

6. Coronary Bypass Surgery

1. Surgical Outcome Better Than Medical Therapy "Classic Indications"

Three Landmark Studies: 1) CASS-Coronary artery Surgery Study. NEJM 1985.

2) ECSS-European Coronary Surgery Study. NEJM 1988.

3) VA Study-NEJM 1984

- a. Left Main Coronary Artery Disease
- b. 3-vessel coronary artery disease (3VD) ± Low EF (<50%)
- c. 2-vessel with proximal LAD lesion (EF <50%) and symptoms
- d. Refractory significant Anginal Pain, despite medical and percutaneous interventions
- e. The concept of incomplete target vessel revascularization of the culprit lesion seems to be a promising option for selected high-risk patients, due to lower perioperative mortality.

2. Surgery vs. Angioplasty for Coronary Artery Disease

- a. PTCA patients have a shorter initial hospital stay
- b. 4% Cypher stent patients required repeat procedures in target vessel. Late sub-acute thrombosis a problem.
- c. Overall survival stent and CABG groups, no significant differences over 3.5 years
- d. Anti-anginal meds were required in nearly twice as many PTCA patients vs. CABG
- e. Angioplasty: Less "pump heads", if not done as a OBCAB

3. Medical, Angioplasty, Surgery for Multivessel Coronary Disease MASS-2

- a. Overall 5-year survival was similar in angioplasty vs. CABG. Medicines may be BEST
- b. Overall in-hospital mortality was ~1.2% (not significantly different between groups)
- c. Subsequent revascularization was 8% in CABG group and 54% in angioplasty group
- d. Diabetics (insulin / non-insulin) had 80% 5-year CABG survival vs. 65% with angioplasty
- e. Overall costs after 5 years were lower for angioplasty only for 2 vessel CAD
- f. Risk of surgical mortality and morbidity inversely related to ejection fraction

4. Overview of Procedure

1. Goal is bypass of significant stenosis with vascular graft from aorta to distal site
2. Up to ~8 separate grafts can be placed in one operation
3. The heart is stopped (cardiac stasis) in a controlled setting
4. Cardiac stasis usually induced by instilling cold solution, but recent trials using potassium as an anti-inotrope with maintenance of physiologic temperature (warm cardioplegia) very favorable
5. Cardiac bypass initiated
6. Arterial grafts (usually internal mammary) are preferred over vein grafts
7. Arterial grafts have longer lifetime without reocclusion : LIMA, RIMA, Radial, Gastroepiploic
8. Compared with saphenous vein grafts, arterial grafts confer a survival benefit
9. The heart is restarted with electrical stimulation at completion of procedure

5. Coronary Artery Bypass Graft Disease

1. Average lifespan of a vein (usually saphenous) graft is 5-8 years; 50% patency at 10 years
2. Average lifespan of an arterial (usually internal mammary) is >10 years (90% patency)
3. Treatment with antiplatelet agents decreases vein graft occlusion rate
4. Warfarin therapy (<4mg/d; INR ~1.8) did not improve angiographic vein graft patency.
5. Consider reoperation for symptoms due to atherosclerosis of LAD graft disease.
6. PTCA and/or stent placement can be used for obstructed grafts.

6. Prognosis

1. Overall 1 year survival >90%, 5 year survival >75%
2. Renal dysfunction and diabetes mellitus (DM) are risk factors for increased mortality
3. Smoking is a major contributor to morbidity and mortality

7. New Procedure:

1. **OPCAB** beating heart coronary bypass
 - Avoids cardiopulmonary bypass. Mechanical stabilizers.
2. **MIDCAB** Minimally invasive CABG (Heart port system)
 - Applicable to very small segment of coronary heart disease (5%)
 - CABG is possible only for limited disease and is mainly done with LIMA to the LAD and Diagonal
3. **TECAB**-Totally endoscopic bypass grafting
 - Several very small incisions, no sternotomy, and is never placed on the heart-lung machine.
 - Two robotic assist systems available Computer Motion's Zeus and Intuitive Surgical's da Vinci.
4. **PortCAB** Port-access coronary artery bypass

