

Peri-procedural Patient Management in the Cath Lab

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Cardiac Catheterization



Activity in the Cath Room

- Diagnosis of cardiac disease
 - Cardiac biopsy
 - Cardiac catheterization
- Coronary artery disease :
 - Percutaneous coronary intervention
- Valvular heart disease
 - Mitral stenosis, pulmonic stenosis, aortic stenosis
- Congenital heart disease
 - ASD, PDA, VSD
- Arrhythmia
 - Electrophysiologic study
 - Pacemaker, ICD implantation

Coronary Artery Disease



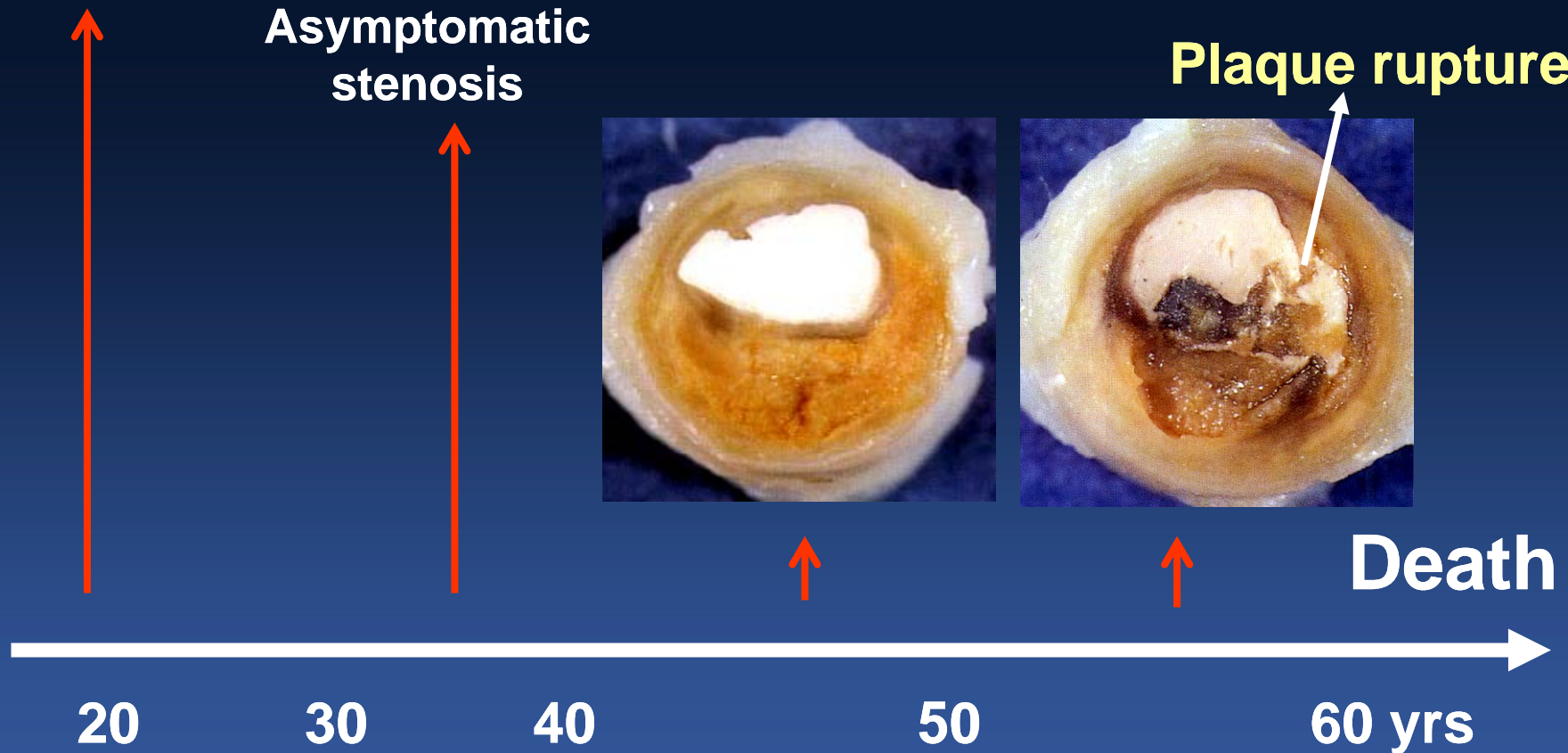
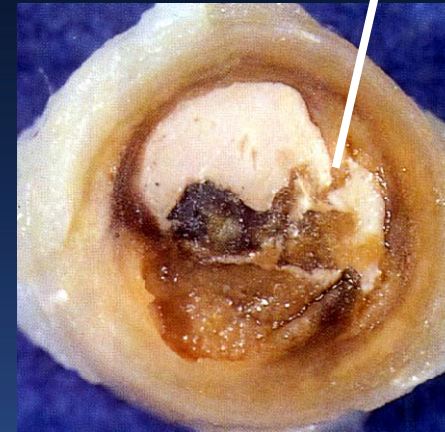
Atherosclerosis

Angina

Myocardial infarction

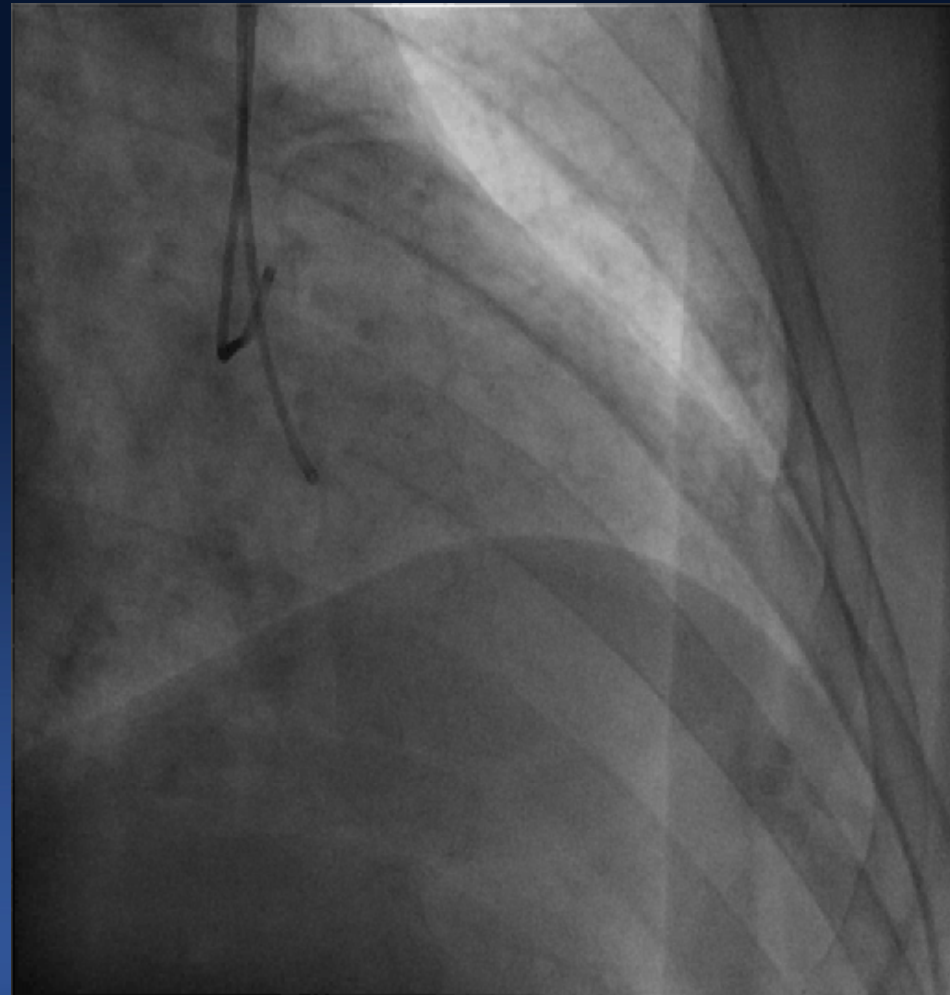
Asymptomatic stenosis

Plaque rupture

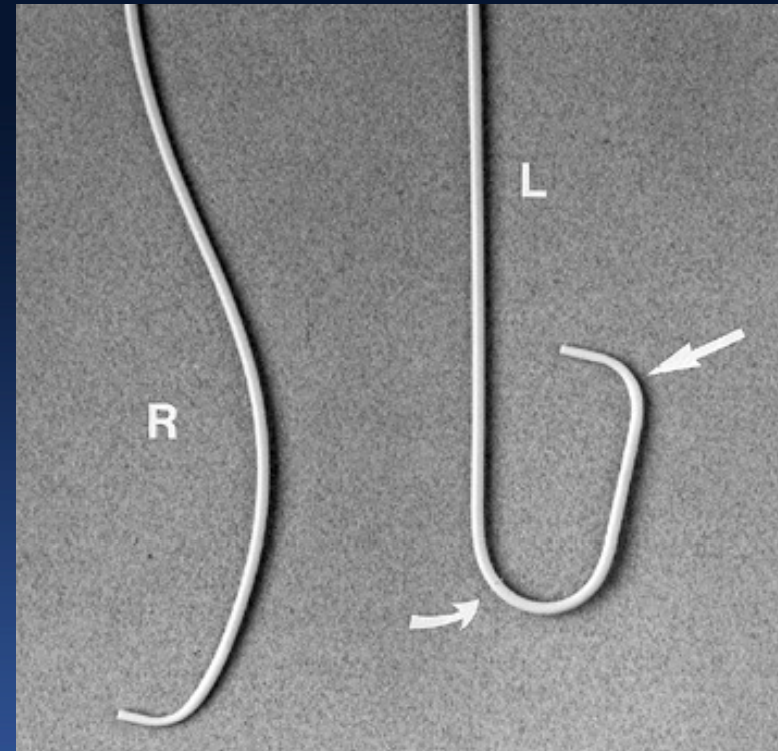
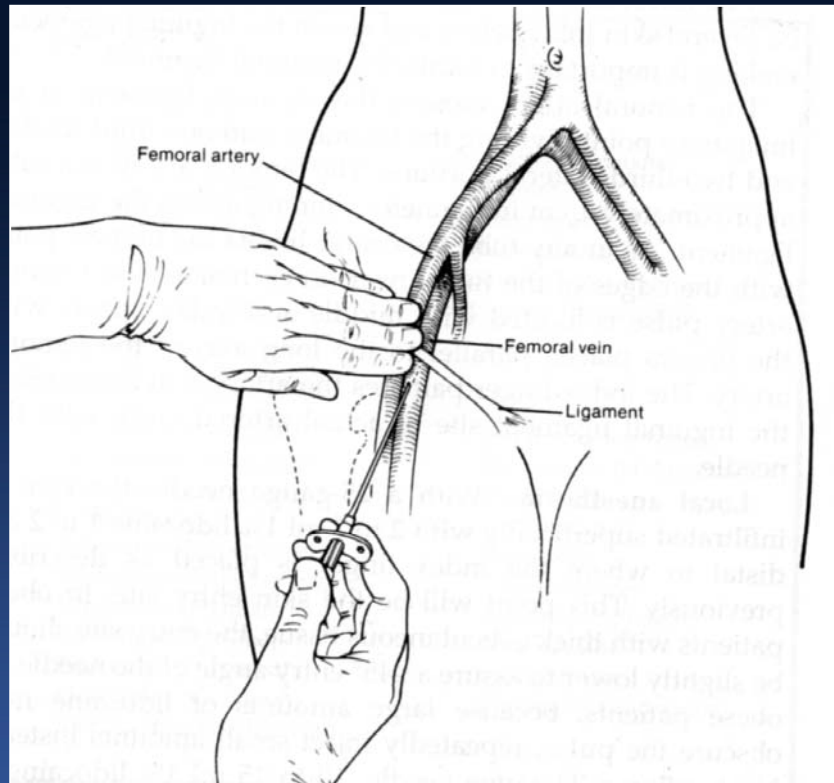


Coronary Artery

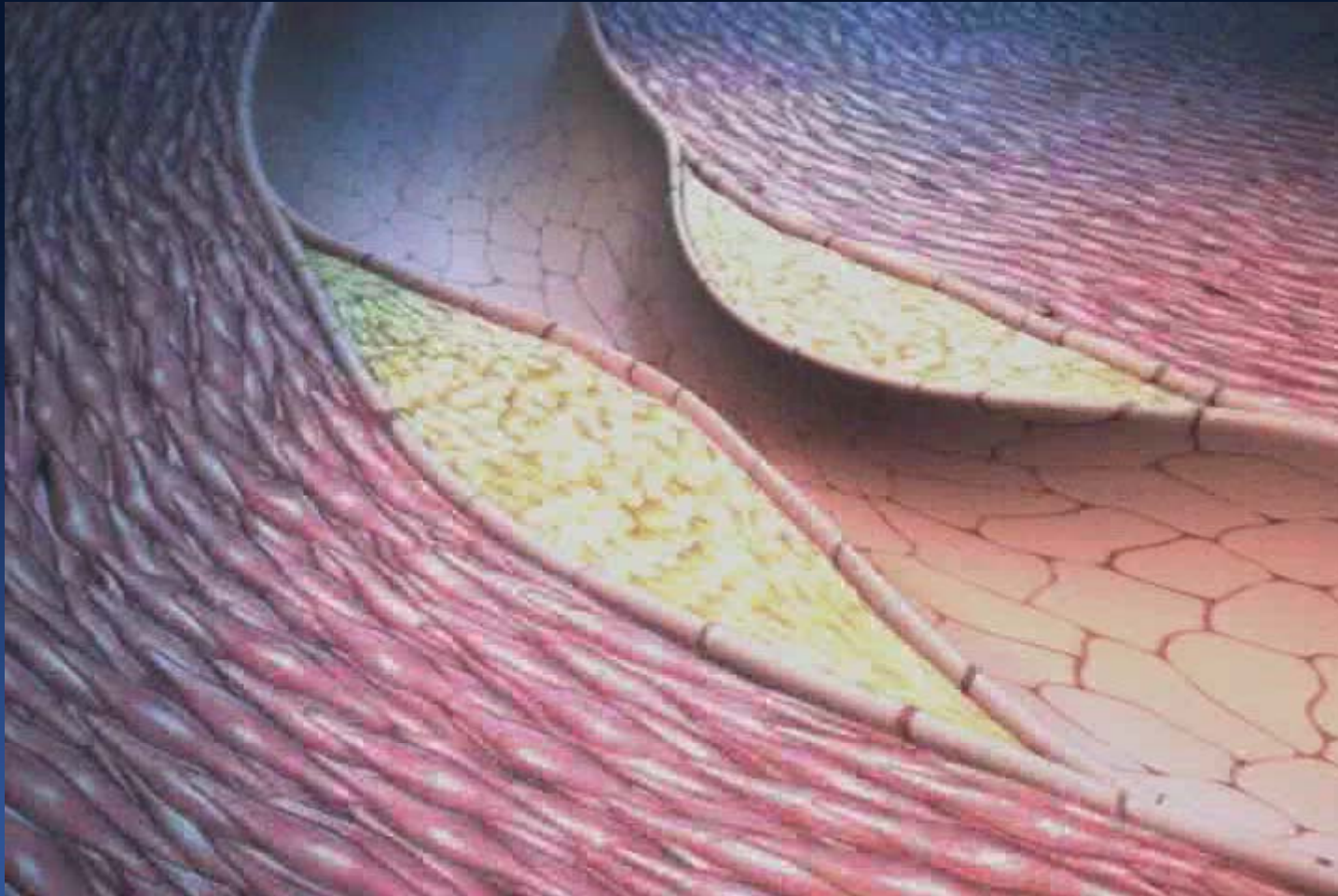
- Conductance vessel to supply blood flow to the myocardium
- Supply of oxygen and nutrient



Coronary Angiography



Percutaneous Coronary Intervention

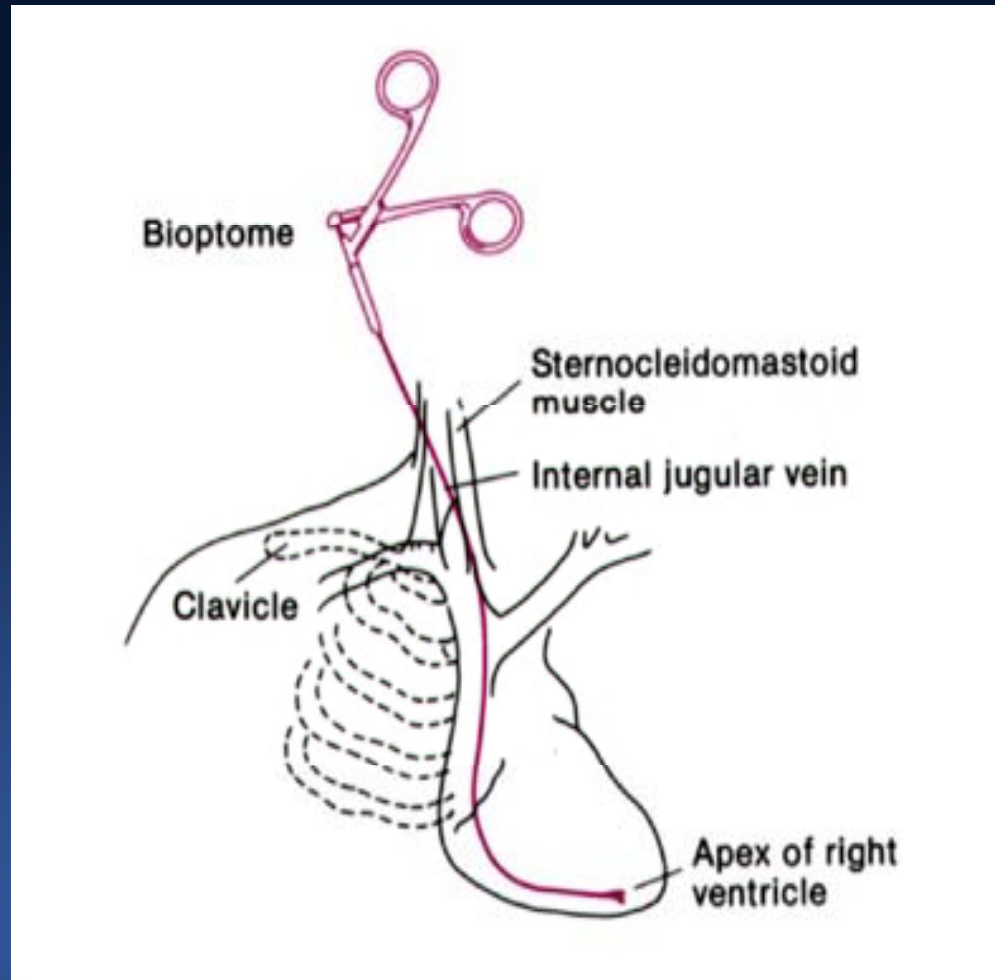


Percutaneous Mitral Balloon Valvuloplasty

To treat mitral stenosis

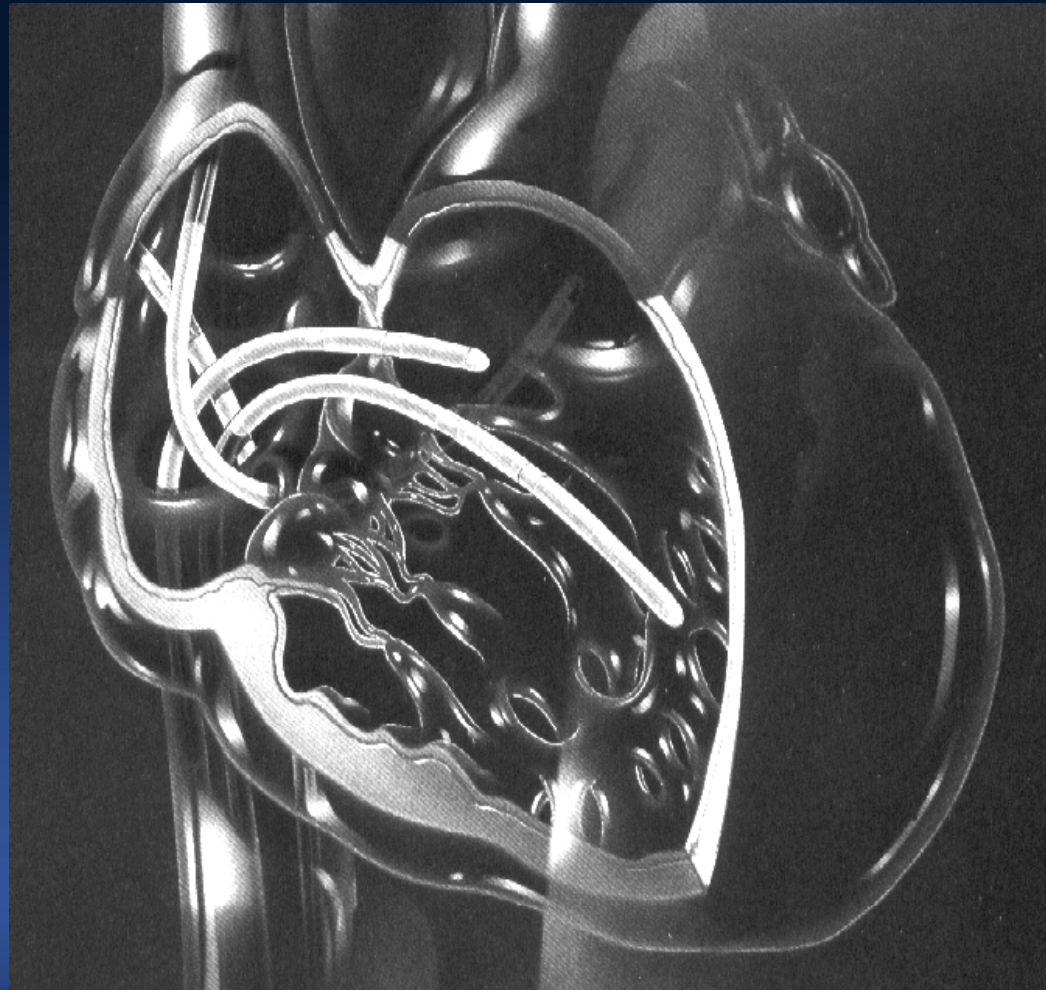


Cardiac Biopsy



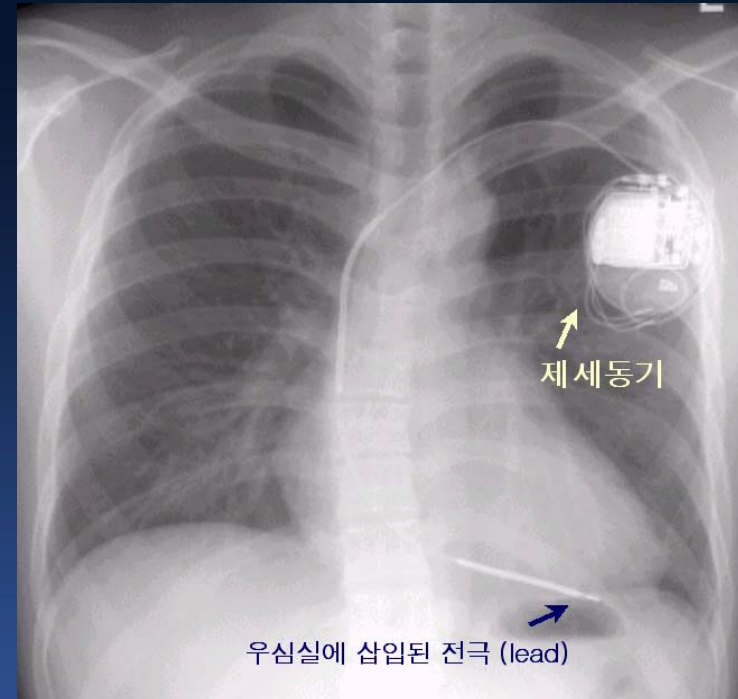
Electrophysiologic Study

To detect and treat abnormal conductance



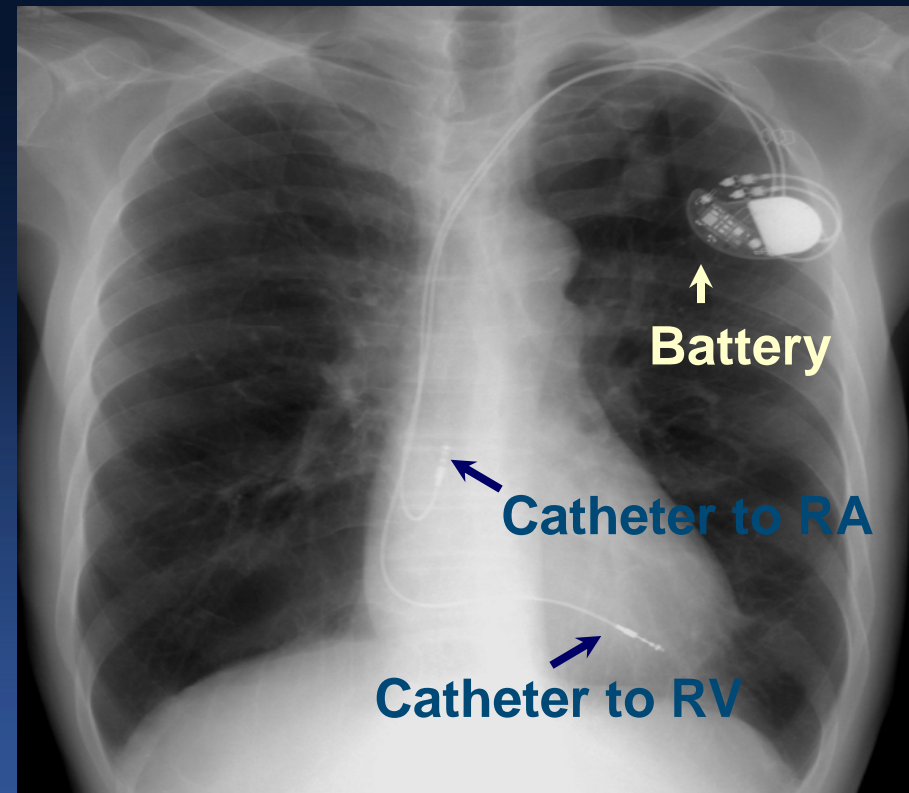
Implantable Cardioverter Defibrillator

Internal shock to treat ventricular tachycardia

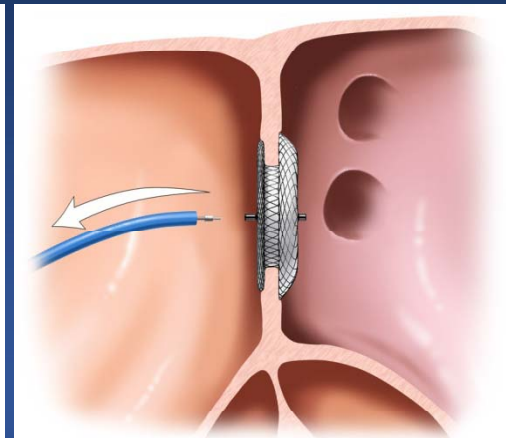
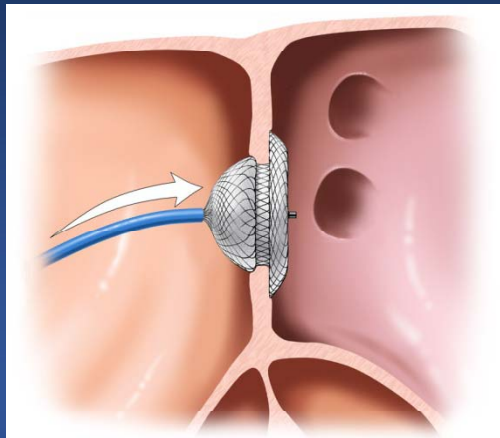
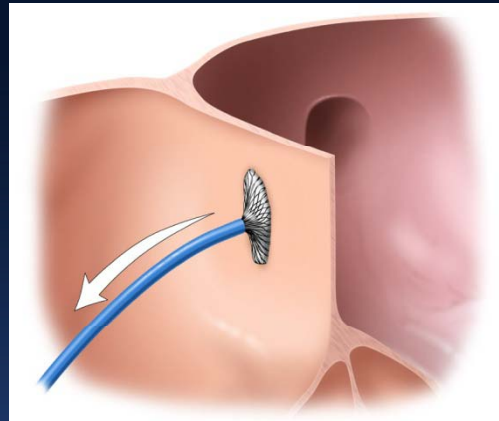
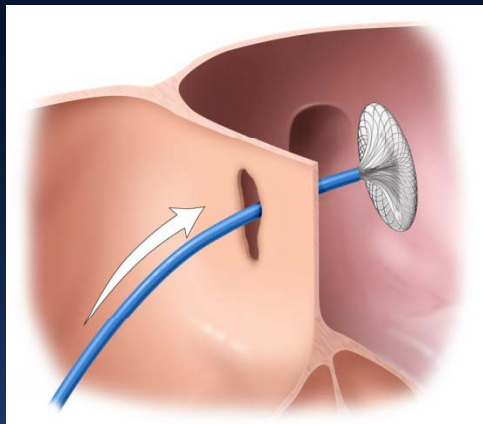


Pacemaker Insertion

To treat conduction delay



Atrial Septal Defect Closure



Preprocedural Management

- Physical and emotional status
- Baseline lab test-CBC, Cr, PT/aPTT
- NPO
- Skin preparation
- IV line – left side (antecubital vein for adenosine infusion)
- Medication

Medications before PCI

- Aspirin for all coronary patients
- Clopidogrel (loading 300-600 mg)
- Beta-blocker, nitrate, calcium channel blocker - not necessary except MI
- IV nitrate – not necessary.
- Heparin – unstable patients

Post-procedural Management

- Close observation
- Frequent symptom and sign (V/S) evaluation
- Keep IV fluid
- Recurrent chest pain or other symptom
- EKG monitoring
- Neurological change

Post-procedural acute complications

- Local complication at puncture site
- Pericardial tamponade due to perforation
- Abrupt closure
- Renal failure
- Atheroembolism, CNS problem
- Hypersensitivity reaction – delayed
- Fatal arrhythmia
- Bleeding

High Risk Patients

- **Major complications in-hospital mortality**
 - ST elevation MI
 - Urgent coronary artery bypass grafting
 - Atheroembolism (Stroke)
- **Minor complications**
 - Periprocedural cardiac enzyme elevation
 - Vascular access site problems

Procedural Complications

- Stent thrombosis
- Intramural hematoma
- Side branch occlusion
- Distal embolization
- Coronary artery perforation
- Emergency CABG for failed PCI

Stent Thrombosis

Abrupt persistent chest pain with ST segment change

- **Acute (<1 day)**
 - **due to incomplete stent expansion, uncovered dissection, intramural hematoma**
- **Subacute (1~30 days)**
- **Late (> 30 days)**
 - **High in DES than BMS**

Endothelialization vs. Stent Thrombosis



Stent Thrombosis

Post-procedure



14 months after PCI



Stroke

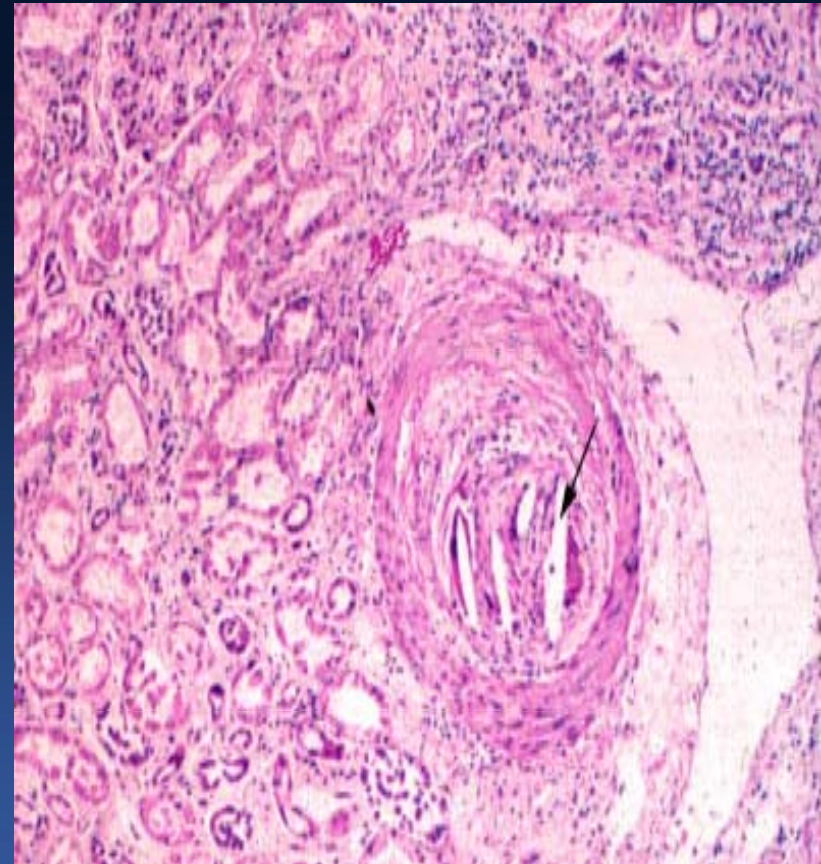
- 0.07 to 0.4 % after PCI
- Due to air, atheroma, or thrombus
- In most cases, it appears to occur in the setting of extensive atheroma in the aortic arch that are disrupted during guiding catheter advancement into the coronaries

Acute Renal Failure

- Hemodynamic instability
- Radiocontrast toxicity
- Atheroembolism.

: most likely in patients with diabetes mellitus, chronic renal failure, shock or dehydrated patients

Atheroemboli Induced ARF



Atheroemboli

The use of stiff, large-bore guiding catheters results in aortic trauma and *the "scraping" of atheromatous debris* from the aortic wall, providing a potential source of systemic embolism.



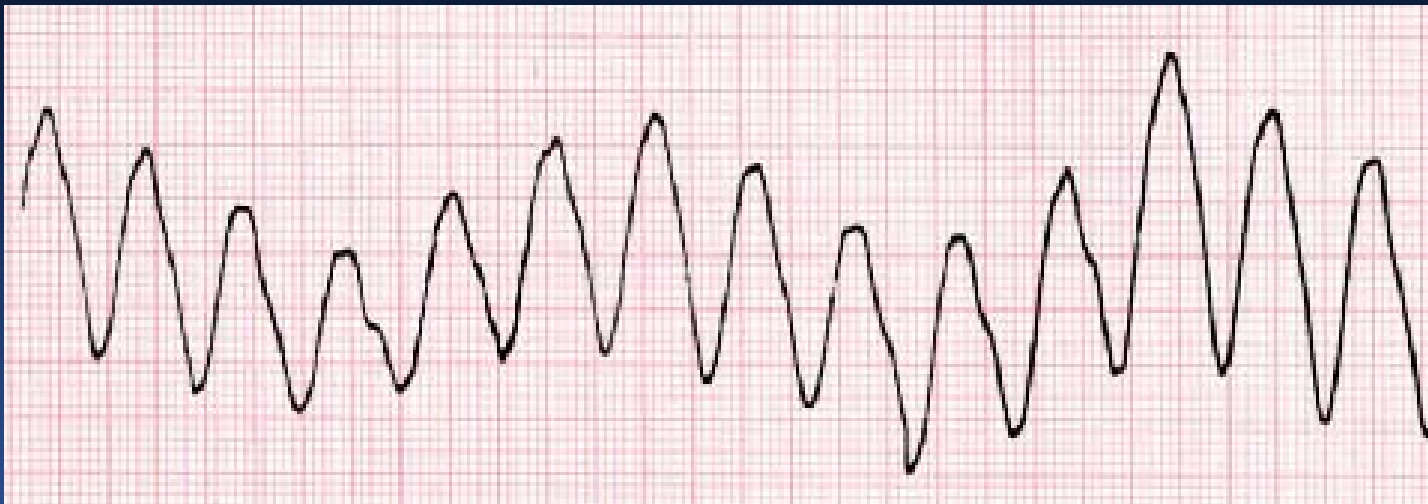
Arrhythmia

- PVC
- Ventricular tachycardia or fibrillation
- Bradycardia

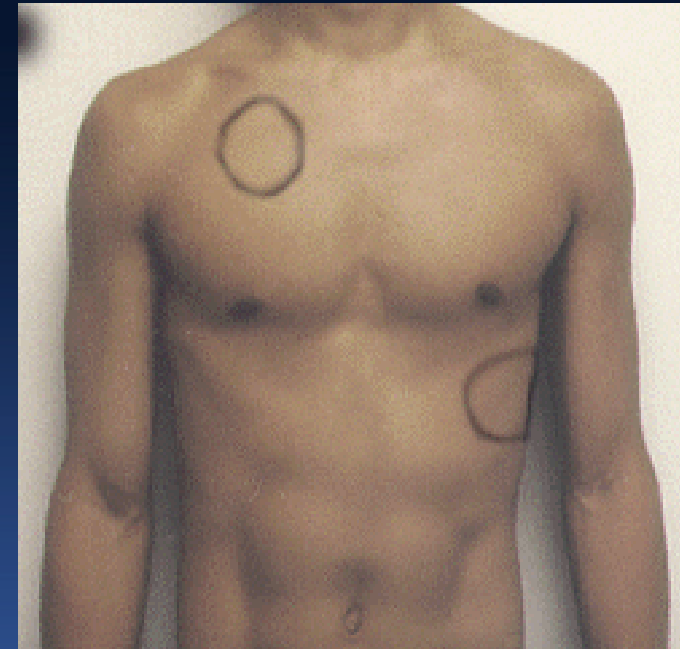
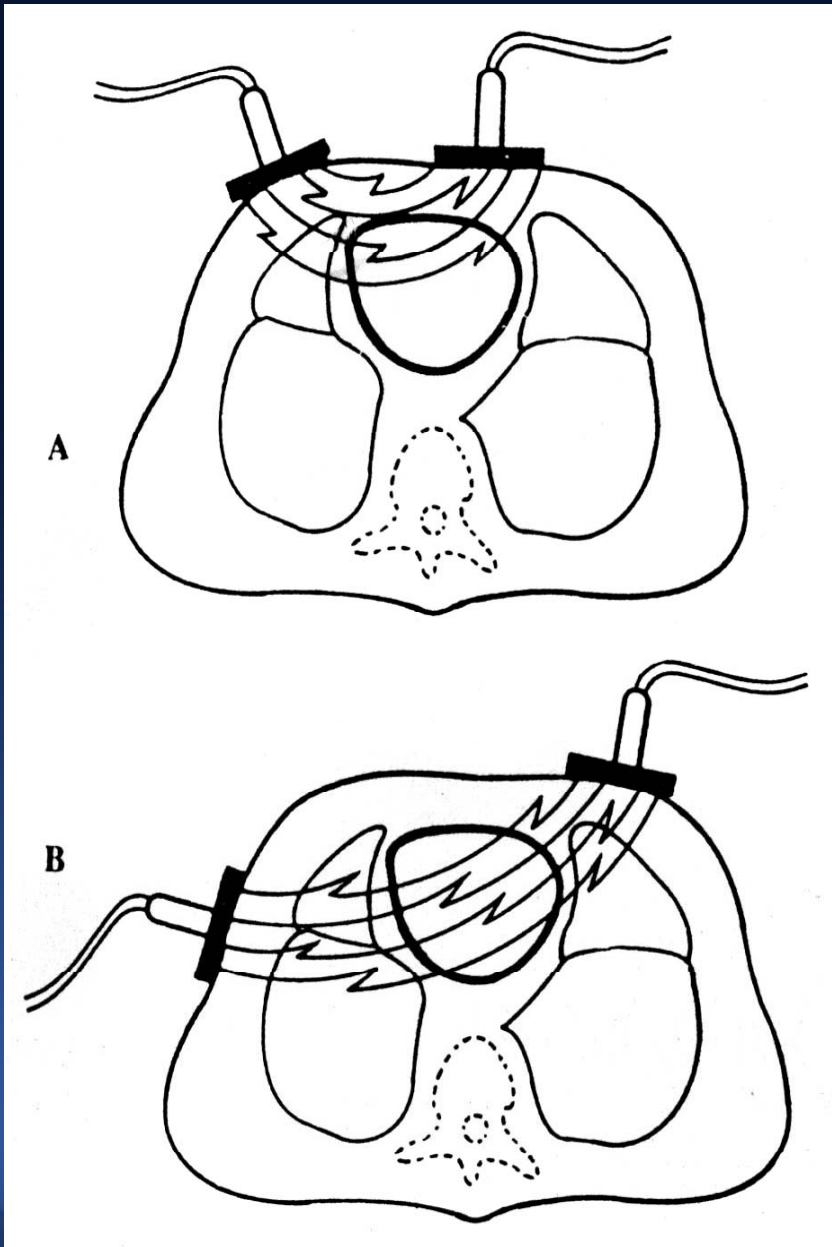
Ventricular tachycardia or fibrillation

- 0.4 percent of PCI
- Due to
 - excess catheter manipulation
 - commonly from intracoronary contrast injection.
- The risk is greatest with injection of high osmolar contrast agents into RCA, particularly in the setting of a prolonged injection or a damped pressure tracing

Defibrillation for fatal arrhythmia







200 J



200 - 300 J



360 J

Allergic Reactions

- **Local anesthetic**
- **Iodinated contrast agents**
 - occurs in up to 1%.
 - highest in patients with a history of prior contrast reactions.
 - Other conditions, such as asthma and other atopic diseases.

Pretreatment for patients with previous hypersensitivity

- Prednisone 50 mg orally 13,7, and 1 h prior to procedure
- Diphenhydramine 50 mg PO/IM/ or IV 1 h prior to procedure
- Lower / iso-osmolar RCM should be recommended
- Emergency therapy should be available

Puncture site complication

- Hematoma – inguinal, retroperitoneal
- Pseudoaneurysm
- A-V fistula

Risk Factors for Vascular Complication

- Periprocedural use of heparin or fibrinolytic therapy, especially if there is prolonged or excessive anticoagulation
- Repeat procedure
- Peripheral vascular disease
- Obesity
- Duration of time sheath remains in place, particularly if >15 hours
- Use of intraaortic balloon pump

Radial Artery Puncture



Radial Artery Puncture



Femoral Artery Puncture



Femoral Artery Puncture



Vascular Closure

Manual Compression



Vascular Closure

Compressor Compression



Vascular Closure *Bandage Compression*

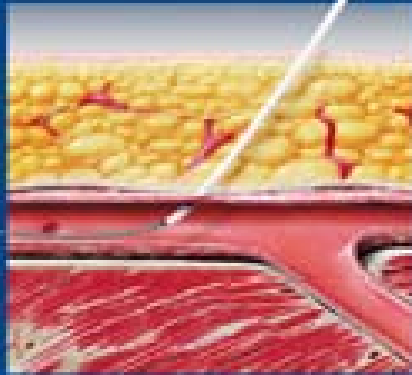


Device Closure

Effective way to reduce puncture site complication

Angio-Seal Device

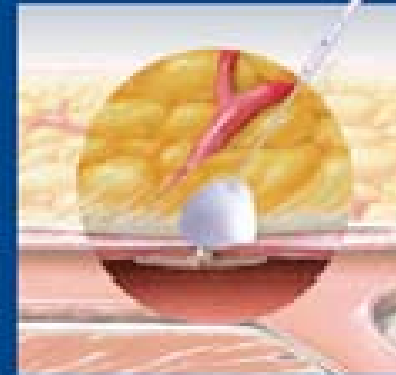
1
LOCATE
the artery



2
SET
the anchor



3
SEAL
the puncture



Take Home Message

- Check vital sign (HR / BP)
- Check chest pain (EKG / Chest X-ray)
- Check puncture site
- Check patient's complaints !!!!