ) NYHA II-IVa, despite optimal medical treatment for $\geq 3$ months <ul style="list-style-type: none"> <li>• With LBBB and QRS duration &gt; 150 ms</li> <li>• With LBBB and QRS duration 130-149 ms</li> </ul>	<b>1A</b> <b>1B</b>

**Table 1:** Current ICD and CRT indications according to the ESC, ACC guidelines.

## ROLE OF ICD IMPLANTATION IN 'HEART FAILURE' PATIENTS:

The two main reasons of cardiovascular death in HF patients are progressive pump failure and VA resulting in sudden cardiac death (SCD).<sup>2</sup> There is sufficient data on the usefulness of ICD in aborting sudden cardiac arrest (SCA) due to VA and improving survival in heart failure population. Therefore, most guidelines recommend ICD as a class IA indication for "secondary prevention" when there is no reversible cause and an expected survival of more than 1 year, in patients with good functional status.<sup>3</sup> Role of ICD in primary prevention in HF patients is complex and significantly depends on the underlying heart disease. Although existing guideline give class 1 recommendation for ICD implantation in patients with LVEF  $\leq$  0.30 (despite optimal medical treatment), NYHA class  $\geq$  II and a predicted survival of more than 1 year. DANISH trial and some European registries have shown differential benefit of ICD in ischemic versus non ischemic etiology.<sup>4-6</sup> In the recent years, the newer heart failure drugs (ARNI, SGLT-2 inhibitor), have shown a further reduction in mortality and SCD in heart failure patients. The role of ICD for primary prevention, especially in non-ischemic cardiomyopathy (NICM) needs to be re-addressed with the current heart failure pharmacotherapy.<sup>7</sup> In ischemic heart disease, the threshold for prescribing ICD as primary prophylaxis is lower, especially with additional risk factors like non-sustained VT on Holter or unexplained syncope. There is emerging data on additional risk markers for SCD like scar burden on cardiac magnetic resonance (CMR) imaging and possibly genetic testing. However, these tools need to be further assessed by larger clinical trials. As clinicians we need to customize therapy for our patients based on what is recommended by the current guidelines and address clinical situations not clarified by these documents. Socio-economic challenges and available expertise to deliver such therapy also influence the penetration of device therapy in HF patients.

Below is our customized approach in device implantation in the Indian 'heart failure' patient:

### ICD indications in 'heart failure':

1. Survivor of SCA due to ventricular tachycardia (VT)/ventricular fibrillation (VF).
2. Sustained VT.
3. Previous myocardial infarction (MI), LVEF  $<$  0.35 plus high grade ventricular ectopy or non-sustained VT or unexplained syncope.
4. Electrophysiology (EP) study inducing VT in patients with previous MI and LVEF  $<$  0.40
5. Non-ischemic cardiomyopathy with LVEF  $<$  0.30 (despite optimal medical therapy) in (a) young patients ( $<$  60 years age), b) those awaiting heart transplant or (c) CMR imaging showing high myocardial fibrosis/scar burden.

### When should ICD not be considered in 'heart failure' patients?

1. Primary prophylaxis ICD should not be considered before optimization of heart failure pharmacotherapy.
2. Primary prophylaxis ICD should not be considered in patients with potentially reversible causes of heart failure like ischemia, tachycardiomyopathy, nutritional/metabolic deficiency etc.
3. In irreversible (un-correctable) end-stage heart failure.
4. During a VT storm (more than 3 episodes of hemodynamically unstable VT requiring electric cardioversion/defibrillation in 24 hours).
5. Life expectancy less than 6 months

## ROLE OF BI-VENTRICULAR PACING IN 'HEART FAILURE' PATIENTS:

Cardiac resynchronization therapy (CRT) has improved the outcomes of patients with LBBB and moderate to severe heart failure. Nearly 15-30% of HFrEF patients have LBBB and intraventricular conduction delay which results in ventricular dyssynchrony and significantly contribute to LV dysfunction and heart failure.<sup>8</sup>

Current guidelines recommend CRT pacemaker as class 1 indication in patients with symptomatic, HFrEF (EF  $<$  0.35), having LBBB and QRS width  $>$  150 ms, despite optimal medical treatment.<sup>3</sup>

By current criteria many of CRT eligible patient also fulfil criteria for ICD and make them candidates for CRT-D. However, ICD implantation for primary prevention in addition to CRT is under scrutiny with the recent advancement in pharmacotherapy (ARNI, SGLT-2 inhibitor). These drugs have shown to reduce the risk of SCD by 44%.<sup>9</sup> CRT also promotes favorable reverse remodeling and has the potential to reduce the risk of SCD in heart failure patient.<sup>10</sup> Additionally, non-sudden deaths are primary cause of mortality in HFrEF patients treated with CRT-P. Therefore an additional ICD might not be useful in 'all' patients requiring CRT pacemaker.<sup>11,12</sup>

## CRT pacemaker implantation indications in 'heart failure':

1. Symptomatic, HFrEF with LVEF < 0.35, despite optimal medical therapy in patients with typical LBBB (QRS width > 150 ms).
2. Echocardiographic evidence of dyssynchrony in patients with symptomatic HFrEF (LVEF < 0.35) and LBBB but with a QRS width of 130-150 ms

## Candidates likely to be responders or super-responders to CRT-P

1. Non-ischemic cardiomyopathy
2. Female gender
3. Hypertensive heart disease
4. ECG characteristics of (a) typical LBBB (b) sinus rhythm (c) QRS width > 150 ms

## ICD indications in 'heart failure', in addition to CRT (CRT pacemaker with defibrillator – CRT-D)

1. Survivor of SCA
2. Spontaneous sustained or non-sustained VT
3. EP induced VT
4. Past MI (and scar) with indications for CRT pacemaker
5. CMR showing significant myocardial fibrosis

EHRA guidelines favor CRT-P only implantation in HFrEF patients with NYHA class III/IV, severe renal insufficiency or other major co-morbidities including frailty and cachexia. CRT-D is only recommended in patients with NYHA functional class II, ischemic heart disease, LVEF < 0.30 and no major co-morbidities with expected life expectancy > 1 year.

## CHALLENGES IN INDIAN SCENARIO:

**a) Lack of health awareness:** The PANARM HF registry showed that only 25% of patients who needed to be referred to an interventional cardiologist were actually referred. Moreover, half the HF patients were in advanced HF stage C or D.<sup>13</sup>

**b) Poor affordability/ scarcity of funds:** The South Asian Systolic Heart Failure Registry (SASHFR) showed that only 24.6% of the eligible patients for CRT-P/CRT-D opted for the device during the 2-year study duration and financial constraints was the most important reason for refusal.

**c) Attrition rate/ lost to follow up:** one of the major challenge is regular follow up. Many patients do not follow-up regularly and many are not referred to higher centers in a timely period to benefit from advanced heart failure treatment like devices and heart transplant.

**d) Lack of data for Indian patients:** lack of contemporary, robust data in Indian heart failure patients also contribute to poor understanding of the lacunae in management and optimal use of advanced HF therapy, including devices and heart transplant.

## CONCLUSION:

Cardiac implantable electronic devices like ICD and CRT have improved the outcomes of many heart failure patients. Primary prophylaxis ICD should be considered in patients with MI and scarred myocardium. ICD should not be considered in elderly patients with end-stage heart failure or during a VT storm. CRT pacemaker should be considered only in patients with persistent LV dysfunction despite at least three months of optimization with contemporary heart failure pharmacotherapy including ARNI, SGLT2 inhibitors, beta blockers and aldosterone antagonists. Appropriate selection criteria predicts responder rates to CRT devices. ICD along with CRT (CRT-D) should be used for IHD patients and those with VA. Left bundle branch area pacing in place or in conjunction with CRT pacemaker is being studied for LBBB and LV dysfunction patients. Evaluation for suitability of ICD and CRT devices should be done for all patients before considering left ventricular assist devices and or heart transplant.

## Bibliography:

1. Chaturvedi V, Parakh N, Seth S, Bhargava B, Ramakrishnan S, Roy A et al. Heart failure in India: The INDUS (INDia Ukieri Study) study. *J Pract Cardiovasc Sci* 2016;2:28-35.
2. Connolly SJ, Hallstrom AP, Cappato R, Schron EB, Kuck KH, Zipes DP et al. Meta-analysis of the implantable cardioverter defibrillator secondary prevention trials. AVID, CASH and CIDS studies. Antiarrhythmics vs Implantable Defibrillator study. Cardiac Arrest Study Hamburg. Canadian Implantable Defibrillator Study. *Eur Heart J*. 2000;21:2071–8.
3. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JG, Coats AJS et al. 2016 ESC guidelines for the diagnosis and treatment of acute and chronic heart failure: The task force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. *Eur J Heart Fail*. 2016;18:891– 975.
4. Tang AS, Wells GA, Talajic M, Arnold MO, Sheldon R, Connolly S et al. Cardiac resynchronization therapy for mild-to-moderate heart failure. *N Engl J Med*. 2010;363:2385–95.
5. Moss AJ, Hall WJ, Cannom DS, Klein H, Brown MW, Daubert JP et al. MADITCRT Trial Investigators. Cardiac-resynchronization therapy for the prevention of heart-failure events. *N Engl J Med*. 2009;361:1329–38.
6. Cleland JGF, Daubert JC, Erdmann E, Freemantle N, Gras D, Kappenberger L et al. The effect of cardiac resynchronization on morbidity and mortality in heart failure. *N Engl J Med*. 2005;352:1539–49.
7. Young JB, Abraham WT, Smith AL, Leon AR, Lieberman R, Wilkoff B et al. Combined cardiac resynchronization and implantable cardioversion defibrillation in advanced chronic heart failure: the MIRACLE ICD trial. *JAMA*. 2003;289:2685–94.
8. Shamim W, Francis DP, Yousufuddin M, Varney S, Pieopli MF, Anker SD et al. Intraventricular conduction delay: a prognostic marker in chronic heart failure. *Int J Cardiol*. 1999 Jul 31;70(2):171–178.
9. Shen L, Jhund PS, Petrie MC, Claggett BL, Barlera S, Cleland JGF et al. Declining risk of sudden death in heart failure. *N Engl J Med*. 2017;377:41–51.
10. Linde C, Gold MR, Abraham WT, St John Sutton M, Ghio S, Cerkenvenik J et al. Long-term impact of cardiac resynchronization therapy in mild heart failure: 5-year results from the REsynchronizationREVersesRemodeling in Systolic left vEntricular dysfunction (REVERSE) study. *Eur Heart J* 2013;34:2592–9.
11. Barra S, Providencia R, Duehmke R, Boveda S, Begley D, Grace A et al. Cause-of-death analysis in patients with cardiac resynchronization therapy with or without a defibrillator: a systematic review and proportional meta-analysis. *Europace*. 2018;20:481–91.
12. Schrage B, Lund L H, Melin M, Benson L, Uijl A, Dahlström U et al. Cardiac resynchronization therapy with or without defibrillator in patients with heart failure. *EP Europace*. 2022;24:48–57.
13. Vora A, Naik A, Lokhandwala Y, et al. Profiling cardiac arrhythmia and heart failure patients in India: the Pan-arrhythmia and Heart Failure Observational Study. *Indian Heart J*. 2017; 69: 226-239.

#### **PRESIDENT**

DR V NANDAKUMAR  
Mob: 9843015888  
Email: [drvnandakumar@gmail.com](mailto:drvnandakumar@gmail.com)

#### **PRESIDENT ELECT**

DR RONY MATHEW  
Mob: 9846097812  
Email: [drronymathew@yahoo.com](mailto:drronymathew@yahoo.com)

#### **VICE PRESIDENTS**

DR JULIUS PUNNEN  
Mob: 9980072785  
Email: [jpunnen@hotmail.com](mailto:jpunnen@hotmail.com)

DR AJITKUMAR V K  
Mob: 9895153684  
Email: [ajitkumarvk@yahoo.com](mailto:ajitkumarvk@yahoo.com)

#### **SECRETARY**

DR JABIR ABDULLAKUTTY  
Mob: 9447011773  
Email: [drjabi@yahoo.co.in](mailto:drjabi@yahoo.co.in)

#### **JOINT SECRETARY**

DR RAJAGOPAL S  
Mob: 9747606600  
Email: [srajagovindam@gmail.com](mailto:srajagovindam@gmail.com)

#### **TREASURER**

DR PRAVEEN G PAI  
Mob: 9847334434  
Email: [praveen.pai.g@gmail.com](mailto:praveen.pai.g@gmail.com)

#### **PAST PRESIDENTS**

DR GEEVAR ZACHARIAH  
(2013-2014 and 2014-2015)  
Mob: 9846066816  
Email: [geevarzachariah@gmail.com](mailto:geevarzachariah@gmail.com)

DR SHIV K NAIR (2015-2016)  
Mob: 9846010220  
Email: [Shivnairmd@gmail.com](mailto:Shivnairmd@gmail.com)

DR K VENUGOPAL (2016-2017)  
Mob: 9847005444  
Email: [venugopalknair@gmail.com](mailto:venugopalknair@gmail.com)

DR JOSE CHACKO PERIAPURAM (2017-2018)  
Mob: 9847043224  
Email: [joseperiapuram@hotmail.com](mailto:joseperiapuram@hotmail.com)

DR P P MOHANAN (2018-2019)  
Mob: 9846076006  
Email: [drppmohan@yahoo.com](mailto:drppmohan@yahoo.com)

#### **MEMBERS**

DR C G BAHULEYAN  
Mob: 9447344882  
Email: [bahuleyan2001@yahoo.co.uk](mailto:bahuleyan2001@yahoo.co.uk)

DR P CHANDRASEKHAR  
Mob: 9443047152  
Email: [chanpad@gmail.com](mailto:chanpad@gmail.com)

DR COL JAMES THOMAS  
Mob: 9892797060  
Email: [thomasdrjames@yahoo.in](mailto:thomasdrjames@yahoo.in)

DR JACOB ABRAHAM  
Mob: 9847128123  
Email: [jacobraham1@gmail.com](mailto:jacobraham1@gmail.com)

DR JAYAGOPAL P B  
Mob: 9847023777

Email: [jaigopallakshmi@gmail.com](mailto:jaigopallakshmi@gmail.com)

DR KARTHIK VASUDEVAN  
Mob: 9845281450  
Email: [karvasudevan@gmail.com](mailto:karvasudevan@gmail.com)

DR C S HIREMATH  
Mob: 9481119646  
Email: [hiremath.cs@sss.hms.org.in](mailto:hiremath.cs@sss.hms.org.in)

DR MANOJ DURAIRAJ  
Mob: 9822322072  
Email: [manojdurairaj@hotmail.com](mailto:manojdurairaj@hotmail.com)

DR RAJESH RAMANKUTTY  
Mob: 9846005737  
Email: [drrajesh\\_mr@yahoo.com](mailto:drrajesh_mr@yahoo.com)

DR V K CHOPRA  
Mob: 9560898900  
Email: [chopravk@gmail.com](mailto:chopravk@gmail.com)

DR TALHA MEERAN  
Mob: 9167048815  
Email: [talha.meeran@gmail.com](mailto:talha.meeran@gmail.com)