

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”

- Clipping 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 of 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 Aprotinen
- 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