

Healthy Heart



The Heart Care Clinic

Care Cardiovascular Consultants

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The Dashing Doctors (DD) team of Western India are getting ready to bowl to Dr. Ajay Naik, Interventional Cardiac Electrophysiologist, who is padding up to face the bouncers in the Healthy Heart T20 world cup.

The doyen of Indian cricket, Mr. Sunil Gavaskar, had remarked that Specialist opening batsmen are a special breed with special skills. Similarly, Cardiac Electrophysiologists are a breed of superspecialist Cardiologists. They tackle the bouncers of complicated arrhythmias and advanced heart failure. Dr. Naik is the opening batsman for the Heart Care Clinic (HCC) team of Ahmedabad.



Focus on Arrhythmia & HF Management

Dr. Ishant from Bhuj bowls the 1st over for DD: Which patients should be suspected of having arrhythmias?

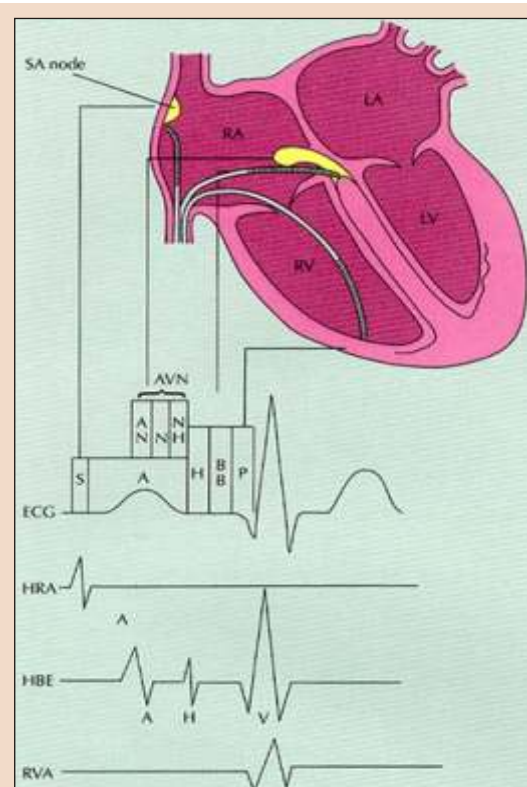
Dr. Ajay Naik: Following symptoms should prompt the suspicion of arrhythmias:

1. Palpitations (uncomfortable awareness of heart beats, rapid heart beats)
2. Pre-syncope (giddiness, feeling faint)
3. Syncope (fainting, unexplained falls, spells of unconsciousness, sudden LOC)
4. Sudden Cardiac Arrest survivors

2nd over Dr. Zaheer from Jamnagar: What is done during Electrophysiology (EP) study?

Dr. Ajay Naik:

1. Special electrode catheters (like temporary pacing leads but with multiple electrodes) are introduced through Femoral or Jugular accesses under local anesthesia.
2. These are introduced into different chambers of the heart (RA, RV, Coronary Sinus, Bundle of His, LA, LV).
3. Two-six catheters may be required



during the procedure (depending on type of arrhythmias).

4. Electrograms (Intracardiac electrical signals) are recorded from these sites and displayed on the computerized EP system at high speeds (300 mm/second).



5. Electrical impulses are delivered from the EP system through the catheters to the heart to stimulate, induce and terminate arrhythmias.
6. Various maneuvers are performed and the abnormal focus or pathway is localized.

3rd over Dr. Sreesanth from Rajkot: What is Radiofrequency Ablation (RFA)?

Dr. Ajay Naik:

1. EPS is performed to diagnose the problem, whereas RFA is done to treat it (analogy-Coronary Angiography for diagnosis and Angioplasty for treatment).
2. In most cases, it is just continuation of the EPS and performed at the same sitting.
3. After localizing the abnormal focus or pathway, radiofrequency energy is passed through the catheter to cause coagulative necrosis of the tissue by resistive heating at the catheter tip.
4. This permanently cures the arrhythmia.

4th over Dr. Harbhajan from Baroda: What are the benefits of EPS and RFA?

Dr. Ajay Naik:

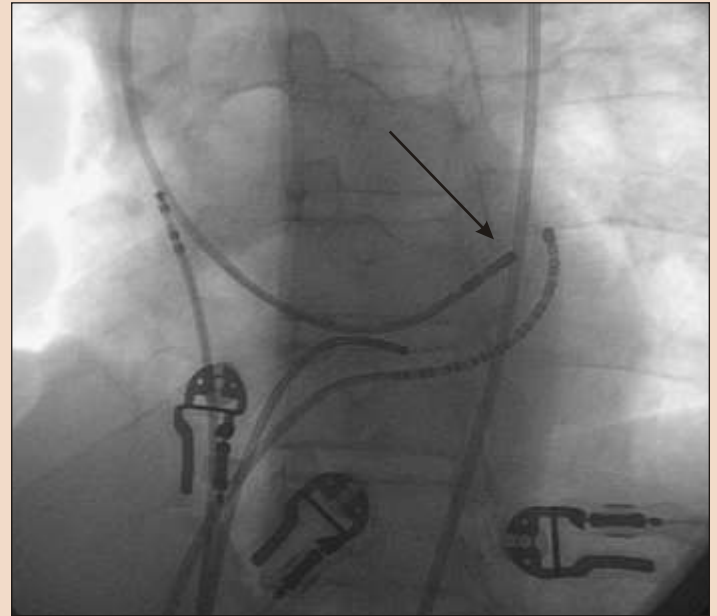
1. RFA provides permanent cure from the arrhythmia.
2. In most cases, it avoids a lifetime of medications or antiarrhythmic drugs.
3. The patient can lead a normal life. The patient is free from repeated episodes, uncomfortable symptoms, psychological stress of impending palpitations and in some cases, hemodynamic compromise.
4. In SCA survivors or unexplained syncope, a firm diagnosis is achieved.

5th over Dr. Anil from Surat: Which arrhythmias can be treated by RFA?

Dr. Ajay Naik:

1. Supraventricular arrhythmias such as AVNRT, AVRT due to WPW syndrome or concealed accessory pathways, Ectopic atrial tachycardia, atrial flutter, certain cases of Atrial fibrillation
2. Ventricular Tachycardias such as RVOT tachycardia, Fascicular tachycardias, Bundle-branch reentrant tachycardias, certain cases of ischemic VT
3. In certain arrhythmias where absolute cure is not possible (such as chronic Atrial Fibrillation and multiple morphologies of Ventricular Tachycardia), EPS and RFA can be utilized to decrease the burden of arrhythmias which makes the management easier.

4. Some arrhythmias can be managed with hybrid therapy of RFA combined with device therapy (e.g. AV node ablation and pacemaker implantation for chronic AF).



Ablation catheter (Arrow) in lateral mitral annulus during EPS and RFA for WPW syndrome

6th over Dr. Yusuf from Himmatnagar-Idar: What is the success rate?

Dr. Ajay Naik:

1. The success rate depends on the type of arrhythmia and is more than 95% in most SVTs.
2. In Idiopathic VTs, the success rate is 80 - 90%.
3. In ischemic VT, the success rate is 50-70%, specialized mapping techniques may be needed.
4. In Atrial Fibrillation, the success rate is 50-80%, patient may require multiple procedures.

7th over Dr. Irfan from Ratlam: What is the recurrence rate?

Dr. Ajay Naik:

1. After successful ablation, the recurrence rate in supraventricular arrhythmias is less than 2 - 5 %.
2. Usually, the recurrences are of benign nature and can be easily managed with medications.
3. In most of these cases, re-ablation can be performed successfully.
4. In ventricular arrhythmias, the recurrence rate is 10 - 20 % (depending on type of arrhythmia).
5. Usually, these VTs can be managed with medications. In some cases, re-ablation may be performed.
6. Chronic AF patients may require multiple procedures because of the diseased and enlarged Left Atrium.



EPS and RFA for WPW syndrome:

Delta wave disappears during Radiofrequency energy (Arrow). The QRS is narrow and normal after the Accessory Pathway conduction is abolished. The patient is cured of his arrhythmias permanently from this point of time and does not require any further medications for this problem.

8th over Dr. Pragyan from Udaipur: Is EPS and RFA safe?

Dr. Ajay Naik:

1. EPS and RFA are “invasive” procedures requiring insertion of catheters in the body. Thus, there is some risk involved. However, this risk is small (less than 1 %).
2. In 2 - 4% of WPW syndrome patients, the accessory pathway may be paraHisian (close to AV node and Bundle His). In such cases, there is a risk of AV block and RF ablation is a considered decision. A better option is cryomapping, which is a reversible form of mapping and cryoablation by cooling the tissue instead of heating it.
3. Hemopericardium can occur which is promptly treated with Pericardiocentesis.
4. Occasional cases may have local vascular problems (such as hematoma) at the groins at site of skin puncture for catheter insertion.

9th over Dr. Piyush from Mehsana: What is the cost of the procedure?

Dr. Ajay Naik:

1. Cost is approximately Rs. 40,000/- (all inclusive in the economy package).
2. Consideration is always given for poor, deserving patients.
3. Certain procedures may require different catheters and sheaths, hence the cost may be higher.
4. Certain procedures need to be performed with specialized mapping systems, so the cost is accordingly higher.

10th over Dr. Murli from Bhavnagar: What are the specialized mapping systems?

Dr. Ajay Naik:

1. In patients with structural heart disease (enlarged chambers, post MI scars, valvular disease, Post-cardiac surgery arrhythmias, ARVD) mapping of arrhythmias using the conventional EP system has its limitations.
2. In these cases, the anatomy of the heart is recreated on special 3-Dimensional mapping systems (BIOSENSE CARTO / NAVIX) during EPS.
3. The arrhythmias are mapped and their relation to the heart topology is determined.
4. Radiofrequency ablation is then performed with guidance of the 3-D images of the heart with higher success rate.
5. Mapping of scars in Post MI patients and Post cardiac surgery arrhythmias help in determining the nature of arrhythmias and their treatment.
6. Special ablation catheters (8mm ablation tip, Cool Tip perfusion catheters) or special energy (Cryoablation) are required for ablation in certain cases.

As all the preceding 10 overs went for 4s and 6s, the innings was closed early and the roles reversed. Now, the questions were from HCC team, to be defended by the DD team in Healthy Heart T20 world cup.

Dr. Keyur Parikh of the HCC team bowls the

1st over: What are the goals of Heart Failure (HF) therapy?

Dr. Sachin from Surendranagar:

1. Improvement in symptomatic status and quality of life
2. Reduction in morbidity and hospitalizations
3. Prevention or retardation of progression of HF
4. Reduction in mortality



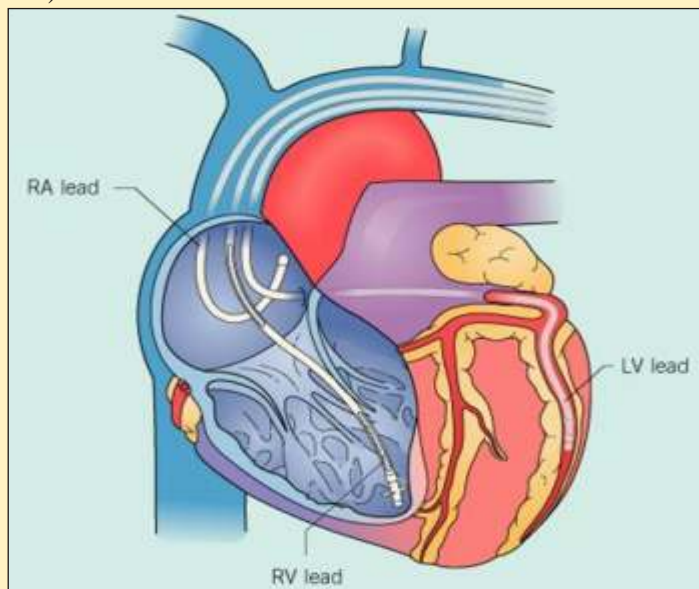
2nd over Dr. Milan Chag: How to optimize the medications in a Heart Failure patient?

Dr. Virender from Junagadh: Optimal pharmacological therapy (OPT) of CHF has assumed a new meaning over the past two decades. Apart from conventional drugs such as Digoxin, a CHF prescription would now incorporate all or some of the following:

1. Beta blockers (Carvedilol or sustained release Metoprolol succinate)
2. ACE inhibitors or ARBs
3. Spironolactone
4. Antiplatelet and/or anticoagulation
5. Statins
6. Diuretics

3rd over Dr. Hemang Baxi: For symptomatic patients despite OPT, what can be offered?

Dr. Rahul from Neemuch: One technological and conceptual advancement has radically changed therapy of HF - **Cardiac Resynchronization Therapy (CRT)**. CRT is a specialized pacemaker with 3 leads that provide **Atrial Synchronous Biventricular Pacing (RA, RV, LV)**.



4th over Dr. Urmil Shah: What is cardiac dyssynchrony?

Dr. Laxman from Jaisalmer:

1. In dyssynchrony, there is abnormal pattern of LV activation and uncoupling of atrial and ventricular systole.
2. The LV normally contracts synchronously with little more than 40 ms variation with the onset of electrical activation throughout the LV wall. This results in

effective and energetically efficient ejection.

3. In patients with LBBB, IVCD or broad QRS, a portion of the heart is stimulated late, generating regions of both early and delayed contraction.
4. Early contraction results in wasted work because intracavitary pressure is still low and no ejection is occurring. Late activation of the region remote to the early site occurs at higher stress, and also results in wasted work because the early activation site now undergoes paradoxical stretch.
5. The net result is a decline in systolic function of about 20% with reduced cardiac output, increased end systolic volume and wall stress, delayed relaxation and decline in efficiency.
6. The AV time delay is also critical - too short or long AV interval results in sub-optimal chamber filling and contributes to mitral regurgitation.

5th over Dr. Anish Chandarana: What are the hemodynamic effects of CRT?

Dr. Saurav from Bardoli: Optimal CRT effect results in:

1. Markedly improved cardiac output
2. Increased systolic pressure
3. Lower pulmonary wedge pressure
4. Enhanced ventricular systolic function as assessed by maximal rate of pressure rise and pressure volume loops
5. Improved magnitude and synchrony of wall contraction
6. Systolic function improvement while concomitantly reducing myocardial energy consumption, resulting in improved chamber efficiency

6th over Dr. Satya Gupta: How would you identify the CHF patients that are likely to respond to CRT?

Dr. Gautam from Patan: Patients in NYHA Class III or IV (ambulatory) should be evaluated for the following indicators:

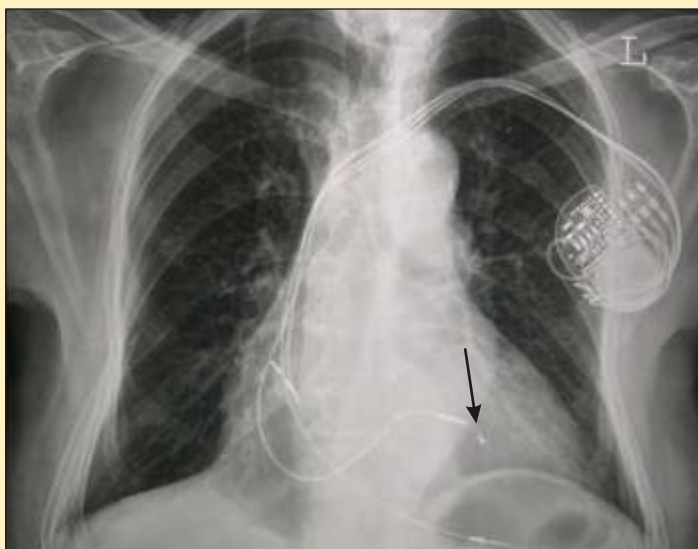
1. QRS duration > 120 ms (>3 mm on a 25 mm/second ECG strip) especially (but not exclusively) with LBBB pattern
2. Intraventricular dyssynchrony as measured by delay in maximal excursion of IV septum vs. LV posterior wall (>130 ms) on M-mode echocardiography
3. Interventricular dyssynchrony as measured by Pre-ejection time difference between Pulmonary and Aortic valve opening (>40 ms)
4. Newer echocardiographic imaging techniques such as Tissue tracking are also used to evaluate dyssynchrony.

Choosing an ideal candidate to benefit from CRT is the key issue and a point of much debate. Echo criteria may be difficult to measure and reproduce. As a general guide, **any patient in CHF Class III / ambulatory class IV with a broad QRS should be evaluated for the need for CRT.**

7th over Dr. Joyal Shah: How is CRT implanted?

Dr. Yuvraj from Amreli: CRT being a specialized pacemaker, its implantation is similar but technically more demanding due to the distorted anatomy and critical hemodynamic status of the patients.

1. The RA, RV and Coronary venous lead system (this stimulates the LV epicardially) are introduced via the Subclavian vein.
2. The RA lead is implanted in the high lateral RA to sense the atrial depolarization with the least possible delay.
3. The RV lead is deployed in the RV apex or mid-IV septum.
4. The LV lead ought to reach the target site (often lateral cardiac wall), maintain lead stability after placement and provide acceptable pacing thresholds.
5. LV preexcitation optimally offsets the LV lateral wall region with greatest basal delay in activation. It may also help ameliorate MR by pre-stimulating the papillary muscle.
6. In the occasional patient, the LV lead may need to be implanted surgically by epicardial approach and then tunneled through the subcutaneous tissue to the pacemaker pocket.



CRT pulse generator with RA, RV and LV (arrow) leads. Note the enlarged heart shadow.

8th over Dr. Mihir Tanna: How do you optimize the functioning parameters of CRT?

Dr. Virat from Chittorgarh:

1. The device is interrogated and pacing parameters are adjusted.
2. The ECG appearance may show a dramatic narrowing of QRS complex after Atrial synchronous Biventricular Pacing. However, absence of narrowing does not preclude achievement of resynchronization.
3. The LV-RV offset parameter is used to achieve intraventricular synchrony and best systolic contraction pattern of the LV.
4. The AV interval is adjusted to allow maximal atrial contribution to LV filling (diastolic function).

9th over Dr. Ravi Singhvie: Are you aware of any mortality or morbidity data of CHF from Clinical Trials of CRT?

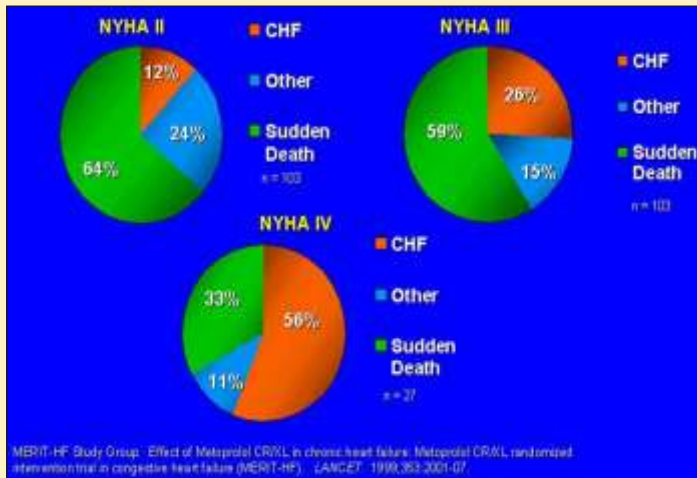
Dr. Mahendra from Surendranagar:

1. 1995 PATH-CHF study
2. 1997 InSync Study
3. 1998 **Multicenter InSync Randomized Clinical Evaluation (MIRACLE)** (453 pts) and **Multisite Stimulation in Cardiomyopathy (MUSTIC)** studies (131 pts) with NYHA Class III or IV symptoms on OPT were subjected to CRT. There was significant improvement in six-minute walk, Functional class, QOL score and LVEF.
4. 2000 **Cardiac Resynchronization in Heart Failure (CARE-HF)** (813 pts). All-cause mortality or unplanned hospitalization for a cardiovascular event occurred in significantly fewer patients in the CRT group as compared with the medical therapy group (34% risk reduction).

10th over Dr. Jayesh Bhanushali: What is a combo device?

Dr. Parthiv from Gandhinagar: In common parlance, CRT with Defibrillator (CRT-D) is called a combo device.

1. The landmark MERIT-HF trial showed that in NYHA Class IV, the dominant cause of death was progressive pump dysfunction and worsening CHF.
2. However, in NYHA class II pts, the major proportion of mortality was Sudden Cardiac Death (SCD), presumably due to VT/VF.
3. Incorporating Defibrillation capacity to biventricular pacing (CRT-D) is likely to prevent SCD in HF patients.
4. The current generation devices are also capable of being monitored by remote wireless monitoring from around the world via satellite communication.



As both teams scored very well with 4s and 6s, the match was tied. The Superover question was the match decider:

Superover: What are CRT devices with Fluid sensors?
Both DD and HCC teams answer simultaneously:

1. A new proprietary technology incorporates sensors in the CRT device to measure transthoracic impedance, a surrogate marker for the amount of fluid in the lungs.
2. Air filled, dry lungs result in a high transthoracic impedance value. Wetter, fluid filled lungs give a lower value. A gradual fall in the impedance correlates with progressive fluid overload in the lungs.
3. At a certain level, the device is programmed to initiate an alert that can be detected by a hand held external device that communicates with the CRT device.
4. With this technology, it is possible to predict need for hospitalization due to HF up to two weeks in advance and Physicians can prevent hospitalization by early institution of appropriate therapy.

Summary:

The past two decades have witnessed major initial strides in the modern management of heart failure. There has been a great paradigm shift-whereas beta blockers were the first drugs to be taken off a prescription of HF patient, now they are at the top of the list for morbidity and mortality reduction in these patients. **Cardiac Resynchronization Therapy has been the single most important advancement that has changed the natural history of the CHF disease.** The coming era heralds the arrival of major advancements in device therapy of heart failure patients.

Quiz of the month

1. **What is an electrogram?**
A. Surface record of cardiac impulse
B. Intracardiac electrical impulse record
C. Abbreviation of Electrocardiogram
D. Machine to perform EP study
2. **What is the normal HV interval?**
A. < 35 ms B. 35 - 55 ms
C. 55 - 75 ms D. >75 ms
3. **RF ablation can be used to treat:**
A. SVT B. VT
C. AF D. All of the above
4. **The likely cause of Sudden Cardiac Arrest in a patient with LV dysfunction is:**
A. Acute ischemia
B. Orthostatic hypotension
C. Ventricular Tachycardia
D. Atrial Fibrillation
5. **In a patient with unexplained syncope, EPS may help diagnose the following cause:**
A. InfraHisian conduction disease
B. Ventricular Tachycardia
C. SVT with rapid rates and hypotension
D. All of the above
6. **CRT can be considered for HF therapy in patients with:**
A. Dilated Cardiomyopathy
B. Coronary Artery Disease with LV dysfunction
C. Post-CABG status
D. All of the above
7. **Current generation CRT-D devices contain capability of:**
A. Pulmonary artery pressure measurement
B. Drug delivery via the leads
C. Remote wireless monitoring
D. MRI safe technology
8. **Successful CRT therapy may result in:**
A. Narrowing of QRS on ECG
B. Reduction of Mitral Regurgitation on echo
C. Regression of LV volume and size
D. All of the above
9. **Meta-analysis of the major CRT trials has shown:**
A. Improvement in Quality of Life
B. Reduction in Hospitalizations and Morbidity
C. Reduction in All cause mortality
D. All of the above
10. **SCA is responsible for the largest proportion of deaths in CHF patients in:**
A. NYHA Class 2 B. NYHA Class 3
C. NYHA Class 4 D. None of the above





3-C Con 2010

Annual Conference on Cardiovascular Medicine

January 8 - 10, 2010, Tagore Hall, Ahmedabad

Organizing Team

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Dr Hemang Baxi	Dr Anish Chandarana
Dr Ajay Naik	Dr Satya Gupta
Dr Guntant Patel	Dr Urmil Shah
Dr Joyal Shah	Dr Mihir Tanna
Dr Ravi Singhvie	Dr Jayesh Bhanushali

- Your presence will ensure the success of this Conference
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- Program update of 3CCon 2010 will be sent to you shortly
- You can visit www.indianheart.com for further details



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Feed Back Form

Please send your feedback and answers to the Quiz for this issue and drop it in the post box:

Name: _____
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 Contact No. (O) _____ (Mobile) _____
 Email ID: _____

- Did you like this issue? Yes No
- Did you like the Topic of the issue? Yes No
- Do you think this issue updated your academic knowledge? Yes No

Answer Sheet of the Quiz of Healthy Heart
Volume 1 Issue-7 (May-August 2009)

Question No.	A	B	C	D
Question-1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Question-2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Question-3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Question-10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Winners of January-April, 2009 Issue



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Dr. I. L. Chandelkar
MD (Medicine)
Jaora



Dr. J. D. Shah
MD
Bayad



Dr. Suresh Jain
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 - b) HIV or
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- f) Pulmonary function test (if indicated)
- g) Angiography (if indicated)

For further details and queries, contact any of our Consultant Cardiologist or The Heart Care Clinic.

Our next issue's topic for Healthy Heart will be:
"Recent Advances in Cardiopulmonary Resuscitation"
By Dr. Keyur Parikh

Quiz and Answers of January-April, 2009 Issue Anti-platelet Drugs : End of the Road or Beginning of the Era?

- 1) **B. Warfarin**
- 2) **C. 80,000**
- 3) **C. Streptokinase or Urokinase**
- 4) **D. All of the above**
- 5) **A. GP2b3a receptors**
- 6) **C. Epsilon amino caproic acid (EACA)**
- 7) **B. 23%**
- 8) **B. Heparin**
- 9) **A. Concomitant use of other antiplatelets drugs & NSAID**
- 10) **D. 1 Year or even longer in high risk patients**

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Time : 9.00 am to 5.00 pm (Monday to Saturday)

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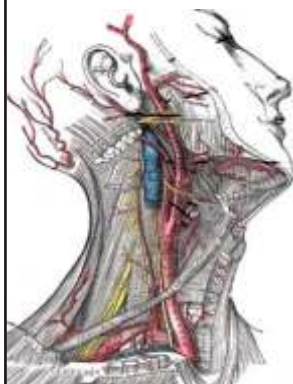
Dates of Echocardiography Course

- (A) 27-07-2009 to 01-08-2009 (Registration Full)
- (B) 28-09-2009 to 03-10-2009
- (C) 23-11-2009 to 28-11-2009

For Registration, kindly contact
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Carotid Intervention Workshop By Dr. Ashit Jain, MD (USA) (August 12-13, 2009)



Dr. Ashit Jain is a well known Carotid Interventional Specialist practicing in this field since 20 years in California, USA. He is affiliated with Washington Hospital and St. Rose Hospital in USA. He has done hundreds of carotid interventions over last few years in USA.

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