Update on Cardiac Anesthesia and Surgery

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“How to make an omelet”
Cardiac Anesthesia

- Surgical Issues – “EGGS”
- Anesthetic Issues -- “MEAT”
- Monitoring Issues -- “MUSHROOMS”
- Post-operative Issues -- “SAUCE”
- Antibiotic Issues -- “CHEESE”
- Glucose Management Issues -- “PEPPERS”
- CNS Issues-- “ONIONS”
- Hematologic Issues --“TOMATOES”
- Hemodynamic Control – “Salt & Pepper”
Surgical Procedures

- CABG Surgery
- OPCAB Surgery
- Valve Surgery
- Aortic Surgery
- Dys-rhythmia Surgery
- Robotic Surgery
CABG Surgery

- Combination of vein and arterial grafts
- Endo vascular vein harvesting the standard
- Cardioplegia administration, proximal graft placement, use of cross clamp are surgeon specific
- Arterial conduits subject to spasm
OPCAB Surgery

- Originally designed for incomplete stenting
- Beneficial in patients at risk for complications from cardiopulmonary bypass
- Used for younger patients with a good EF
- Shunting beneficial
- Rate control/ischemic pre-conditioning are no longer essential
- Anesthetic management is critical
Valve Surgery

- TEE has revolutionized this surgery
- Valve repair (mitral) is increasingly popular
- Aortic valve surgery often done via a mini-sternotomy
- Tissue vs mechanical valve replacement
- Tricuspid repair is now recommended
Aortic Surgery

- Ascending aorta dilatation is detected by cath or echo
- High resolution CT scanning defines aortic dimensions
- Aortic valve/ ascending aorta replacement is increasingly common
- Retrograde cerebral protection is beneficial
- Various glue products have improved hemostasis
Dysrhythmia Surgery

- Modified Mazze procedure often accompanies mitral valve repair/replacement in patient with atrial fibrillation
- Left atrial plication common
- Vats for epicardial lead placement and pathway interruption possible
Robotic Surgery

- Avoids sternotomy and cardiopulmonary bypass in selected patients
- Primarily for left sided lesions
- Time consuming
- Requires one lung ventilation
Surgical Issues

“EGGS”

- Preserve Cardiac Function
- Prevent Neurologic Damage
- Use of Vein vs Arterial Grafts
- Cardiopulmonary Bypass Advances
  - Vacuum assisted venous drainage/RAP
  - Avoidance of aortic cross clamping
  - Retrograde cardioplegia
Primary Anesthetic Goals

“Meat”

- Induce a stable anesthetic
  - Propofol vs Etomidate vs Narcotics
- Prevent awareness and control hemodynamics
  - Propofol/Inhaled Anesthetics
- Provide a rapid controlled emergence
  - Role of Anti-histamines, Cardiopulmonary bypass
Anesthetic Issues

“MEAT”

- Role of Intravenous Anesthetic Agents
  - For induction
  - For maintenance
- Role of Narcotics
- Role of Inhalational Agents
- Role of Relaxants and Reversal Agents
Post-Operative Issues

“Sauce”

- Early emergence should be the standard unless contraindicated
- Cardiac function, temperature, bleeding, respiratory function, and mental status are deciding factors
- Early extubation is the deciding factor in limiting length of stay
- Requires committed Critical Care Nursing personnel and protocol driven extubation
Secondary Anesthetic Issues

- Infection Prevention
- Antibiotic Administration
- Temperature Control
- Glucose Control
- Hemodynamic Control
- Anticoagulation
- Hemostasis
- Transfusion Therapy
CATS

Clippers/Antibiotics/Temperature/Sugar
“Cheese”

- **Clippering of Hair**

- **Antibiotic Selection and Administration**
  - Cephalosporins when appropriate
  - Role of MRSA/VRE/C Diff
  - Timing of administration is crucial
  - Re-dosing is essential
CATS (continued)

- **Temperature management**
  - Maintain room temperature
  - Prepping and draping as quickly as possible
  - Use of active and passive warming devices

- Improves myocardial performance

- Thought to improve outcome

- Improves coagulation

- May improve wound healing / reduce infections
CATS
“PEPPERS”

- **Glucose management**
  - Improves Outcome
    - Neurologic
    - Reduces incidence if Wound Infection
  - Post-Operative Target -- <110 mg/dl
  - Pre-Operative Hgb A1c is useful
  - Insulin infusion plus glucose infusion works best
Monitoring Issues

- Cardiovascular Monitoring
  - Pulmonary Artery Catheter Monitoring
  - Trans-esophageal Echocardiography
- CNS Monitoring
  - BIS Monitoring
  - Cerebral Oximetry Monitoring
- Neuromuscular Blockade Monitoring
- Bedside Laboratory Testing
CNS Issues
“Onions”

- **Stroke**
  - Embolic vs Thrombotic
  - Primarily a Surgical Issue
  - Micro emboli
  - Atheroma from instrumentation of the aorta
    - Epi-aortic scanning
  - Air emboli during open procedures

- **Post-Operative Cognitive Dysfunction**
  - Anesthetic related
  - Subtle but reversible
Hematologic Issues

“Tomatoes”

- Heparin is the mainstay
  - Heparin resistance is an issue
  - HIT complicates care
- Role of Aprotinin
- Role of Amicar and Transexamic acid
- Role of Cell Salvage, Hemodilution and return of chest tube drainage
- Role of Transfusion
Hemodynamic Control
“Salt & Pepper”

- **Vasopressors**
  - Standard drugs: Ephedrine, Phenylephrine, Nitroglycerine, Nitroprusside
  - Other drugs: Norepinephrine, Epinephrine, Vasopressin, Nicardipine

- **Inotropic drugs**: Dopamine, Dobutamine, Epinephrine, Milrinone

- **Anti-Dysrhythmics**: Lidocaine, Amiodarone