CARDIAC SAQ 3

OPCABG

N R Burri
• **Question 9 (Orange Book)**
• a) What are the theoretical advantages of “off pump” coronary artery bypass grafting (OPCAB) compared to “on bypass” technique? (35%)
• b) What causes haemodynamic instability during OPCAB? (20%)
• c) Which strategies help to minimise this haemodynamic instability? (25%)
• d) Outline the measures that help to minimise perioperative hypothermia during OPCAB. (20%)
Weighting:

- Advantages over on pump........................35%......7
- Causes of HD instability..........................20%......4
- Strategies to minimize above..................25%......5
- Strategies to minimize hypothermia.20%......4
RATIONALE BEHIND OPCABG

Avoidance of complications of CPB

• SIRS
• Coagulopathy
• Neurological injury
• Renal impairment
KEY POINTS - OPCABG

- **Grafts:** Possible to do multiple grafts
- **Main challenge:** Maintenance of HD stability
- **Benefit:** Reduced requirement of blood
- **More benefit:** To high risk patients
- **Communication:** Good between A & S
OPERATIVE TECHNIQUE

• Effective local cardiac wall stabilization
  Epicardial placement of Stabilizer

• Facilitation of Cardiac displacement:
  Deep pericardial retraction sutures
  Stockinet sutured into oblique sinus

• Double limb shunt through arteriotomy site
OPERATIVE TECHNIQUE

OCTOPUS SYSTEM

- Double Limb

Stabilization device

Bypass graft

Stenosis of the left anterior descending coronary artery

Suction cups
TRANSVERSE & OBLIQUE SINUSES OF THE HEART
DOUBLE LIMB INTRACORONARY SHUNT
INTRACORONARY SHUNT
SHUNT SHUFFLE TECHNIQUE
VERTICALISED HEART - TOE IMAGE
ANAESTHETIC TECHNIQUE

- Induction & Maintenance: Safe conduct
- Cardiac protection: Offer to maximum
- Maintain HD stability: Monitor / Rx
- Post Op: Early emergence & Excellent analgesia

- Anticoagulation: Targeted ACT: 250 – 300 sec
  Heparin: IV 100 -200 iu/kg
  Reverse with Protamine
MONITORING

- 12 lead ECG (Lead II + V5)
- Invasive: Arterial / CVC / PAFC
- TOE: Difficult to interpret and acquire image
Haemodynamic management

3 CAUSES OF HD INSTABILITY:

- Displacement of heart (lifted up)
- Pressure by retractor on the myocardial wall
- Vertical position of heart: leads to MR & TR

MANAGEMENT:

- Maintain high perfusion pressure MAP > 70
- Trendelenberg position / Fluids / Vasopressors
- Beta blocker for tachycardia
Off-pump coronary artery bypass surgery: physiology and anaesthetic management

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a) ADVANTAGES OVER CPB........7

- High risk patients with severe co morbidities
- Reduced derangement of coagulation
- SIRS to CPB / \downarrow Inflammatory markers post op.
- Reduced need for transfusion
- Reduced incidence of stroke
- Reduced ventilatory support & ICU stay
- Reduced costs.
- ? Reduced risk adjusted mortality (2.9 vs 2.3)
b) CAUSES OF HAEMODYNAMIC INSTABILITY...

- Displacement of heart (lifted & tilted)
- Pressure by retractor on the myocardial wall
- Profound: Anterior & lateral wall compression
- Vertical position of heart: Leads to MR & TR
- Distortion of Atrioventricular annulus
c) STRATEGIES TO MINIMISE HD INSTABILITY…..5

• Hypotension:
  - Leg elevation  Trendelenberg Position
  - Norepinephrine perfusion
  - Increase i.v. fluid administration
  - HR up to 50 – 60/mt atrial pacing if bradycardic

• Low cardiac output (SvO2 < 60%)
  - Increase heart rate with atrial pacemaker wire
  - Increase preload As far as possible,
  - No β-stimulation before revascularization
  - Intra-aortic balloon pump if LV acute failure
BUFFINGTON RATIO
Coronary stenosis & MI

MAP/HR < 1 = Risk of MI

• Maintain MAP > 70mmHg
• Vasopressor & Preload
• Keep MAP higher than HR
d) STRATEGIES TO MINIMISE HYPOTHERMIA

• Room temperature set at 24°C.
• Fluid warming.
• Forced-air heating device.
• Heating mattress.

= Routine measures to counter hypothermia