

PCI

# Percutaneous Coronary Intervention

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# PCI

- Objective

- ◆ To increase nurses knowledge related to PCI (Percutaneous Coronary Intervention)

# PCI

- Less invasive alternative to coronary artery bypass surgery
- Very similar to cardiac catheterization

# Types of PCI

- Balloon tipped angioplasty with and without stent
- Coronary artherectomy – three methods
  - ◆ Directional coronary artherectomy (DCA) – shaves plaque into catheter tip
  - ◆ Coronary rotational ablation (Rotablator) – Diamond coated high speed burr
  - ◆ Transluminal extraction catheter (TEC) – cutting head shaves plaque and suctions out the pieces
- EXCIMER laser coronary atherectomy (ELCA) – laser vaporizes atheroma

# PCI

## ■ Indications

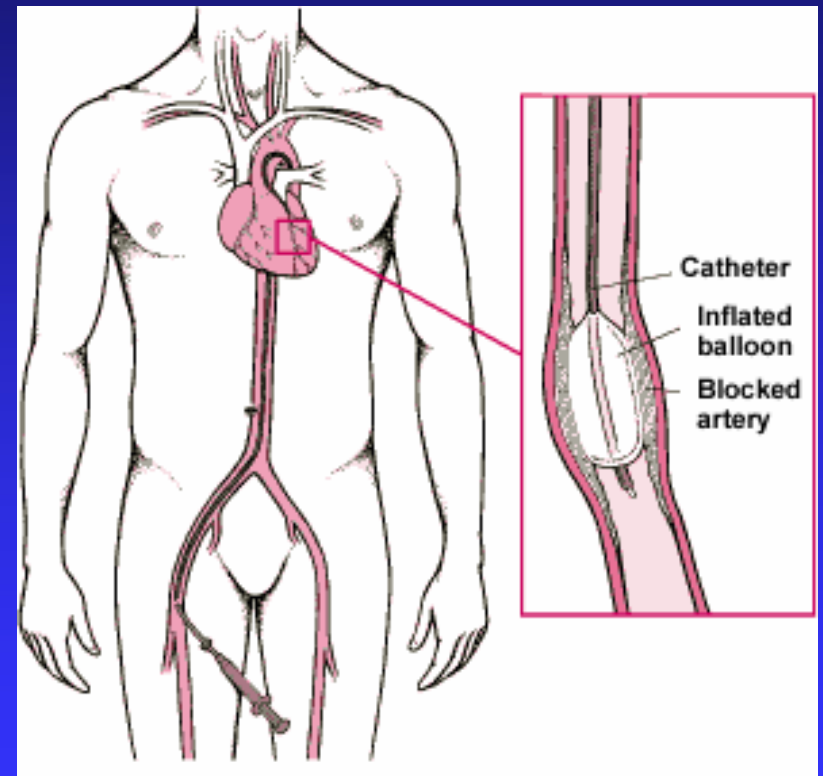
- ◆ Unstable or chronic angina
- ◆ Acute or post acute MI
- ◆ Post ACB with post operative angina

## ■ Contraindications

- ◆ Left main disease unless protected with bypass
- ◆ Diffuse disease
- ◆ Disease distal to area for intervention
- ◆ Coronary orifice stenosis
- ◆ Variant angina – spasm
- ◆ Torturous vessels – some can be PCI without stent

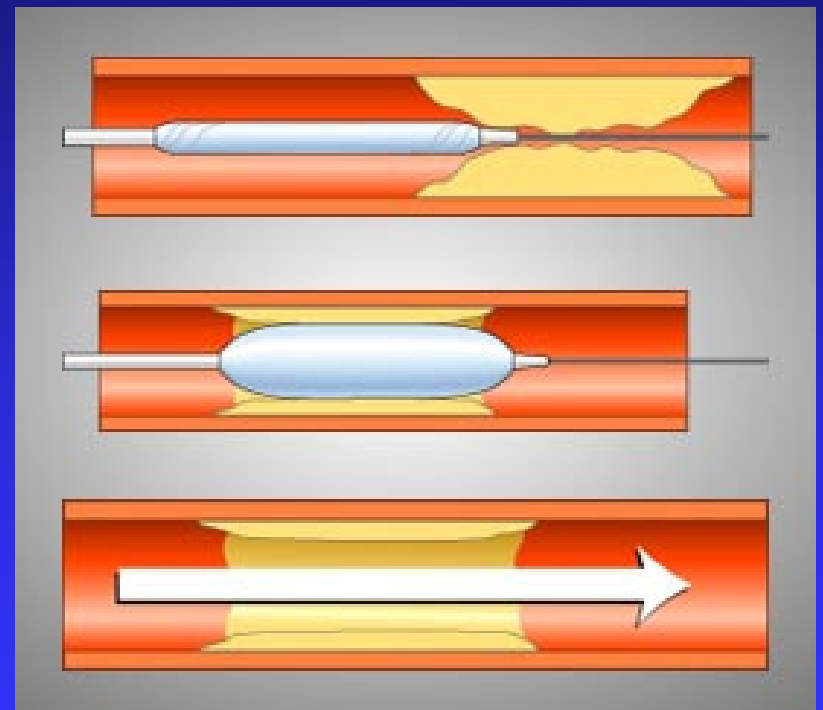
# PCI

- Catheter threaded through artery – usually femoral or radial to the aortic root
- Guide wire is then inserted into the coronary artery and advanced past the area of stenosis



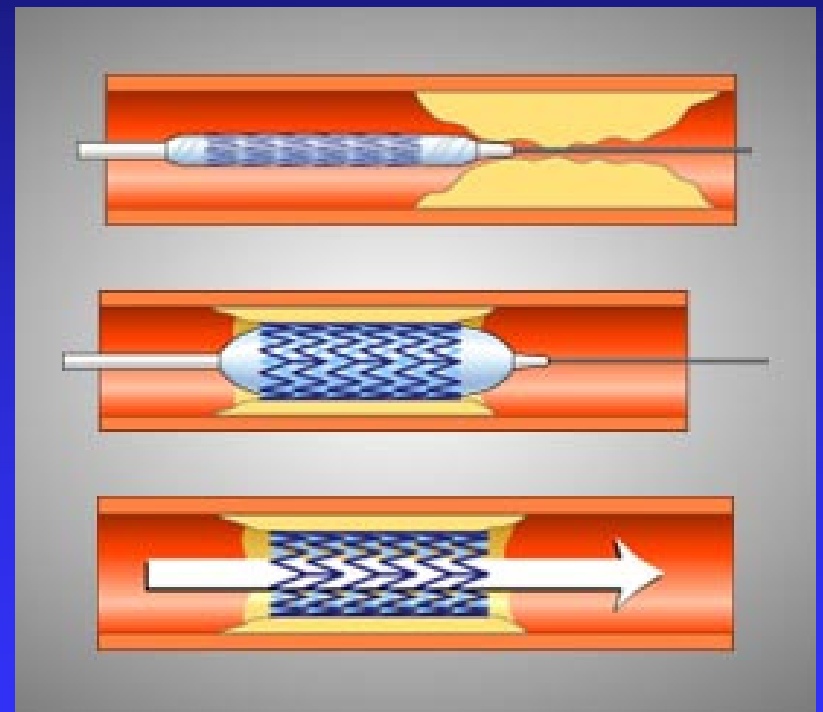
# PCI

- Balloon tipped catheter inserted over guide wire until balloon is in area of stenosis
- Balloon is inflated pushing plaque against the vessel wall



# PCI

- Most PCI are performed with the use of stents
- Wire mesh coil pushed against vessel wall to prevent closure of the vessel post procedure



# PCI

- Presence of a foreign object in the vessel can induce clot formation and therefore restenosis
- Development of drug eluding stents has reduced this risk

# Possible Complications During the Procedure

- Arrhythmias
- Vasovagal reaction
- Thromboembolism
- Tamponade
- MI
- Bleeding at puncture site
- Coronary artery dissection
- Allergy to contrast medium
- Pulmonary edema
- Pulmonary embolism
- Cerebral vascular accident

# Post Procedure Management

- Return from cath lab with IIbIIIa inhibitor infusing
- Patients remain flat – on bed rest
- Sheath remains in place until heparin received during the procedure wears off
- This can be determined by time or testing ACT (normal 70-120 sec., therapeutic 150-190 sec)
- Femoral sheaths removed by specially trained and certified nurse
- Radial sheaths removed by MD

# Post Procedure Management

## ■ Post sheath removal

- ◆ Patient remains flat for minimum 4 hours
- ◆ Frequent monitoring of v/s, cardiac rhythm, peripheral pulses, chest pain, LOC, bleeding or oozing at puncture site, clamp placement, hematoma formation, back pain, leg pain
- ◆ Clamp remains on for approximately 30 minutes – released in increments
- ◆ Patient needs to remain flat during clamp time and for several hours post removal
- ◆ Must avoid anything which will increase intra-abdominal pressure

# Potential Complications

- Vasovagal Reaction – A transient vascular and neurogenic reaction to vascular irritation, and parasympathetic nervous system stimulation, marked by:
  - ◆ Bradycardia – Sudden decrease in HR by 15% or greater
  - ◆ Hypotension – Sudden decrease in systolic blood pressure by 15% or greater
  - ◆ Nausea
  - ◆ Vomiting
  - ◆ Cold clammy skin
  - ◆ Diaphoretic
  - ◆ Pale
- IV fluids (100-200mL)
- Head of bed flat
- IV atropine
- Slight release of clamp unless bleeding occurs
- Notify MD

# Potential Complications

- Acute Occlusion resulting in angina due to:
  - ◆ Jagged edges of plaque or the stent can induce clot formation
  - ◆ Inflammation from trauma to the artery initiating clotting cascade
  - ◆ Arterial spasm and recoil
- Initially treat as vasospasm with IV nitroglycerin to vaso-dilate or calcium channel blocker to relax artery
- If unsuccessful treat as MI
- May need to consider re-dilation or coronary artery bypass surgery
- New onset chest pain or ST segment changes should be reported immediately

# Potential Complications

- Dysrhythmias due to ischemia or reperfusion:
  - ◆ Ischemia during balloon inflation can cause arrhythmias
  - ◆ Common for a re-perfused area of the heart to produce arrhythmias
- Usually transient
- If non lethal – monitor and treat appropriately
- Lethal – follow ACLS guidelines

# Potential Complications

- Bleeding at puncture site – Hematoma or hemorrhage
  - ◆ Bleeding note
  - ◆ Extensive bruising noted at puncture site, down side of hip, or into groin
  - ◆ Firm lump noted at puncture site
- Reassess clamp position and/or apply manual pressure
- If extensive notify MD
- Assess vital signs

# Potential Complications

- Pseudoaneurysm due to catheter dissection of artery wall not sealing post sheath removal or blood leaking while sheath is in.
  - ◆ Unlike other aneurysms which is a tearing of one or two of the three layers of the vessel a pseudoaneurysm is a hole in all three layers of the vessel allowing blood to accumulate in the tissue.
- Assess hematoma
- Size
- Character – soft, firm
- Assess pulses to affected leg
- Other characteristics
- Bruising
- Pain
- Apply pressure to area
- ? Retroperitoneal bleed

# Potential Complications

- Pain at puncture site
- Check site
- Assess limbs
- Administer analgesic
- Notify MD if unrelieved

# Potential Complications

- Back Pain
  - ◆ Due to prolonged period of immobility during bed rest
- Patient may bend unaffected leg
- As period of bed rest progresses HOB may be elevated gradually to no more than 30 degrees

# Potential Complications

- Acute tubular necrosis and renal failure
  - ◆ Due to contrast medium
- Hydration – encourage fluid after hemostasis

# Potential Complications

- Embolic complications
- Due to thromboembolism
  - ◆ MI
  - ◆ Cerebral Infarct
  - ◆ Peripheral Emboli
- MI
  - ◆ Heparin
  - ◆ O2
  - ◆ Nitro
  - ◆ Morphine
- Cerebral Infarct
  - ◆ Monitor neuro vitals
  - ◆ CT head
  - ◆ Possible heparin
- Peripheral Emboli
  - ◆ Monitor pulses
  - ◆ Heparin

# Potential Complications

## ■ Cardiac Tamponade:

- presence of elevated central venous pressure with neck vein distention
- muffled heart sounds
- hypotension
- pulsus paradoxus

## ■ Treatment:

- pericardiocentesis
- cardiac surgery