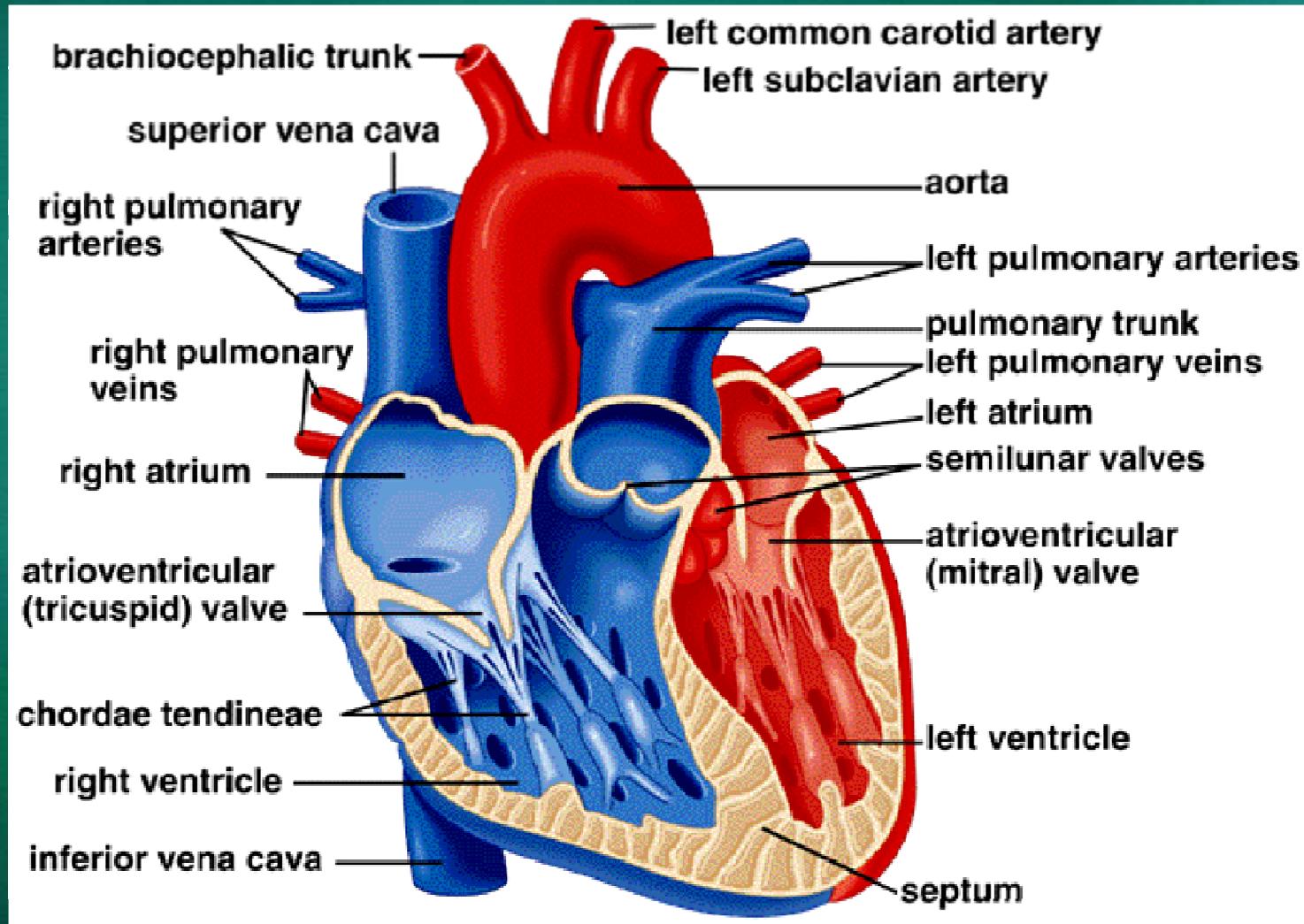


# **OVERALL CARDIOVASCULAR DISEASE INVESTIGATION AND MANAGEMENT**

Sudarat Satitthumanid, MD.

# CARDIOVASCULAR DISEASES



# CARDIOVASCULAR DISEASES

- Endocardium :
  - Valvular heart disease
  - Infective endocarditis
- Myocardium :
  - Ischemic heart disease
  - Myocarditis
  - Cardiomyopathy
- Pericardial disease
  - Pericarditis
  - Pericardial effusion
- Aortic disease :
  - Aortic aneurysm
  - Aortic dissection
- Coronary heart disease
- Congenital heart disease
- Arrhythmias
- Hypertension
- Peripheral arterial disease
  - Carotid artery stenosis
  - Renal artery stenosis
  - Extremity artery stenosis
- Miscellaneous
  - Pulmonary artery embolism
  - Deep vein thrombosis

# *Cardiovascular Investigations*

# AIMS OF INVESTIGATIONS

- FOR DIAGNOSIS
  - History + P.E. + Investigations
- FOR ASSESSMENT OF
  - DISEASE SEVERITY
  - DISEASE PROGNOSIS

# CARDIAC INVESTIGATIONS

## NON-INVASIVE

- Blood pressure measurement
- Oxygen saturation measurement
- Electrocardiogram (ECG)
- Chest X-ray (CXR)
- Laboratory testing
- 2D-3D Echocardiography
- Transesophageal echocardiography (TEE)
- Exercise stress test (EST) or Exercise treadmill test (ETT)
- Exercise stress- Echocardiographic study
- Dobutamine stress echocardiographic study
- Holter monitoring
- Tilt table test
- Carotid artery Doppler study
- Ankle-brachial index (ABI) study
- CT-angiography : coronary, pulmonary, aorta, renal artery, peripheral artery
- Cardiac MRI: rest CMR or stress CMR
- Stress cardiac nuclear study

## INVASIVE

- Coronary angiography
- Left sided cardiac catheterization
- Right sided cardiac catheterization
- Pulmonary artery, carotid artery, renal artery, extremity artery angiography
- Endomyocardial biopsy
- Electrophysiologic (EP) study

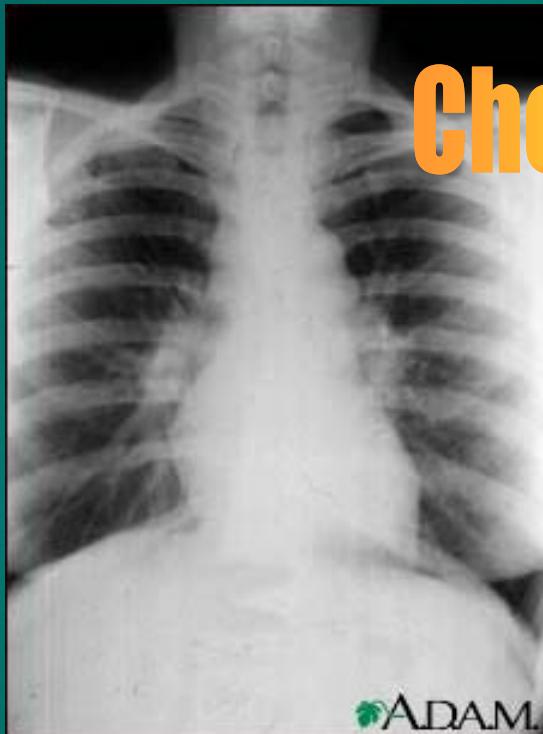
# **NON-INVASIVE INVESTIGATIONS**



# Sphygmomanometer

# Pulse Oximeter

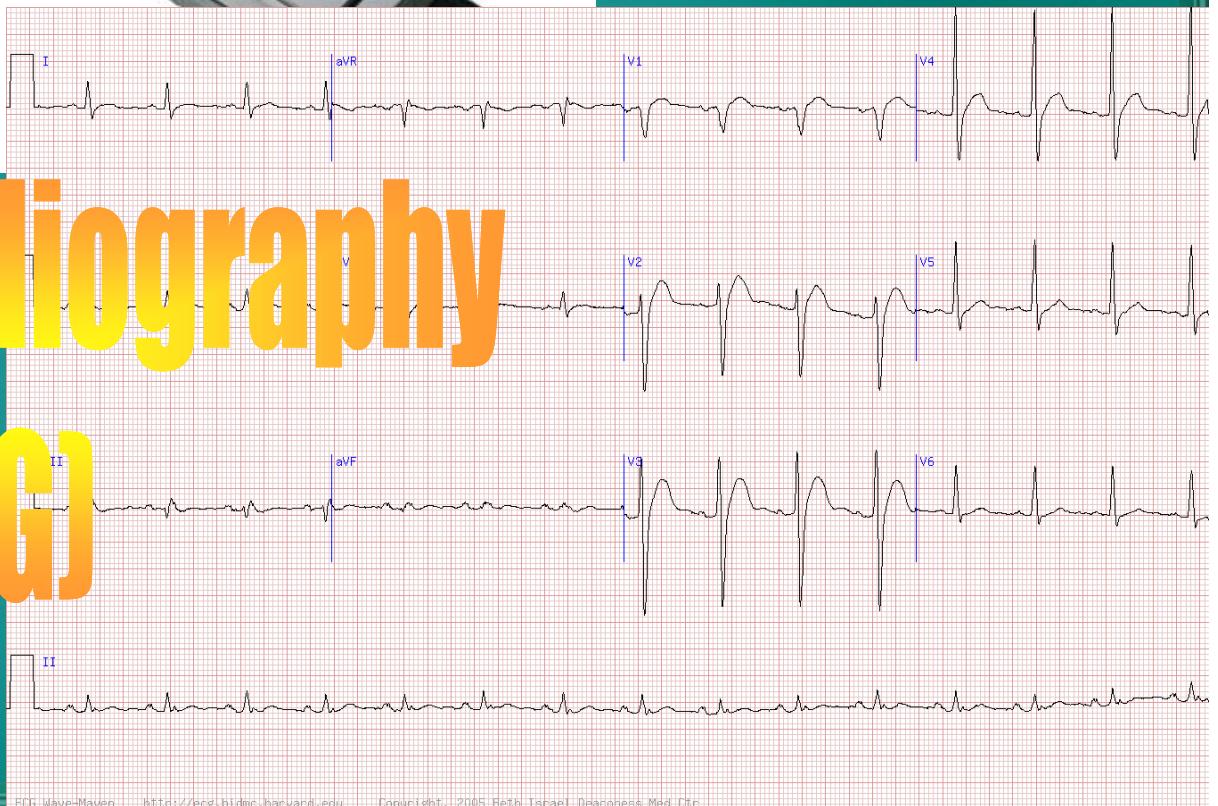


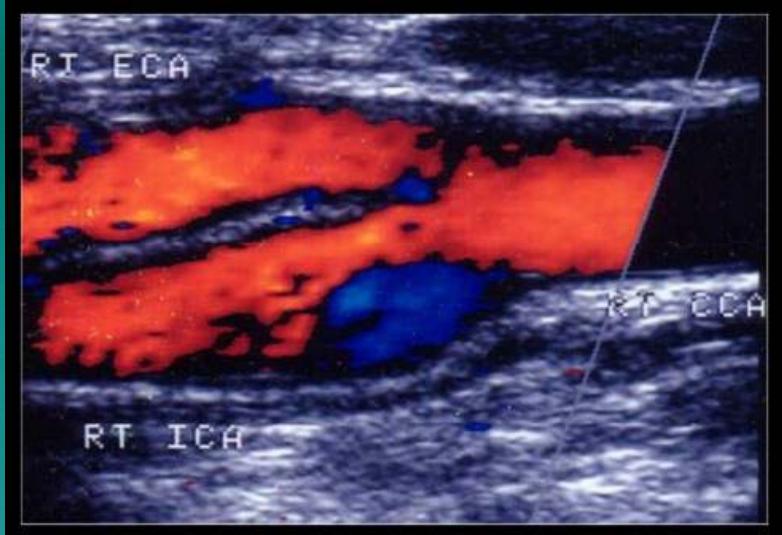


# Chest X-ray (CXR)

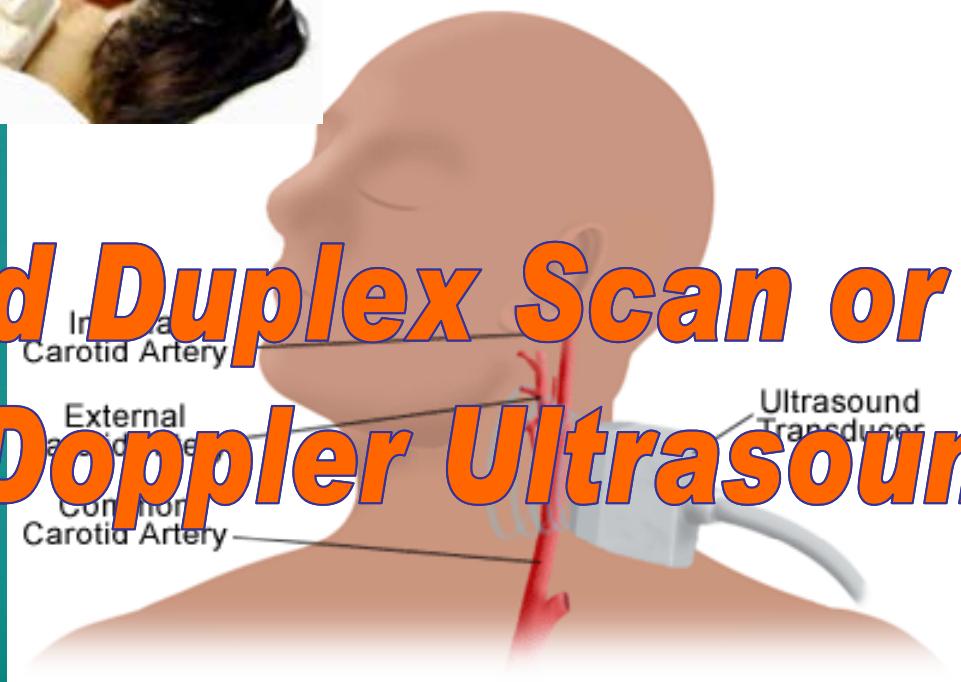


# Electrocardiography (ECG)

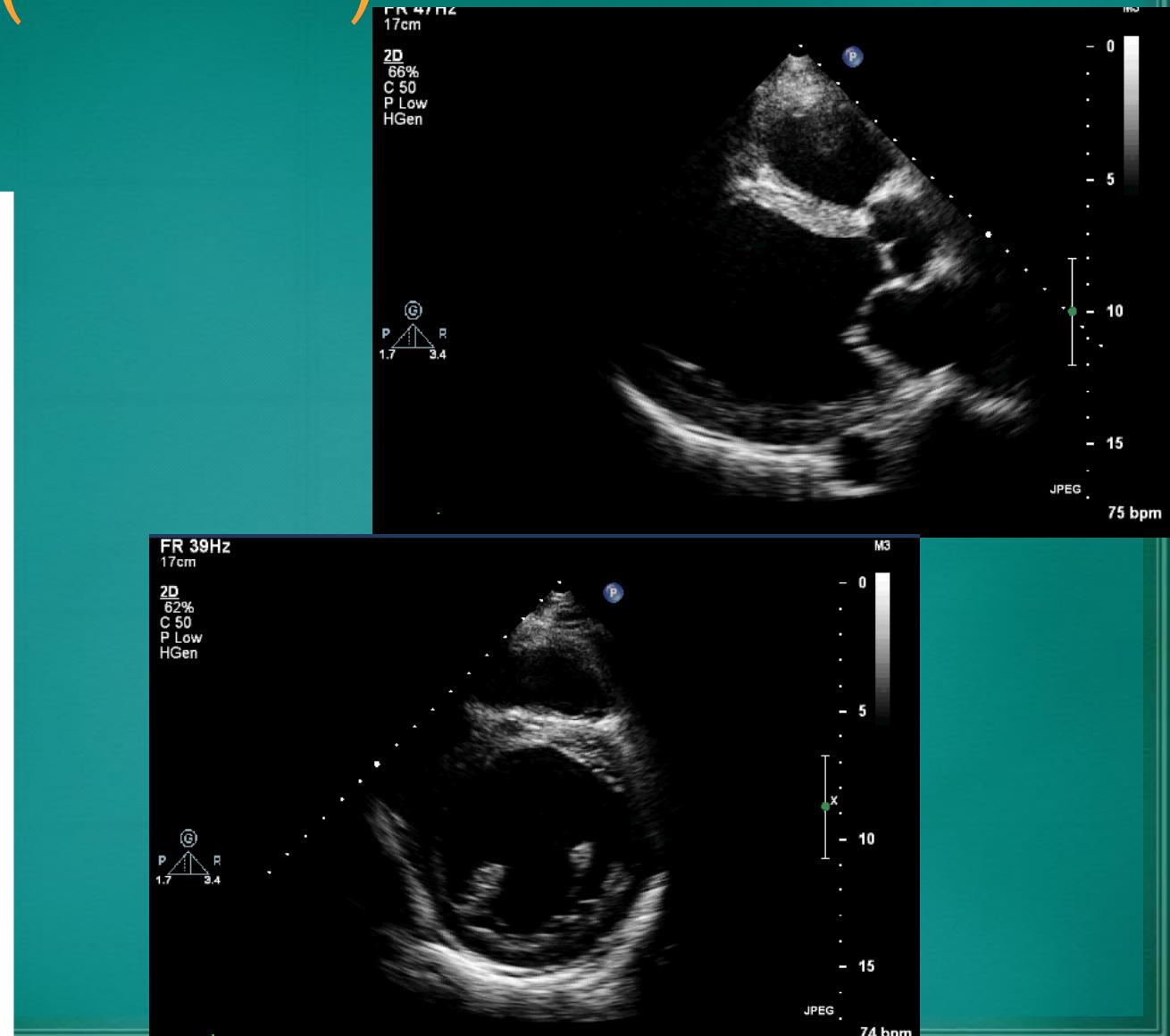




# Carotid Duplex Scan or Carotid Doppler Ultrasound



# 2Dimensional Echocardiography (2D-Echo)





# EXERCISE STRESS TEST EXERCISE TREADMILL TEST



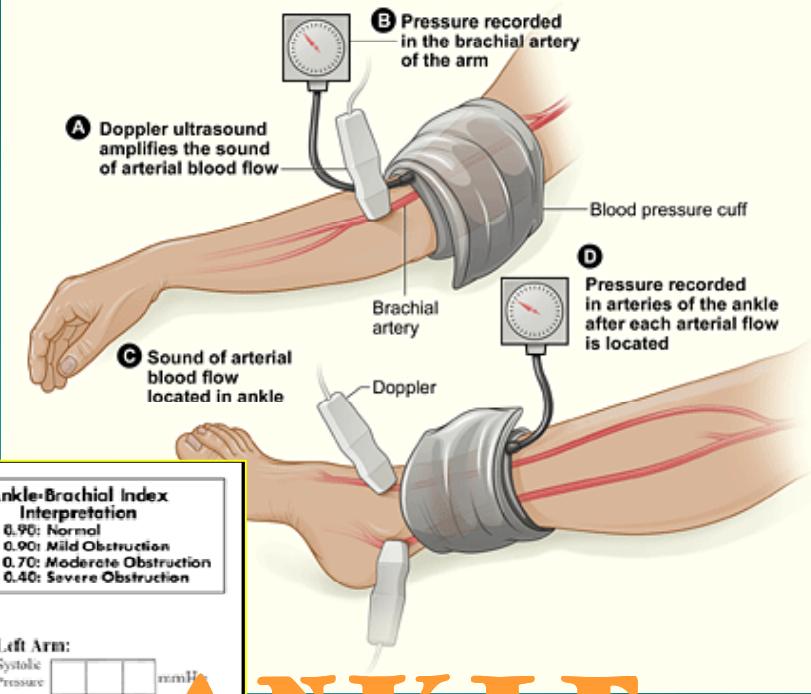
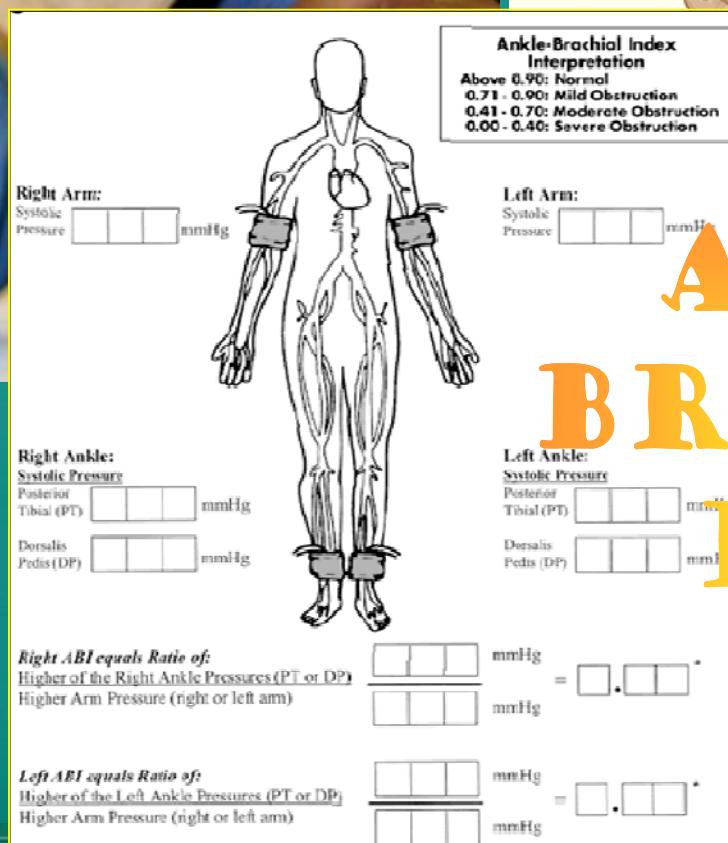
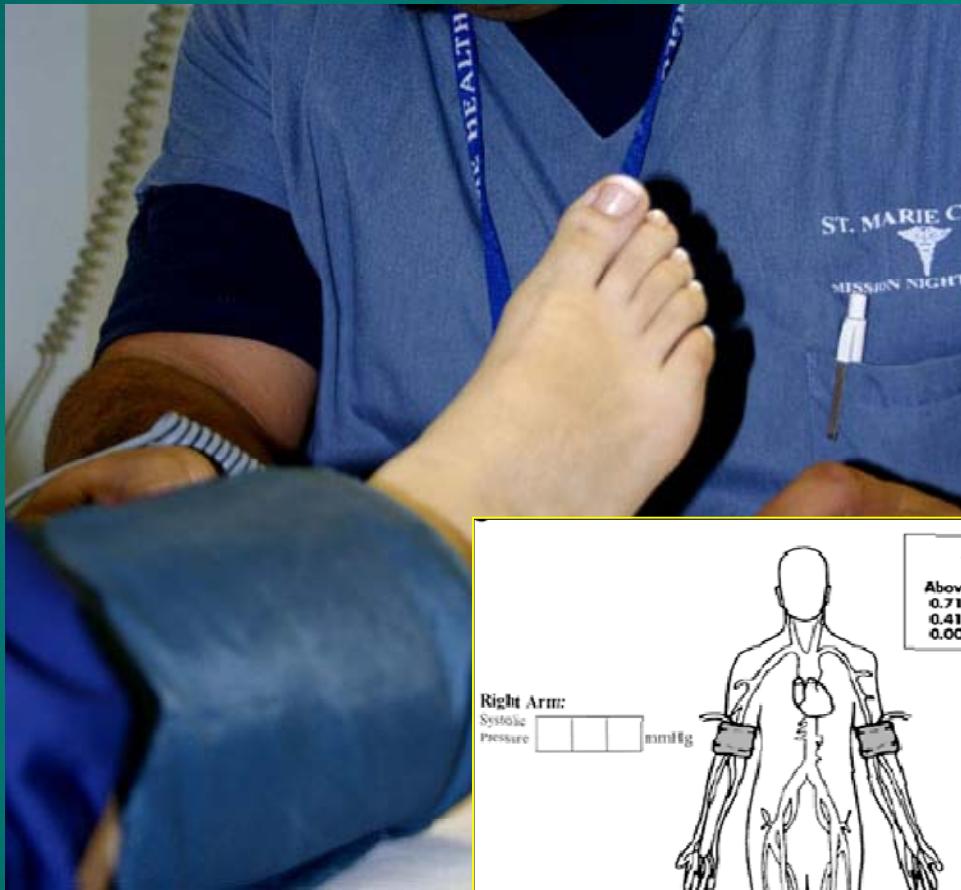
Exercise-Stress Echocardiographic Study



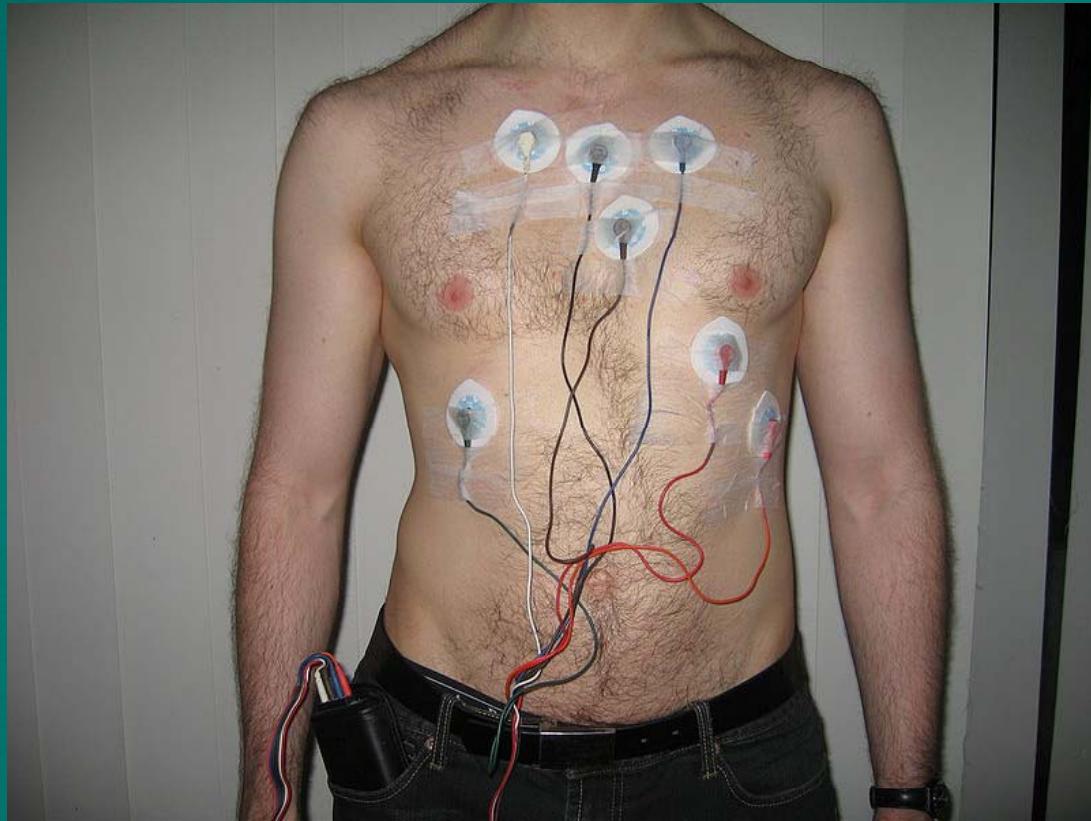
Dobutamine-Stress Echocardiographic Study



# TIlt- TABLE TEST



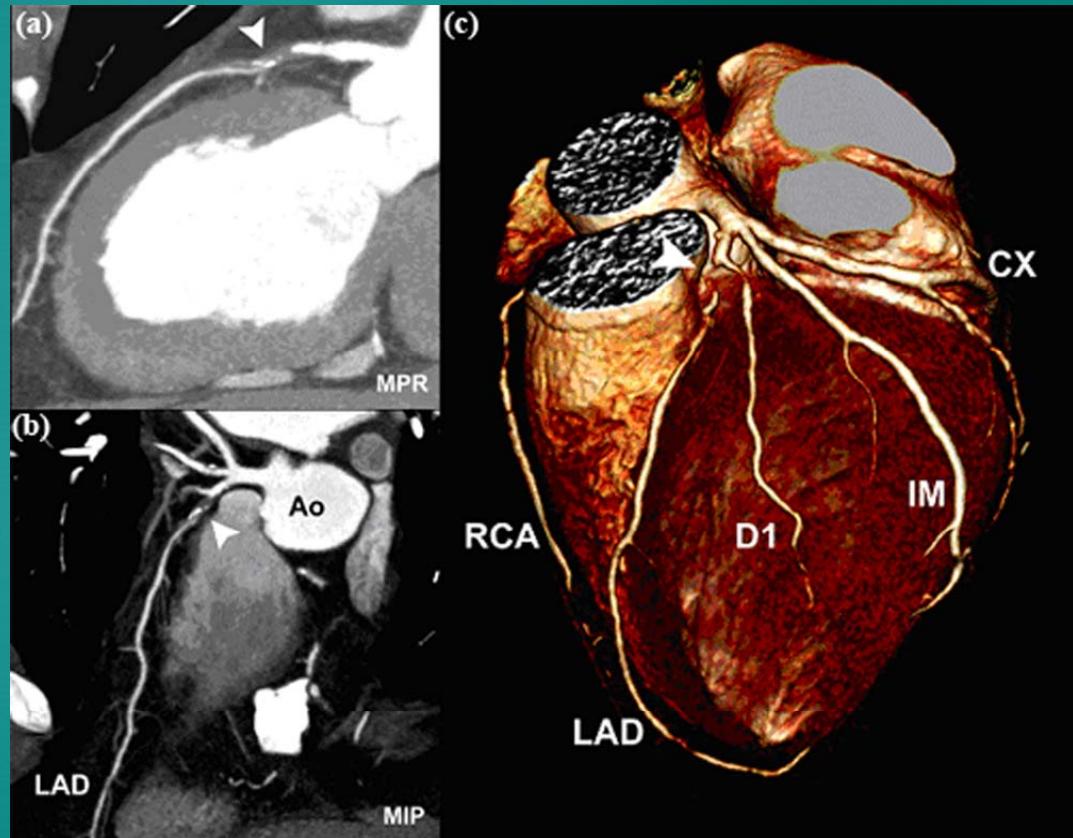
# ANKLE-BRACHIAL INDEX (ABI)



# Holter Monitoring



# Computed Tomography (CT) Angiography (CTA)





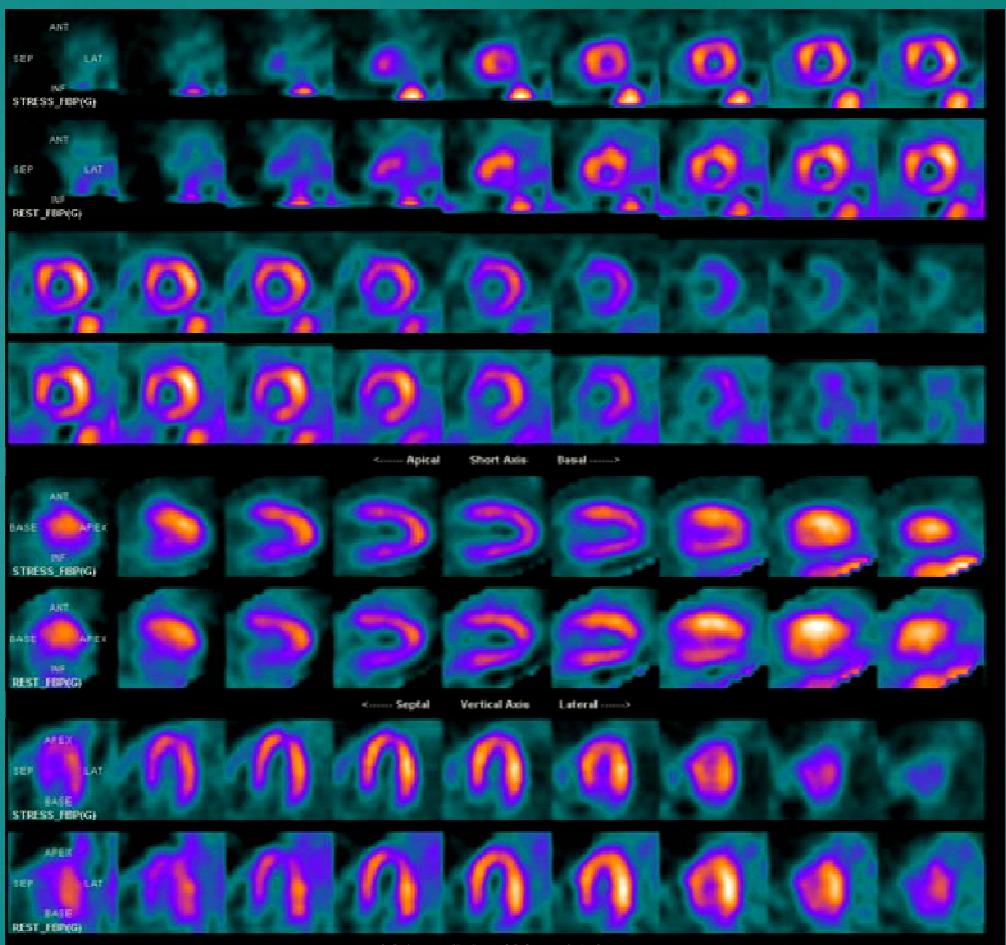
# Magnetic Resonance Imaging (MRI)

# Magnetic Resonance Angiography (MRA)

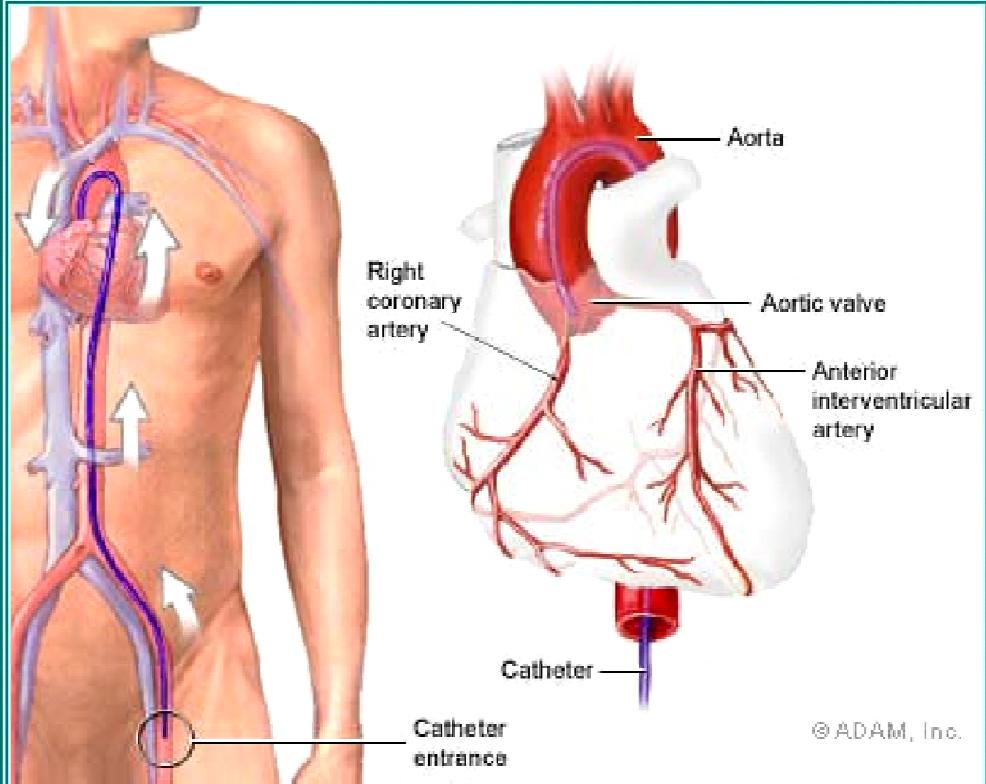
# Cardiac MRI (CMR)



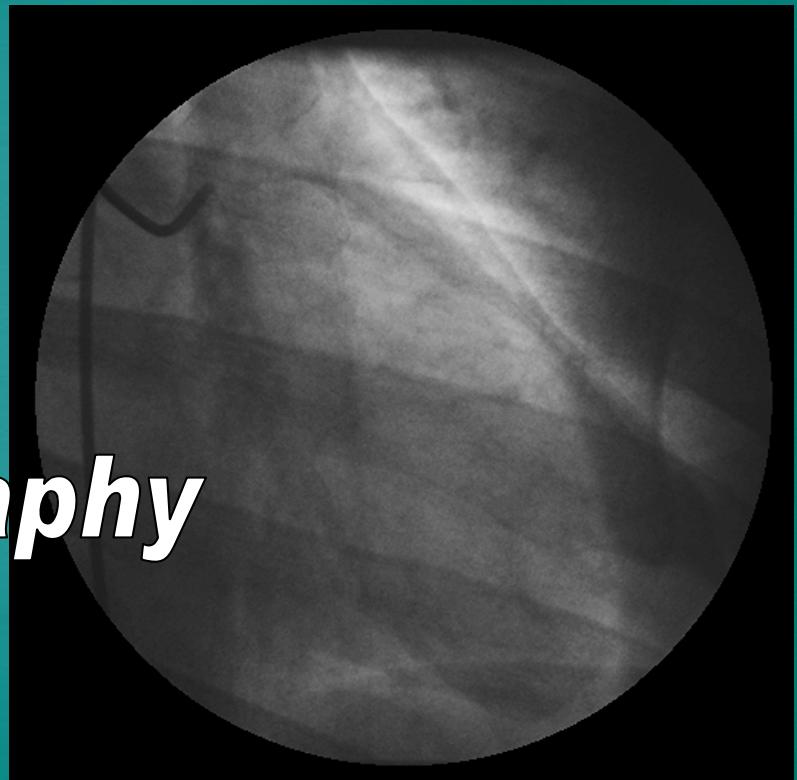
# Cardiac Nuclear Study



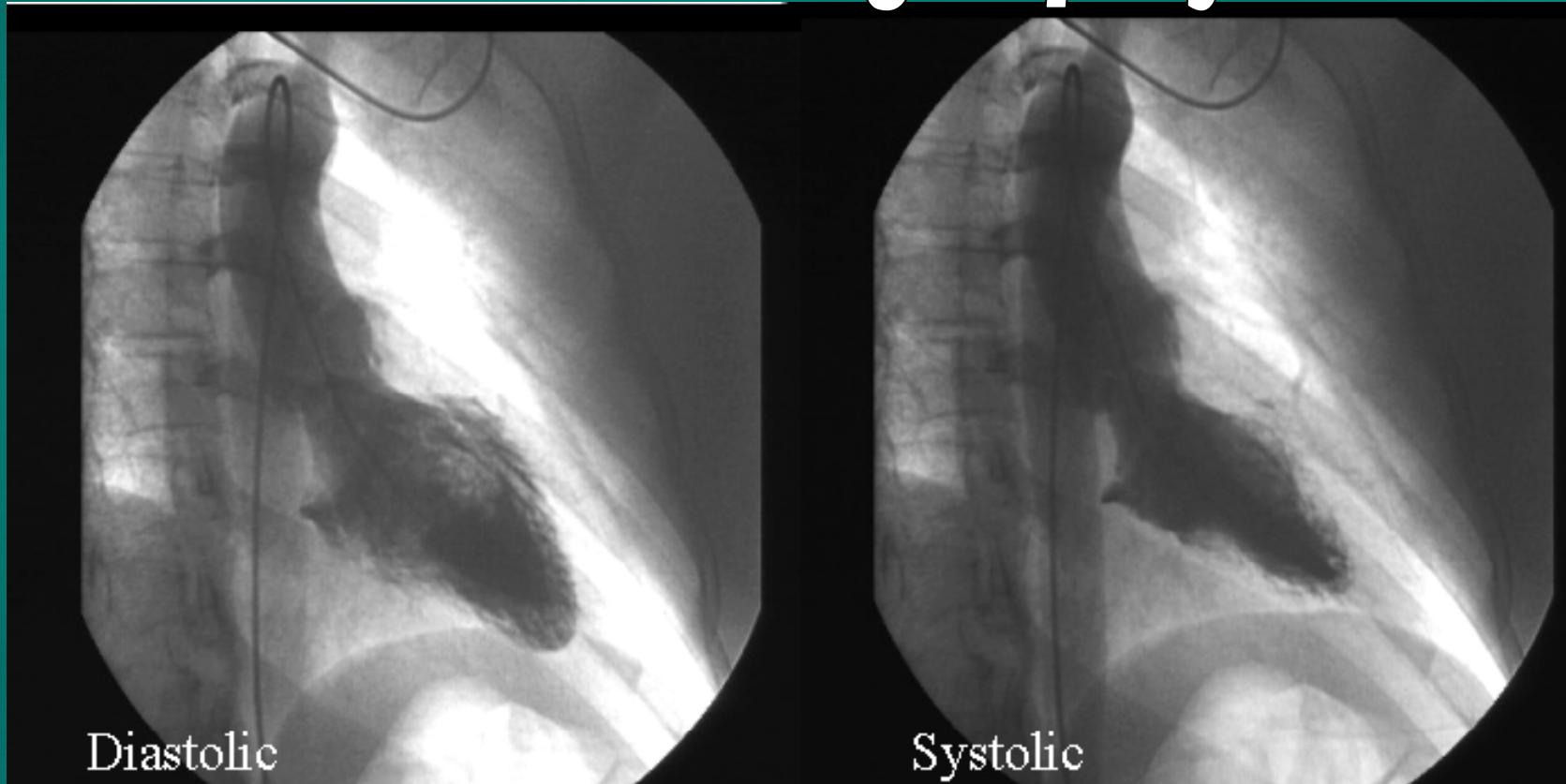
# ***INVASIVE INVESTIGATIONS***



# *Coronary Angiography (CAG)*



# Ventriculography



Diastolic

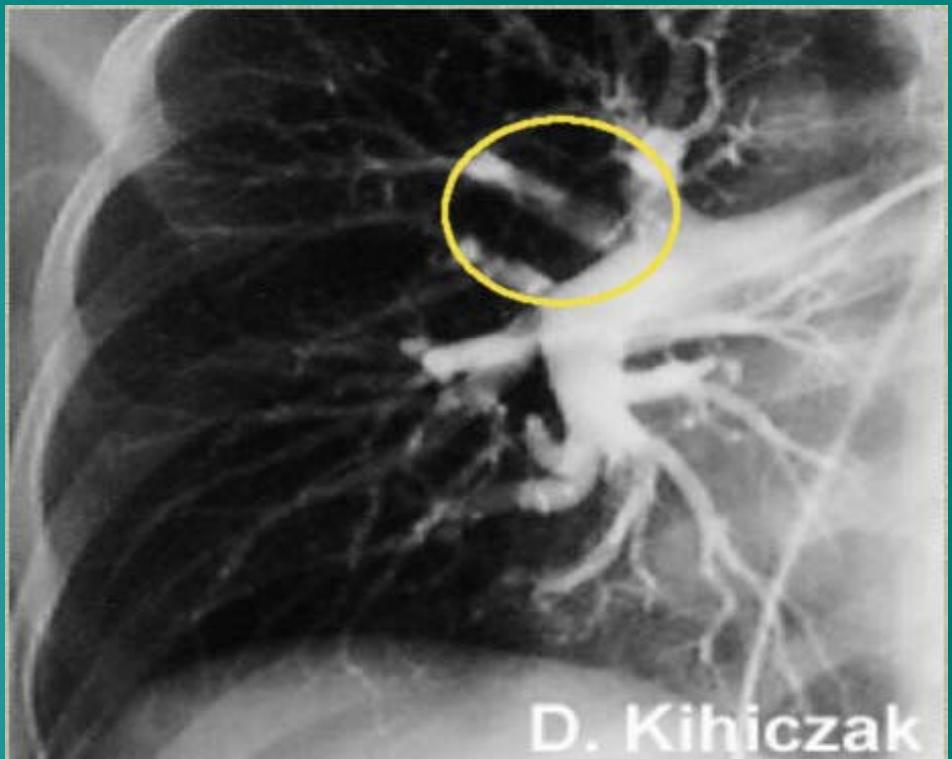
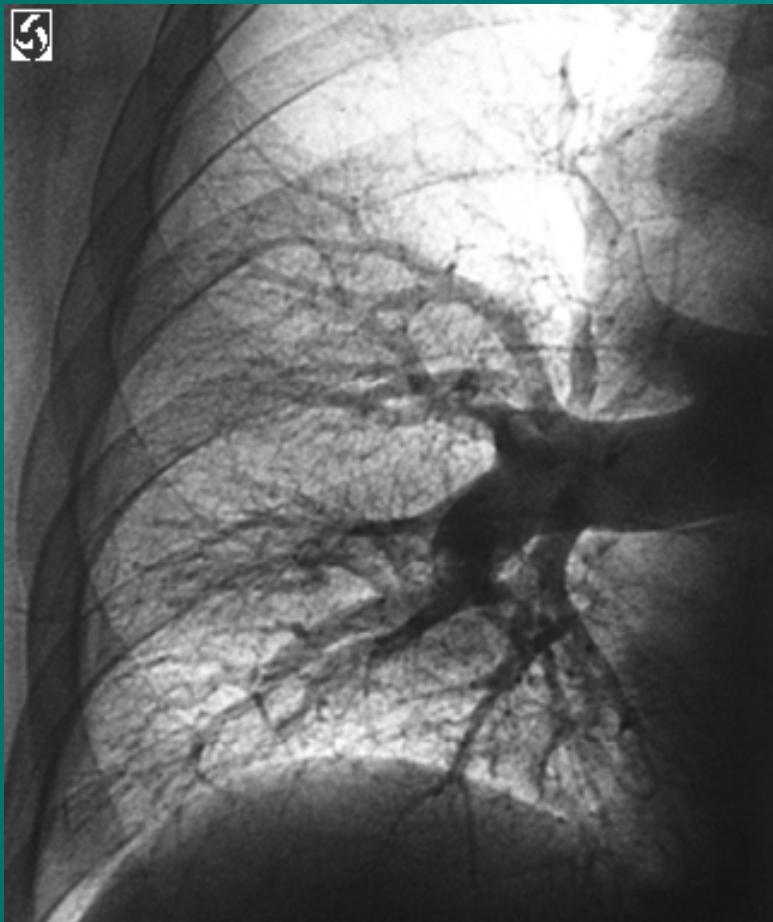
Systolic

Ventriculogram

LV-gram

# *Pulmonary Angiography*

## *Pulmonary Arteriogram*



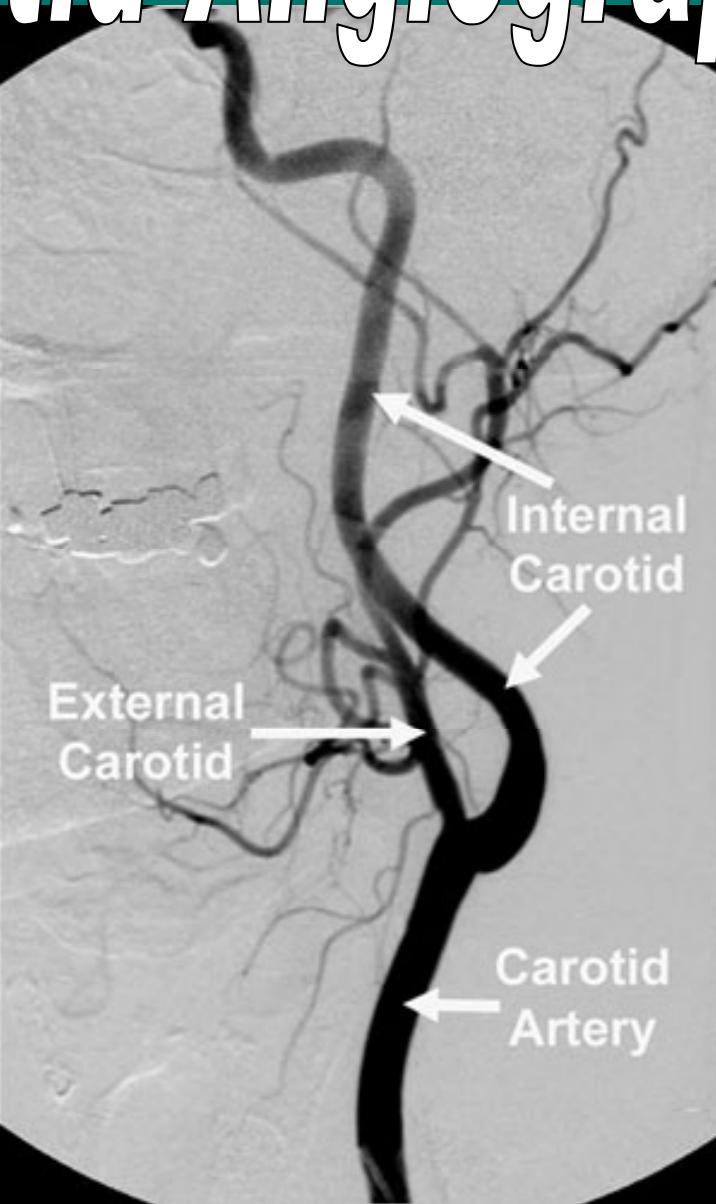
D. Kihiczak

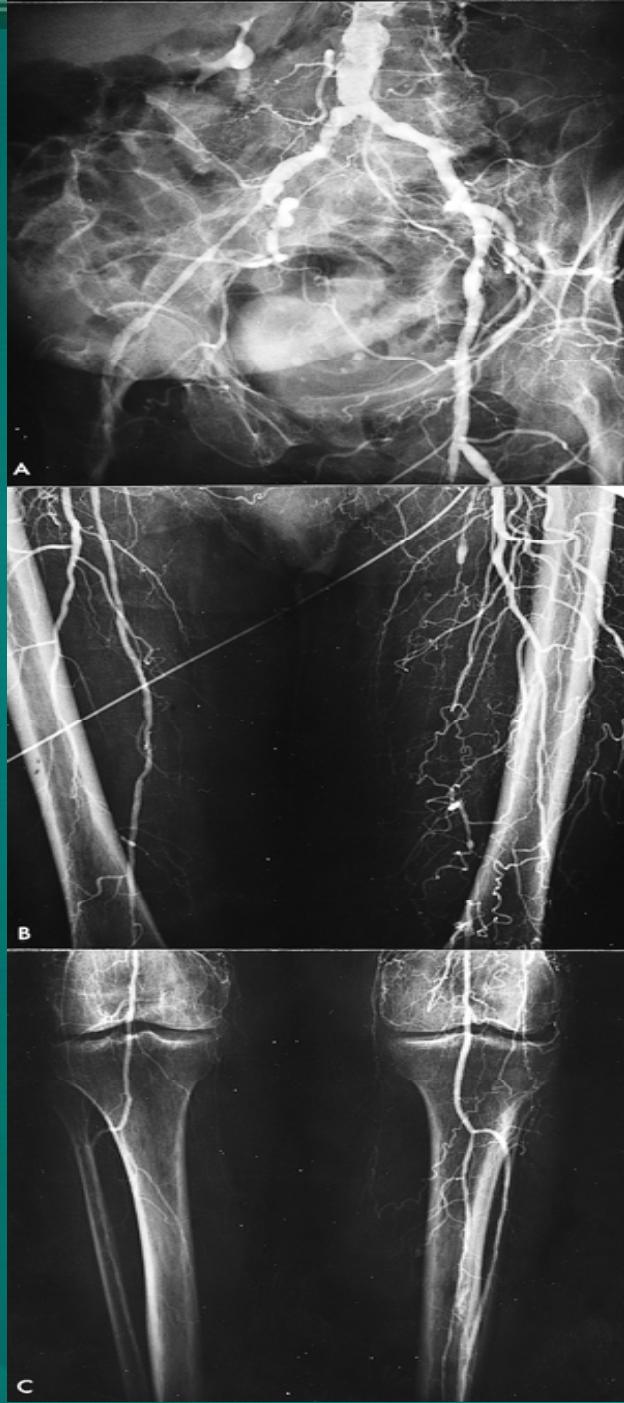
Pulmonary Embolism

# Aortography



# Carotid Angiography



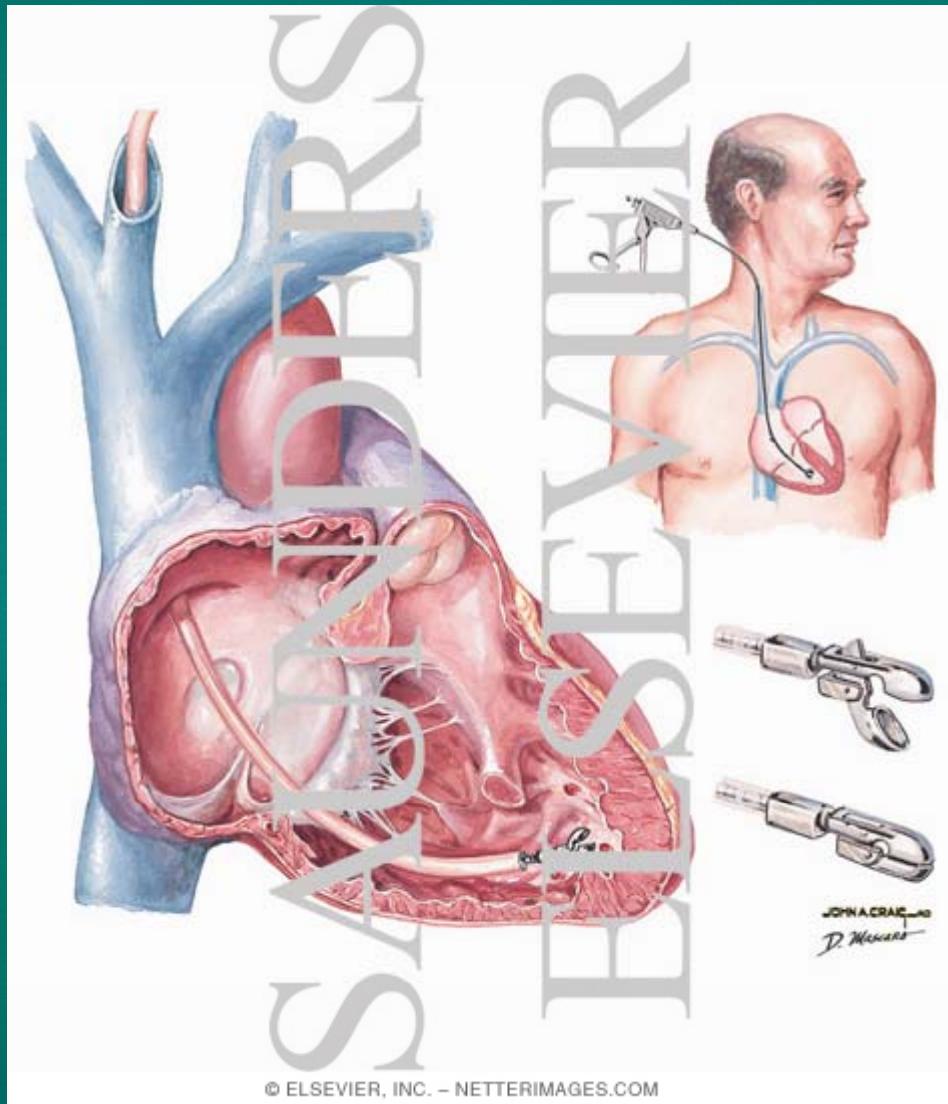


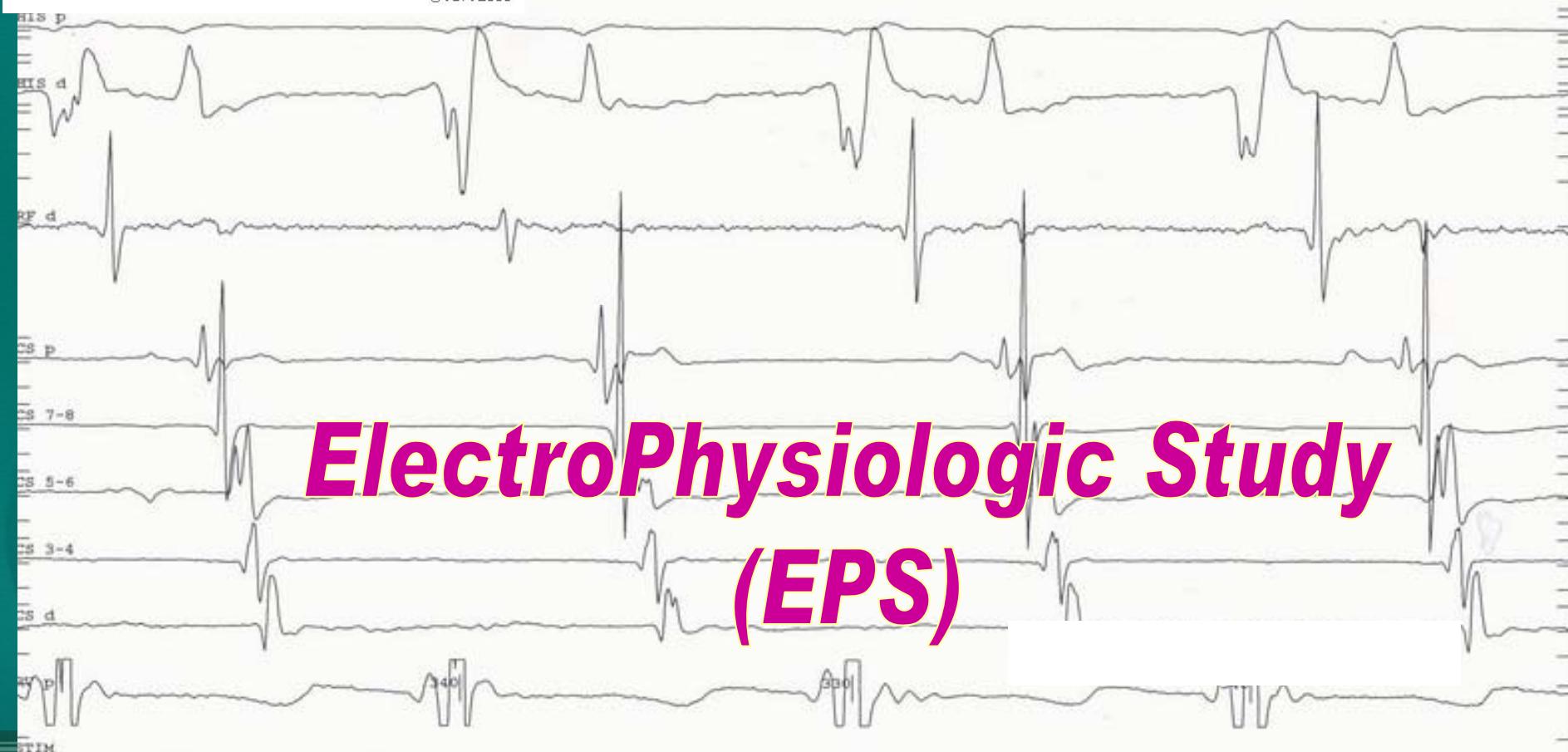
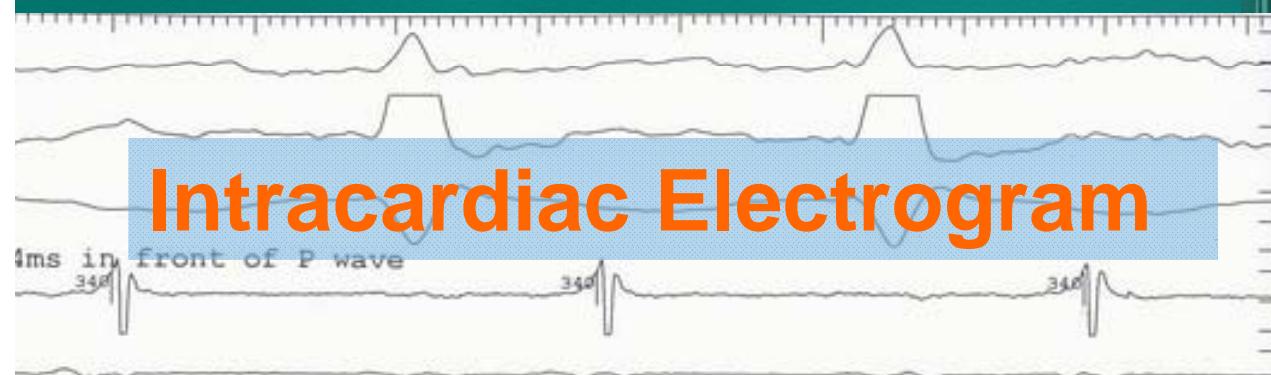
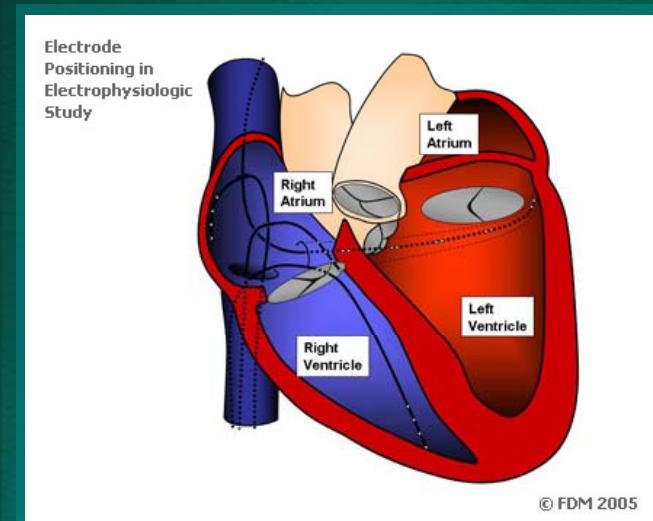
Medscape® [www.medscape.com](http://www.medscape.com)



# Peripheral Artery Angiography

# *Endomyocardial Biopsy*





*Overall*  
*Cardiovascular Diseases*  
*Managements*

# SCOPE OF ‘MANAGEMENT’

- Diagnosis
- Prognosis and course of disease assessment
- Treatment
- Prevention and risk factors modification
  - Primary prevention
  - Secondary prevention

## LINE OF TREATMENT

## INVESTIGATIONS

- Medications
- Invasive procedures
- Surgery
- Rehabilitation

# MEDICATIONS

## CARDIAC DRUGS

- Adrenergic agonists
- Antiarrhythmic agents
- Antithrombotic agents
- Antiplatelet agents
- Antianginal agents
- Fibrinolytic agents
- ACEI
- ARB
- Beta blockers
- Calcium channel blockers
- Diuretics
- Anti-diabetic agents
- Lipid lowering agents

## NON-CARDIAC DRUGS

- Nephrologic drugs
- Neurologic drugs
- Gastroenterologic drugs
- Pulmonary drugs
- Endocrinologic drugs

# INVASIVE PROCEDURES

## DIAGNOSTIC PROCEDURES

- Coronary angiography (CAG)
- Cardiac ventriculography
- Pulmonary angiography
- Angiographic of the aorta and peripheral arteries
- Left and right cardiac catheterization
- Electrophysiologic study (EPS)
- Endomyocardial biopsy

## TREATMENT PROCEDURES

- PCI or PTCA
- PTA : of renal, carotid, peripheral arteries
- PTMC/ PBMV/PBPV
- RFCA
- Pacemaker, CRT, ICD implantation

# คำย่อ

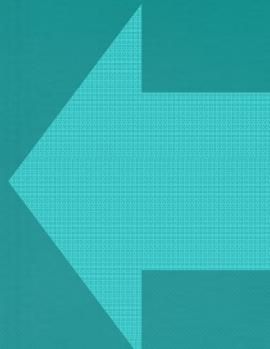
- ✿ **PCI** : Percutaneous Coronary Intervention
- ✿ **PTCA** : Percutaneous Transluminal Coronary Angioplasty
- ✿ **PTA** : Percutaneous Transluminal Angioplasty (of renal, carotid, peripheral arteries)
- ✿ **PTMC/ PBMV/PBPV** : Percutaneous Transluminal Mitral Commissurotomy/ Percutaneous Balloon Mitral Valvuloplasty/ Percutaneous Balloon Pulmonic Valvuloplasty
- ✿ **RFCA**: Radio Frequency Catheter Ablation
- ✿ Permanent pacemaker, **CRT** (Cardiac Resynchronization Therapy) , **AICD** (Automatic Implantable Cardioverter Defibrillator) implantation  
**CRT-D** (Cardiac Resynchronization Therapy – Defibrillator) implantation

**SPECIFIC  
INVESTIGATIONS  
FOR EACH DISEASE**

# CARDIOVASCULAR DISEASES

- Endocardium :
  - valvular heart disease
  - infective endocarditis
- Myocardium :
  - Ischemic heart disease
  - myocarditis
  - cardiomyopathy
- Pericardial disease
  - pericarditis
  - pericardial effusion
- Aortic disease :
  - aortic aneurysm
  - aortic dissection
- Coronary heart disease
- Congenital heart disease
- Arrhythmias
- Hypertension
- Peripheral arterial disease
  - Carotid artery stenosis
  - Renal artery stenosis
  - Extremity artery stenosis
- Miscellaneous
  - Pulmonary artery embolism
  - Deep vein thrombosis

- Endocardium :
  - valvular heart disease
  - infective endocarditis
- Myocardium :
  - Ischemic heart disease
  - myocarditis
  - cardiomyopathy
- Pericardial disease
  - pericarditis
  - pericardial effusion

- 
- ECG
  - LAB
  - CXR
  - 2D-ECHO
  - (CMRI)

- Aortic disease :

- aortic aneurysm
- aortic dissection

- CXR
- TEE
- CTA
- MRA

- Coronary heart disease

- ECG
- CXR
- 2D-ECHO
- EST
- EST-ECHO
- DOBUTAMIN-ECHO
- CORONARY CTA
- STRESS CMR
- CAG

## ■ Congenital heart disease

- ECG
- CXR
- 2D-ECHO
- CMR
- CARDIAC CATH.

## ■ Arrhythmias

- ECG
- CXR
- 2D-ECHO
- HOLTER MONITOR
- EPS
- CAG

- Peripheral arterial disease
  - Carotid artery stenosis
  - Renal artery stenosis
  - Extremity artery stenosis

- CAROTID DOPPLER
- RENAL ARTERY DOPPLER
  - ABI
  - CTA
  - MRA

- Miscellaneous
  - Pulmonary artery embolism
  - Deep vein thrombosis

- ECG
- CXR
- 2D-ECHO
- CTA
- VENOUS DOPPLER

**SPECIFIC  
MANAGEMENT  
FOR EACH DISEASE**

# DISEASES

- Endocardium :
  - valvular heart disease
  - infective endocarditis
- Myocardium :
  - Ischemic heart disease
  - myocarditis
  - cardiomyopathy
- Pericardial disease
  - pericarditis
  - pericardial effusion

# MANAGEMENT

- MEDICATIONS
  - Antibiotics
  - Diuretics
  - ACEI/ARB
  - BB/CCB
  - Nitrates
  - Digoxin
  - NSAIDs
- Surgery
  - Valve repair, valvuloplasty
  - Pericardectomy, pericardiotomy, pericardial window
- Special treatment
  - CRT, CRT-D implantation
  - EECP (Enhanced External CounterPulsation)

# DISEASES

- Aortic disease :
  - aortic aneurysm
  - aortic dissection

# MANAGEMENT

- Conservative treatment
- Cardiac risk factors modification
- Medications
  - Anti-hypertensive drugs
- EVAR (Endovascular Repair, aortic stent graft)
- Surgery
  - Aneurysmectomy with graft, aortic repair, etc.
- Rehabilitation

# DISEASES

- Coronary heart disease/ coronary artery disease
  - Chronic CAD
  - Acute coronary syndrome (ACS)
  - Ischemic cardiomyopathy

# MANAGEMENT

- Cardiac risk factors modification
- Medications
  - Antiplatelets
  - Anticoagulant/antithrombotic
  - Nitrates
  - ACEI/ ARB
  - BB/CCB
  - Others
- PTCA
- Surgery
  - CABG (Coronary Artery Bypass Grafting)
- EECP
- Rehabilitation

# Chronic Coronary Artery Disease

## Chronic stable angina

- Medications
  - Antiplatelet
  - Nitrate
  - Statin
  - Beta blocker or Calcium channel blocker
  - Etc.
- Non-invasive investigations: stress tests
- Invasive investigation: CAG
- Invasive treatment: PCI or CABG

# ACUTE CORONARY SYNDROME (ACS)

## STEMI

- Medications
  - Antiplatelets
  - Thrombolytic therapy
    - ± antithrombotic agent
  - Other CAD drugs
- Medications + Procedure
  - Antiplatelets
  - Antithrombotic agent
  - Primary PCI or
    - rescue PCI or CABG
  - Other CAD drugs

## NSTEMI / UA

- Medications
  - Antiplatelets
  - Antithrombotic agent
  - Other CAD drugs
- Medications + Procedure
  - Antiplatelets
  - Antithrombotic agent
  - Other CAD drugs
  - CAG ± PCI or CABG

# DISEASES

- Congenital heart disease

# MANAGEMENT

- Medications
- Percutaneous Procedures
  - ASD closure device
  - VSD closure device
  - PDA closure device, coil embolization
  - Coil embolization
- Surgery
  - Palliative surgery
  - Corrective surgery

# DISEASES

- Arrhythmias
- Bradyarrhythmia
- Tachyarrhythmia

# MANAGEMENT

- Medications
  - BB
  - CCB
  - Anti-arrhythmic agents
- EPS + RFCA
- Procedures
  - Temporary pacemaker insertion
  - Permanent pacemaker implantation
  - AICD implantation
  - CRT-D implantation

# DISEASES

- Peripheral arterial disease
  - Carotid artery stenosis
  - Renal artery stenosis
  - Extremity artery stenosis

# MANAGEMENT

- Cardiac risk factors modification
- Medications
  - Antiplatelet
  - Anti-hypertensive drugs
  - Cilostazol
- PTA with or without stent (carotid, renal, peripheral arteries)
- Surgery
  - Carotid bypass
  - Peripheral arterial bypass
  - Peripheral arterial embolectomy

## ■ Miscellaneous

- Pulmonary artery embolism
- Deep vein thrombosis

- Medications
  - Anticoagulant
  - Thrombolytic drugs
- Surgery
  - Pulmonary embolectomy
- Rehabilitation

**THANK YOU**