

5. Percutaneous Cardiovascular Intervention

Background

- A. In the U.S., > 500,000 interventions / year
- B. Worldwide, >1,000,000/ year
- C. Interventional cardiology include Coronary and peripheral angioplasty-stents, intra vascular radiation, valvuloplasty, embolectomy, pericardiotomy, pulmonary and conduit angioplasty (ie AAA), pulmonary valve placement, percutaneous closure holes, foreign body retrieval, L atrial appendage occlusion

II. Interventional Coronary: PTCA-Gruentzig 1977

- A. Adjunctive Technologies
 - 1. POBA (Plain old balloon angioplasty)
 - 2. Stents (Slotted tube and coiled wire)
 - 3. DES-Drug Eluting stents: Sirolimus, Paclitaxel (Taxol), Heparin
 - 4. Cutting Balloons
 - 5. Fx MiniRail (wire on balloon surface)
 - 6. Rotational Atherectomy (Rotablator)
- B. Other Percutaneous Technologies
 - 1. Transluminal Extraction Catheter (TEC)
 - 2. Laser Wire
 - 3. Pullback Atherectomy
 - 4. Directional Atherectomy
- C. Additional Technology:
 - 1. Brachytherapy-Intracoronary X-RT
 - a. -Novoste Beta-Cath™/⁹⁰Strontium-Beta
 - 2. Covered Stents- Wallgraft for AAA Guidant Acure.
 - 3. Ultrasound Thrombolysis
 - 4. Angiojet Rheolytic Thrombectomy
 - 5. Balloon Valvuloplasty (Inoue)
 - 6. Transmyocardial Revascularization TMR
- D. Distal Protection Device-Catches downstream
 - 1. Filter Wire
 - 2. Guard Wire
- E. Non Coronary Cardiovascular Interventions
 - 1. Closure devices-ASD's & PFO: CardioSEAL & Angel Wing & Amplatzer
 - 2. Coils: Vascular Occlusion Device
 - 3. Recover Devices: Snares
 - 4. L Atrial Appendage Transcatheter occlusion : Plaato
- F. Intracoronary Diagnostics:
 - 1. Intravascular Ultrasound (IVUS)
 - 2. Doppler Flow Wire
 - 3. Pressure Wire-Wave Wire-Fractional Flow
 - 4. Angioscopy
 - 5. Intravascular temperature

III. AHA/ACC Lesion Characteristics: Ambrose

- A. Type A; discrete (< 10 mm length); concentric; readily accessible; < 45 degree bend; smooth contour; little/no calcification; not totally occluded; not ostial; no branch involvement; no thrombus.
- B. Type B; tubular (10-20 mm length); eccentric; moderate tortuosity of proximal segment; > 45 to < 90 degree bend; irregular contour; moderate to heavy calcification; total occlusions < 3 months; ostial in location; bifurcation lesions requiring double guides; some thrombus present.
- C. Type C; diffuse (> 2 cm length); excess proximal tortuosity; extreme angulation > 90°; unable to protect major side branches; total occlusion > 3 mos; degenerated vein grafts .

IV. Coronary Intervention Complications:

- A. Major Complications:
 - 1. Death (0.5 – 1%)
 - 2. Q wave MI (1 – 3%)
 - 3. Need for emergent CABG (2%)
- B. Etiology of Complications: "dissection, thrombosis, embolism, spasm, and "snowplowing" of debris into a sidebranch" may lead to abrupt closure of the target vessel, side-branch, or nearby vessel (occurs in 3-8% of cases)
- C. Other Considerations:
 - 1. No-Reflow Phenomenon
 - 2. Restenosis (elastic recoil, neointimal hyperplasia, and arterial remodeling)
- D. Thrombolytic Enzymes (i.e. urokinase)-TAUSA trial increased adverse effects with intracoronary urokinase

V. Directions in Interventional Cardiology:

- A. Gene Therapy
- B. Carotid, Renal and anywhere else stents
- C. Percutaneous placement of temporary and permanent prosthetic heart valves

Peri-Procedure Notes:

- a. Check groin, closure device?
Perclose or Angioseal
- b. Sealant: Syvek Patch, Hemaderm™ Powder
- c. Stent = IIb/IIIa IV until next morning

Mucomist/Acetylcysteine

Controversial for renal dysfunction

600 mg po bid, preferably 12 hours before, and two follow up doses