Tips And Techniques For Multivessel OPCAB

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“Beating Heart” Surgery vs “Beat The Heart” Surgery
OPCAB CAN BE A WILD RIDE...

UNLESS YOU HAVE A REALLY STABLE SADDLE

Immobilizer
OPCAB Technique

- sternotomy, limited skin incision and retraction
- LIMA (RIMA) harvest under direct vision
- wide pericardiotomy, traction sutures; open pleurae
- epiaortic U/S in every patient (60-90 seconds)
- cardiac displacement: Starfish/Urchin + deep traction suture
- mechanical coronary stabilization: Octopus IV/ Acrobat
- proximal occlusion of target vessels with silastic
- distal “no-touch”; blower; 8-0 suture; 3.5x loupes
- SVG or RA proximals from ascending aorta or IMA
- Doppler assessment of grafts
Techniques For Multivessel OPCAB In 2001

“Heart may be rotated but not compressed”

- Divide diaphragmatic muscle which inserts on right xiphoid to elevate right sternal border
- Open both pleural spaces widely; pacing
- Bilateral, transverse, diaphragmatic pericardiotomies towards phrenic nerves
- Deep pericardial traction suture(s); sling
- PLOM, MOM, ALOM, Ramus: let base of heart descend; rotate apex under right sternal border
- PDA, PLV, PLOM: elevate base of heart; apex toward the ceiling; traction suture above IVC
- Third generation stabilizer: Octopus III
Multivessel OPCAB Since 2003
“Heart may be rotated but not compressed”

- Divide diaphragmatic muscle which inserts on right xiphoid to elevate right sternal border
- Open right pleural space only for large hearts, low EF, multiple lateral wall grafts
- Deep pericardial traction suture
- Use Starfish/Urchin for atraumatic cardiac displacement
  - on apex for PDA, LAD, Diagonal
  - on lateral wall for RI, ALOM, MOM, PLOM
  - on acute margin for RCA
- Latest generation coronary stabilizer
Manipulate the Heart:

Slowly
Gently
Incrementally
Persistently
Manipulate the Heart With:

“Apical” Suction Devices
Traction Sutures
Table Rotation/Tilt
Gravity

Not your hands!
Pericardial Suture(s)
OPCAB
Left Circumflex Grafts

- deep traction suture(s) and suction positioner in combination
- bilateral transverse diaphragmatic pericardiotomy
- rotate heart to right; avoid compression against sternal border
- excise right pericardial fat pad
- atrial pacing for large hearts
- open right pleural cavity for large hearts, low EF, multiple OMs
- latest generation stabilizers
- learning curve, patience and judicious persistence
Using The Cardiac Positioner

- The Starfish (or Urchin) can be used on ANY surface of the heart and is most helpful when moved around for different grafts:
  - On apex for LAD, Diagonal, PDA
  - On lateral wall for Ramus and Obtuse Marginals
  - On acute margin for RCA, some PDAs
- Place it near the target artery, but not too near
- Use minimum suction necessary
- Avoid cracks in epicardial fat that break suction
Using the Coronary Stabilizer

- The Coronary Stabilizer may be used to both present and to stabilize coronary artery targets, but it works best to stabilize.
- The Octopus or Acrobat is a suction device, not a compression device. **Apply it at the mechanical median of the cardiac cycle.**
- If hemodynamics are compromised, try easing off the degree of compression (do not turn off suction).
- Take advantage of the malleable pods.
Using the Coronary Stabilizer

- The malleable pods may be:
  - bent up or down or bent into a curve
  - bent together or apart
  - rotated
  - bent independent of each other

- Especially useful for irregular epicardial fat to optimize “tissue capture” and stabilization.

- Useful for curved areas of the heart, grafting vessels close to each other.

- Pods together for max stabilization.
Using the Mister-Blower

- Use warm, humidified, pH-balanced fluid.
- Minimize force of CO₂ at all times.
- Blow on target ONLY when driving the needle. Otherwise, direct jet outside field.
- Beware of endothelial injury or vessel wall dissection which are possible with excessive use of the blower.
OPCAB Suture Technique

- Proximal occlusion with silastic vessel loop
- Direct silastic loop with pericardial suture
- “No touch” distally
- Shunts used sparingly:
  - large RCAs (alternative to pacing)
  - intramyocardial vessels
  - critical anatomy
- Good visualization is *sine quo non* of precise anastomoses; humidified CO2 mister/blower
- “Second” assistant is your best friend
- Head light, 3.5x loupes, Castros, 8-0 suture
- See intima on both sides, every stitch
OPCAB Techniques: Intramyocardial Vessels

- Use “usual” tricks to find vessel:
  - refer to angio
  - dissect back from visible branch
  - “see” or feel the vessel
  - use topographic clues, crevices/creases in epicardial fat

- Optimize use of malleable pods of stabilizer.
- Achieve tissue capture, then (progressively) spread pods apart to expose IM vessel(s).
- Blower is key to visualization.
- May use shunt rather than snare.
“Rules” For Graft Sequencing
In Multivessel OPCAB (1)

- Graft the collateralized vessel(s) first, then reperfuse the collateralized vessel(s)
- Finally, graft the collateralizing vessels last.
- Be flexible with timing of IMA-LAD anastomosis:
  - First:
    - LAD is collateralized
    - tight LM
  - Last:
    - LAD is least diseased (collateralizing)
    - Routine case, completely stable
“Rules” For Graft Sequencing In Multivessel OPCAB (2)

- Be flexible with timing of proximal:
  - first, for critical ischemia, early reperfusion is desired
  - early, after distals of critical collateralized targets
    - allows perfusion during occlusion of the collateralizing vessel and minimizes overall ischemia
    - early, before in situ RIMA distal
    - last, after LAD distal, in routine cases
      - facilitates estimation of graft length
“Rules” For Graft Sequencing In Multivessel OPCAB (3)

- Beware occlusion of the large RCA, especially if it is not very tightly stenosed: BRADYCARDIA
  - Epicardial pacing
  - Intracoronary shunt
  - reperfuse other collateralizing vessels first

- Beware mitral regurgitation in OPCAB
  - cardiac displacement + MR = HD instability
  - Ischemic MR: graft culprit vessel to papillary muscle early
“Rules” For Graft Sequencing In Multivessel OPCAB (4)

- Graft sequence in OPCAB should be INDIVIDUALIZED FOR EACH PATIENT:
  - Coronary anatomy, pattern of stenoses
  - Patterns of collateralization
  - Myocardial contractility
  - Ascending aortic atherosclerosis
  - Conduit availability
  - Graft geometry
OPCAB
Heparin Protocol

- Half dose (1.5 mg/kg) Heparin IV given 3 min before IMA is divided from chest wall
  - Supplemented with 3000 units every 30 minutes
  - ACT monitored, kept > 300 sec
- Half dose (typically 0.75 -1.0 mg/kg) Protamine after last anastomosis; ACT 130-150
OPCAB Platelet Inhibition

- Aspirin not stopped preop
- Aspirin 325 mg po night before OPCAB
- Aspirin 325 mg per rectum as foley catheter is inserted
- Plavix routinely given postoperatively (since 2003 at Emory), starting with 150 mg “load” 4-12 hours postop and then 75 mg qd for 6-12 months
- Aspirin 162 mg qd beginning 4-12 hr postop; life