



The 5th Annual Conference of

The Egyptian Cardiothoracic Anesthesia Society

11-12 February, 2009 - Hilton Golf Hotel Resort
13 February, 2009, The learning Resource Center
Faculty of Medicine, Cairo University
Egypt



www.ectasegypt.org



**The 5th Annual International Conference of
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Anesthesia Society
(E.C.T.A.S)**

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WELCOME

Dear Friends and Colleagues

I am delighted to have the opportunity to welcome you at the fifth Annual Meeting of the Egyptian Cardiothoracic Anesthesia society (ECTAS).

This important scientific event will take place in Hilton Pyramid Hotel 11-12 February 2009 Located in October 6th district, near by Giza the city of grand history, magnificent Pyramids and Great vivacity.

The scientific program of the fifth annual meeting is addressing the most current Developments in cardiothoracic anesthesia and intensive therapy. We have an exciting Combination of advanced lectures which will be presented by distinguished international Speakers and oral presentations with special educational symposia and practical Workshops.

I am sure that this excellent scientific program will have a positive input for further development of our medical discipline in Egypt.

Where the number and quality of heart and lung operations has increased continuously over the last several years

There is no doubt those cardiothoracic anesthesiologists contribute significantly to the positive outcome in cardiovascular and thoracic Surgery and intensive care medicine and may have further advances in our professional skills and the efficiency of patient care.

I am sure that ECTAS 2009 Meeting will stimulate further development of anesthesia and Intensive therapy in our country and provide an excellent opportunity to merge new ideas, Different views, cultures, and people from the whole world in the climate of Egypt Hospitality. Our ECTAS 2009 Meeting should also be memorable for the fact that this year

We will have the 1st exam for the TEE accreditation for the anesthesiologist In Egypt which will be held on 13 February 2009 In Cairo university.

Conference President

Prof. Dr. Fawzeya Aboul Fetouh

President of the ECTAS

Secretary General

Prof. Dr. Adel Abdel Fattah

President of the Scientific Committee

ECTAS Board

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Dr. Maged Salah

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Dr. Ahmed Mukhtar

Dr. Maged Salah

Dr. Hossam Ashmawy

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International Speakers

Dr. Abd El Hameed El-Samarkandi

Dr. Ahmed Shawky

Dr. Anis Baraka

Dr. Dhafir El-Khodairi

Dr. Faisal Elghadam

Dr. Matthas Arlt

Dr. Peter Booker

Dr. Rob Feneck

Dr. Sabine Voelkel

National Speakers

Dr. Adel Abdel Fattah

Dr. Amani Abo Zeid

Dr. Amani Ezzat

Dr. Amr Abdel Moneim

Dr. Ashraf Al-Masry

Dr. Fawzeya Aboul Fetouh

Dr. Fodan Shaltot

Dr. Gamal Fouad

Dr. Hisham Hosny

Dr. Karim Mashhor

Dr. Maged Salah

Dr. Ahmad Mukhtar

Dr. Mohamed Yosry

Dr. Tarek Mohsen

PROGRAM

Wednesday, February 11, 2009

08:00-08:30 Registration
08:30-09:00 Opening Ceremony

Session I 09:00-10:40 Pediatric Cardiac Anesthesia

Chairpersons: Prof. Dr. Adel Abdel Fattah, Prof. Dr. Peter Booker, Prof. Dr. Ekram Abdalla

09:00-09:20 Anesthesia for Pediatric Cardiac MRI
Peter Booker

09:20-09:40 Anesthesia and Eisenmenger's Syndrome
Peter Booker

09:40-10:00 Hypoplastic Left Heart Syndrome Anesthesia Consideration
Aly Anwar

10:00-10:20 Anesthesia for Thoracoscopic Pediatric Surgery
Fodan Shaltot

10:20-10:40 Discussion

10:40-11:00 Break

Session II 11:00-12:40 Cardiac Surgery in Special Population

Chairpersons: Prof. Dr. Anis Barka, Prof. Dr. Talaat Abdel Haleem, Prof. Dr. Nahed Effat

11:00-11:20 Cardiopulmonary Bypass in the Pregnant Cardiac Patient- Maternal Fetal Conflict
Anis Baraka

11:20-11:40 Cardiac Surgery in Patients with End Stage Liver Disease
Ahmed Mukhtar

11:40-12:00 Ladies First!: Gender-Related Pathophysiologic Differences in Coronary Artery Disease and Perioperative Management
Gamal Zaki

12:00-12:20 Hemodynamic Crisis in Patients Having Neuromuscular Disorders
Anis Baraka

12:20-12:30 Discussion

12:30-12:40 Prayer Time

Session III 12:40-15:00
Cardiac Anesthesia, State of the Art

Chairpersons: Prof. Dr. Adel Abdel Fattah, Prof. Dr. Gamal Fouad, Prof. Dr. Ahmed El-Agaty

12:40-13:00 The Impact of (rFVIIA) to Control Intractable Bleeding in Cardiac Surgery
Fawzia Aboul Fetouh

13:00-13:20 Clinical, Echocardiographic and Laboratory Assessment of the Cardioprotective Effect of Deferoxamine in Patients Undergoing CABG
Pierre Zarif Tawadrose

13:20-13:40 Organ Protection Properties Sevoflurane
Fawzia Aboul Fetouh

13:40-14:00 Role of Entropy as a Monitor of Depth of Anesthesia
GE Healthcare Symposium

14:00-15:00 **Lunch**

Session IV 15:00-17:00
Postoperative Situation of Special Interest

Chairpersons: Prof. Dr. Yehya Khater, Prof. Dr. Safeya Abdel Hameed, Prof. Dr. Fayka Madboli

15:00-15:20 Mechanical and Electrical Support of the Failing Heart
Ahmed Shawky

15:20-15:40 Long Term Postoperative Nutritional Management in Ischemic Patients
Amr Abdelmonem

15:40-16:00 NIPPV Therapy for Postoperative Cardiac Patients
Amany Abozeid

16:00-16:20 Acute Post Thoracotomy Neuropathic Pain, Mechanisms, Management and Outcome
Amany Ezzat

16:20-16:40 **Discussion**

Thursday, February 12, 2009

Session V 09:00-11:00 Challenge in Cardiac Surgery

Chairpersons:	Prof. Dr. Assem Abdel Razik, Prof. Dr. Fawzia A. Fetouh, Prof. Dr. Golnar Fathy
09:00-09:20	Cardiac Surgery in the Elderly; How Well are we Doing? Rob Feneck
09:20-09:40	Diastolic Dysfunction in Cardiac Surgery Patient Challenges in Anesthesia and Intra Operative Management Faisal Alghadam
09:40-10:00	A Novel Risk Prediction Model for Postoperative Blood Loss in Adult Cardiac Surgery Patients Sabine Voelkel
10:00-10:20	Off Pump: Update Dhafer Elkhodery
10:20-10:40	Discussion
10:40-11:00	Break

Session VI 11:00-12:40 Perioperative Management

Chairpersons:	Prof. Dr Hoda Saad, Prof. Dr. Ossama Abdel Hay, Prof. Dr. Tamer Ossama
11:00-11:20	Patients with Coronary Artery Stents Perioperative Consideration Adel Abdel Fattah
11:20-11:40	Statin In Cardiac Surgery Abdel Hameed El-Samarkandi
11:40-12:00	Update In Coagulation During Cardiac Surgery Ayman Dessoki
12:00-12:20	Screening for Risk Factors Karim Mashhour
12:20-12:40	Discussion

Session VII 12:40-14:00
Extracorporeal Management

Chairpersons: Prof. Dr. Mohamed Morad, Prof. Dr. Maha Nassar, Prof. Dr. Omar Elsafty

- 12:40-13:00** A New Portable Ecmo System for Mechanical Life Support in Resistant
Cardiopulmonary Failure
Matthias Artl
- 13:00-13:20** Vascular Reactivity and Cardiopulmonary Bypass
Rob Feneck
- 13:20-13:40** Cerebral Oximetry: The Monitor of Mass Debate
Hesham Hosni
- 13:40-14:00** Red Blood Cells Rheology Between Cyanotic and Acyanotic Heart Disease
Mohamed Saleh
- 14:00-15:00** Lunch

Session VIII 15:00-16:40
Anesthesia for Thoracic procedure

Chairpersons: Prof. Dr. Medhat Hashem, Prof. Dr. Hisham Kheder, Prof. Dr. Laila Hassan

- 15:00-15:20** COPD and Implications of Lung Volume Reduction Surgery in the Current Era
Tarek Mohsen
- 15:20-15:40** Anesthetic Implications for Esophageal Surgeries
Ashraf Almasry
- 15:40-16:00** Assessment Criteria for Lung Resection
Fawzia Aboul Fetouh
- 16:00-16:20** Chronic Post - Thoracotomy Pain Syndrome
Mohamed Yousry
- 16:20-16:40** Discussion

Friday, February 13, 2009

Session I 09:00-02:00

Chairpersons: Prof. Dr. Wafaa Al-Arosy, Prof. Dr. Ahmed Mukhtar

- 09:00-09:20** Physics and Echocardiography
Prof. Dr. Rob Feneck
- 09:20-09:40** Basic TEE views
Dr. Dina Soliman
- 09:40-10:00** TEE Assessment of Aortic Valve
Prof. Dr. Rob Feneck
- 10:00-10:20** Hemodynamic Assessment Using TEE
Dr. Maged Salah

10:20-11:00 Coffee Break

Session II 11:00-13:30

Chairpersons: Prof. Dr. Mahmoud Battawy, Prof. Dr. Medhat Hashem

- 11:00-11:20** Cardiac Masses and the Pericardium
Prof. Dr. Rob Feneck
- 11:20-11:40** TEE Assessment of Infective Endocarditis
Prof. Dr. Amal Khalifa
- 11:40-12:00** The Thoracic Aorta
Prof. Dr. Rob Feneck
- 12:00-12:30** Discussion

12:30-13:30 Prayer and Lunch

Session III 13:30-15:00

Chairpersons: Prof. Dr. Nabila Abdel Aziz, Prof. Dr. Hossam El-Ashmawy

13:30-13:50 Indications, Safety and Complications of TEE
Prof. Dr. Rob Feneck

13:50-14:10 TEE Assessment of Mechanical Valve
Prof. Dr. Hussein Heshmat

14:10-14:30 TEE Assessment of Mitral Valve Repair
Dr. Dina Soliman

14:30-15:00 Discussion

TEE Exam

Chairpersons: Prof. Dr. Rob Feneck, Prof. Dr. Maged Salah, Prof. Dr. Ahmed Mukhtar

15:00-16:00 Exam (paper 1)

16:00-16:30 Break

16:30-17:30 Exam (Paper 2)

ABSTRACT

ANESTHESIA FOR PEDIATRIC CARDIAC MRI

Dr. Peter Poker

Introduction:

Before 2003, all UK institutions performing paediatric cardiac surgery submitted their patients to echocardiography; if diagnostic problems remained, they underwent cardiac catheterisation. Since 2003, many patients with complex congenital heart problems now undergo MRI or CT rather than catheterisation, unless measurement of pressure is essential or interventions are required. In the past five years, the number of infants and children undergoing diagnostic cardiac catheterisation in our institution has fallen by 52%, and the number of infants and children undergoing cardiac MRI has increased by 130%.

Advantages vs. Echocardiography: [1]

- Large field of view (no constraints due to acoustic windows)
- Three dimensional imaging with high spatial resolution
- Tissue characterisation
- Freedom from artefacts due to calcification or surgical patches
- Reproducibility
- Serial accurate measurements of ventricular function with no geometric assumptions
- Most accurate method for quantifying regurgitant fractions, stroke volumes, etc.

Advantages vs. CT:

- Equally good three-dimensional imaging is acquired
- No exposure to X-radiation or iodine-based contrast media
- Provides more accurate measure of ventricular function (25-40 frames per cardiac cycle vs. 10 frames per cycle for CT)
- Phase-contrast imaging offers good assessment of valve function (CT unable to quantify regurgitant valve lesions using flow measurements)

Disadvantages:

- Requires general anaesthesia if behavioural problems or mental age <8 yr (threshold higher for CT as scan time shorter); usually not required for transthoracic echocardiography
- Exposure to gadolinium-containing contrast agents (though less toxic than iodine-based contrast); contraindicated in patients with severe renal dysfunction
- Take much longer (30-60 min) than CT (4-6 min)
- Waiting list relatively long (about 4 weeks) unless 'urgent'; no waiting list for CT or echo
- Airway (relatively) poorly visualised, so suspect vascular ring best imaged using CT
- Cannot be used for patients with some metallic implants (including those being paced)

- Image quality less good in patients with high heart rates ; ECG gating severely limits time interval in which to obtain data
- Image quality less good for very small structures, as maximum image resolution = 1 mm² (CT image resolution 0.7 mm²)
- CT better for patients with pulmonary venous abnormalities or aorto-pulmonary collaterals

Particular indications for MRI:[2]

- Assessment of right ventricular outflow tract obstruction
- Aortic disease (and left ventricular function)
- Post-arterial switch repair (imaging of branch pulmonary arteries and coronary arteries)
- Assessment of complex congenital heart disease

Sedation vs. general anaesthesia

Remaining motionless in the MR scanner is essential for data integrity because motion blurs the image and gives erratic volume measurements. Most sensible children over six years old can remain still in the scanner and cooperate with breath-holding as requested. (Respiratory movement also produces artefact). However, for high quality cardiac imaging in infants and young children, general anaesthesia (including paralysis and controlled ventilation) is commonly used to ensure complete lack of motion artefact and the highest possible image quality. Nonetheless, a few institutions perform 'deep sedation' rather than general anaesthesia on young children requiring cardiac MR imaging. A typical sedation protocol for a two year old would include intravenous midazolam 0.1 - 0.2 mg/kg and fentanyl 1-2 mcg/kg. A recent retrospective review of a similar sedation technique in 652 children was compared to general anaesthesia in 153 (sicker) children; it showed no statistical or clinical differences amongst images obtained, according to the blinded observer examining 30 samples from each group. [3] Fourteen sedated children awoke before scanning was complete, but there were no serious adverse events during or after the scan. The authors concluded that young children requiring cardiac MRI can be safely sedated (as long as you use a dedicated sedation team and carefully select your patients), with a high success rate and no compromise in image quality.

Specific concerns for the anaesthetist working in the MRI suite include:

- Effect of magnetic fields, radiofrequency emission & electromagnetic interference on conventional monitors means that special MRI-compatible equipment is essential
- Remote access to patient; lack of visibility of patient
- Effect of magnetic field on implants containing ferromagnetic material (including stainless steel alloys) Effect of magnetic field on external ferromagnetic objects
- Noise (up to 120 decibels in 1.5 T scanner)
- Isolated working environment; lack of immediately available help in event of emergency

The advent of 3 Tesla scanners increases the challenge to providing safe patient care; a recent survey found that burn injuries (secondary to heat generated in a conductor lying on a patient), and projectile injuries increased substantially in these much more powerful magnetic fields.

A recent review of infants requiring cardiac MRI during their stay in the PICU (either preoperative or postoperative) suggested that general anesthesia is safe even in this critically ill group of patients who required intensive monitoring.[5] All patients were paralysed, intubated and ventilated for the procedure. 70% of patients had procedures or interventions initiated purely on the basis of their MRI findings.

Anaesthetic Management of Infants And Children Requiring Cardiac MRI

Preoperative assessment:

- Diagnosis and current problems, including exercise tolerance
- Past anaesthetic history
- Past medical and surgical history
- Current medications & allergies
- Examination, including HR, BP, O₂ sats

Anaesthetic technique:

- Propofol or sevoflurane induction
- Paralysis using rocuronium (0.5-1 mg/kg)
- Intubation and IPPV (circuit loop from ventilator to patient through control room)
- Maintenance using inspired nitrous oxide 50-60% and isoflurane 1.0% in oxygen
- Reversal at end of procedure
- Extubation when awake in recovery (usually within 5 min)

Postoperative care:

- Most of our cardiac MRIs are performed on patients expected to return home within 2 h of the end of the procedure
- Patients are admitted first to our day case ward and return there for observation after the scan is complete
- If patients are asymptomatic and normally have oxygen saturations >95% in air, then we aim to discharge them home after only one hour
- For chronically hypoxic patients, a minimum observation period of 2 h is required

Problems:

- Atelectasis (develops in up to 37% of patients); risk factors include age <1 yr & tracheobronchial narrowing [7]

- Inadvertent bronchial intubation (in about 10% of patients); related to patient & MR coil positioning Postoperative exacerbation of hypoxia in chronically hypoxic patients (<5%); oxygen required for >1 h

References:

1. Krishnamurthy R. *Pediatr Radiol* 2008; **38**: S192-9
2. Taylor AM. *Pediatr Radiol* 2008; **38**: S433-8
3. Fogel MA et al. *J Pediatr* 2008; **152**: 534-9
4. Byrne AT. *Curr Anaesth Crit Care* 2008; in press.
5. Sarikouch S et al. *Pediatr Cardiol* 2008: in press.
6. Bailliard F et al. *Eur J Radiol* 2008: in press.
7. Blitman NM et al. *J Comput Assist Tomogr* 2007; **31**: 789-94

ANAESTHESIA AND EISENMENGER'S SYNDROME

Dr. Peter Poker

Introduction:

Pulmonary vascular pathology relating to a ventricular septal defect was first described by Eisenmenger in 1897. Eisenmenger's syndrome (ES) is now used to describe the sequelae consequent upon irreversible changes in the pulmonary vasculature and a high pulmonary vascular resistance, secondary to a large congenital communication between pulmonary and systemic circulations that has resulted in a reversed (pulmonary-to-systemic) or bidirectional shunt and chronic hypoxaemia. Advances in medical care now allow these patients to survive well into adulthood.

Epidemiology:

The prevalence of adult patients with pulmonary arterial hypertension associated with congenital heart disease in Western Europe ranges between 1.6 and 12.5 cases per million adults, with 25–50% of this population affected by ES. The incidence is higher in developing countries.

Pathology:

In patients with a large non-restrictive ventricular septal defect or ductus arteriosus, shunt volume and direction are determined mainly by the pressure gradient between systemic and pulmonary circulations. In contrast, patients with a large atrial communication may have right-to-left shunting due more to reduced right ventricular compliance (a consequence of right ventricular hypertrophy) than pulmonary hypertension. This latter group of patients develops ES rarely and only later in life. All forms of pulmonary arterial hypertension have a common characteristic histopathological pattern of vascular remodelling. As pulmonary blood flow increases, endothelial cells in the pulmonary vasculature are subjected to increased shear stress that leads to:

- stimulation of collagen deposition
- smooth muscle proliferation within vessel walls
- endothelial dysfunction

Disease progression is associated with overproduction of vasoconstrictors, promoters of smooth muscle and fibroblast proliferation, and pro-coagulant factors.

Vital organ function in patients with ES deteriorates progressively over time. Cyanosis and secondary erythrocytosis are frequently observed. Impaired exercise tolerance and dyspnoea on exertion tend to increase in severity. Haemoptysis may occur as a result of rupture of dilated

bronchial arteries. Partial thrombosis of enlarged proximal pulmonary arteries is found in up to 20% of adults with ES and may cause peripheral embolization and pulmonary infarctions. Cerebrovascular accidents may occur as a result of paradoxical embolization, venous thrombosis of cerebral vessels or intracranial haemorrhage. In addition, affected patients are at risk of brain abscesses, bacterial endocarditis and pneumonia. ES patients may have syncope as a result of inadequate cardiac output, or as a result of an arrhythmia. Symptoms of heart failure, which are uncommon until the disease is far advanced, also portend a poor prognosis. Renal dysfunction, secondary to heart failure and/or glomerular abnormalities (as a consequence of hypoxaemia), is common and progressive.

ANAESTHETIC MANAGEMENT FOR ES PATIENTS HAVING EMERGENCY OR MAJOR ELECTIVE SURGERY:

Preoperative assessment and optimization:

History:

- Nature of lesion
- Past medical & surgical history; recent anaesthetic history
- Present medication, e.g. epoprostenol, warfarin, sildenafil, bosentan
- Current condition; exercise tolerance, haemoptysis, syncopal episodes
- Other problems; e.g. Down's syndrome

Examination:

- Cyanosis, clubbing, plethora
- Hepatomegaly, oedema, ascites, jugular venous pressure
- Volume status; heart rate, blood pressure, capillary refill time, mucous membranes
- Chest auscultation; heart murmurs; air entry, added sounds, etc.

Investigations:

- FBC (high Hb expected); INR (high?)
- U & E; renal dysfunction?
- Lactate; may be elevated due to low cardiac output
- CXR: large heart & prominent main pulmonary artery; oligoemic lung fields
- ECG: right axis deviation; right ventricular hypertrophy; right bundle branch block; ± large RA
- Echocardiography & cardiological opinion if recent deterioration

Optimization:

- Oxygen (to keep O₂ sats >80%) for at least 4 h prior to surgery
- Order FFP if INR >2.5; stop long-acting anti-thrombotics
- Start short-acting anti-thrombotic regimen
- Book ICU bed (if not there already)
- Give anxiolytic (e.g. midazolam orally) as indicated

- Apply local anaesthetic cream (e.g. Ametop) to cannulation sites (both arterial and venous)
- Explanation of risks given to patient and/or parents; obtain informed consent

Anaesthetic room management

- Insert peripheral venous cannula (s); give antibiotics
- Insert arterial cannula; take baseline ABGs
- Insert CVP but not PAC (increased risk of haemorrhage, arrhythmias, embolization, infection)

Preoxygenation (5 min 100 %)

- Give fluids as required; aim for CVP >10 mm Hg; special care to avoid air bubbles in venous line
- Induction with ketamine 2 mg/kg & opioid (e.g. fentanyl 5 µg/kg)
- Avoid thiopental, propofol, etomidate
- Vecuronium (probably) relaxant of choice; intubate and ventilate
- Insert urinary catheter
- Avoid spinal; epidural may be appropriate in some cases

Intra-operative management

- Maintain preload; expect high CVP
- Maintain anaesthesia using opioid & isoflurane (≤ 1 MAC) or TIVA (?)
- Maintain high normal HR; use anticholinergics to prevent opioid-induced bradycardia
- Intensive monitoring (routine +):
 - IABP; CVP; urine output
 - ABGs, electrolytes, pH; lactate
 - BIS (to optimise anaesthetic depth)
 - TOE/Doppler (if relevant expertise)
- Keep Hct > 30%; transfuse as needed
- Use IPPV to control PaCO₂ (aim for 5 kPa); remember that EtCO₂ is unreliable
- Avoid hypoxia, acidosis, hypercarbia

Treatment of deterioration in PaO₂:

- Increase FiO₂ to 1.0
- Ensure anaesthesia & analgesia are adequate
- Check both lungs being inflated
- Check adequate filling (CVP >10 mm Hg)
- Hyperventilate
- Fully correct any acidosis using i.v. sodium bicarbonate
- Start inhaled nitric oxide (5-20 ppm)
- Infuse norepinephrine (start @ 0.1 µg/kg/min)

Postoperative management:

- ICU care; continue CVS monitoring for ≥ 48 h

- Maintain high FiO₂ for at least 48 h; respiratory support as indicated
- Maintain adequate analgesia with PCA or PCEA as appropriate
- Resume antithrombotic agents as soon as possible after surgery
- Preoperative vasodilator medication continued, e.g. nebulised epoprostenol, sildenafil
- N.B. Most deaths in ES patients are postoperative!

Prognosis:

In a series of 100 patients with Eisenmenger's syndrome listed for transplantation, the survival of patients who did not receive transplants was 97% at 1 year, 89% at 2 years and 77% at 3 years. Pregnancy in Eisenmenger's patients is associated with an increased rate of deterioration, death (in up to 50%) and spontaneous abortion (in up to 40%). Perioperative mortality rates for elective non-cardiac surgery & anaesthesia in ES patients is about 10%; for emergency surgery up to 30%.

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- Galie N et al. *Drugs* 2008; **68**: 1049-66
- Van Albada ME et al. *Cardiol Young* 2008; **18**: 10-7
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HYPO PLASTIC LEFT HEART SYNDROME ANESTHESIA CONSIDERATION

Dr. Aly Anwar, MD

ANESTHETIC IMPLICATIONS OF VIDEO-ASSISTED THORACOSCOPIC SURGERY IN INFANTS AND CHILDREN

Dr. Foudan Shaltout, MD

Video-assisted thoracoscopic surgery (VATS) was first introduced as a surgical technique in 1991. It has become the primary approach for a wide variety of intrathoracic problems previously addressed through open thoracotomy (lung biopsy, lobectomy, pneumonectomy, PDA ligation, repair of congenital diaphragmatic hernia and tracheoesophageal fistula). Goals of anesthesia include: maintaining airway reactivity, optimizing gas-exchange, maintaining stable cardiovascular function and providing adequate pain relief in postoperative period. Thoracoscopic surgery should be performed with the child in a position that allows for greatest access to the area of interest and uses gravity to aid in keeping the uninvolved lung out of field of view. One-lung ventilation is usually required to allow better view of operative field and avoid possible injury to lung tissue. Methods for one-lung ventilation are: endobronchial intubation using a tube 0.5 mm smaller in ID than that appropriate for age, bronchial blockers as balloon-tipped catheter or Fogarty embolectomy catheter, univent tube and double lumen tube in older children. CO₂ insufflation can induce, in addition to hypercarbia, hemodynamic instability and hypoxia as a result of the increase in intrathoracic pressure. To avoid this, CO₂ should be insufflated at as slow a rate as possible (1L/min) to produce desired compression of the lung. Methods to improve oxygenation during OLV are: high FiO₂, tidal volume 8-12 ml/kg, CPAP to operative lung, PEEP to dependant lung and high frequency jet ventilation at low driving pressure and re-inflation of non-ventilated lung.

CARDIOPULMONARY BYPASS IN THE PREGNANT CARDIAC PATIENT- MATERNAL FETAL CONFLICT

Dr. Anis S. Baraka, MD, FRCA (Hon)

Professor of Anesthesiology American University of Beirut

Beirut –Lebanon

The report will discuss the hemodynamic changes of pregnancy and its interaction with the acquired and congenital heart disease during pregnancy.

The report will also outline the suggested precautions during cardiopulmonary bypass which may affect the mother and/or the fetus such as pump flow, mean arterial pressure, hypothermia and hemodilutional CPB.

1. HEMODYNAMIC CHANGES DURING PREGNANCY

Changes in Cardiovascular System

Variable	Average Change
Blood volume	+35%
Plasma volume	+45%
Red blood cell volume	+20%
Cardiac output	+40%
Stroke volume	+30%
Heart rate	+15%
Femoral(uterine?) venous pressure	+15 torr
Total peripheral resistance	-15%
Mean arterial blood pressure	-15 torr
Systolic blood pressure	-0-5 torr
Diastolic blood pressure	-10-20 torr
Central venous pressure	no change

2. INTERACTION OF HEMODYNAMIC CHANGES OF PREGNANCY WITH CARDIAC DISEASE

MALADAPT

Mitral Stenosis

Aortic Stenosis

R-L Shunt

Marphan Syndrome & Aortic Dissection

ADAPT

Mitral Regurgitation

Aortic Regurgitation

L-R Shunt

3. COMMON CARDIOVASCULAR DISEASES AND RECOMMENDATIONS

▪ Mitral Stenosis: Anesthetic Considerations

1. Prevent rapid ventricular rates
2. Minimize increases in central blood volume
3. Avoid marked decreases in systemic vascular resistance
4. Prevent increases in pulmonary artery pressure

▪ Mitral Insufficiency: Anesthetic Considerations

1. Prevent peripheral vasoconstriction
2. Avoid myocardial depressants
3. Treat acute atrial fibrillation immediately
4. Maintain a normal or slightly elevated heart rate
5. Monitor PCW pressure and intensity of murmur

▪ Acute Insufficiency: Anesthetic Considerations

1. Avoid marked increases in systemic vascular resistance
2. Maintain a normal or slightly elevated heart rate
3. Avoid myocardial depressants
4. Monitor arterial diastolic pressure, PCW pressure, and intensity of murmur

▪ Aortic Stenosis: Anesthetic Considerations

1. Avoid decreases in systemic vascular resistance
2. Avoid bradycardia
3. Maintain venous return and left ventricular filling.

▪ Anesthetic Considerations: Ventricular Septal Defect

1. Avoid marked increases in systemic vascular resistance
2. Avoid marked increases in heart rate
3. With pulmonary hypertension, avoid marked decreases in systemic vascular resistance
4. With pulmonary hypertension, avoid marked increases in pulmonary vascular resistance

▪ Anesthetic Considerations: Tetralogy of Fallot

1. Avoid decreases in systemic vascular resistance
2. Avoid decreases in blood volume
3. Avoid decreases in venous return
4. Avoid myocardial depressants

▪ Anesthetic Considerations: Eisenmenger's Syndrome

1. Avoid decreases in systemic vascular resistance
2. Avoid decreases in venous return
3. Avoid increases in pulmonary vascular resistance (e.g. hypercarbia, acidosis, hypoxia)

▪ Anesthetic Considerations: Primary Pulmonary Hypertension

1. Avoid increases in pulmonary vascular resistance

2. Avoid marked decreases in venous return
3. Avoid marked decreases in systemic vascular resistance
4. Avoid myocardial depressants

4. RECOMMENDATIONS OF CARDIOPULMONARY BYPASS DURING PREGNANCY

1. The maintenance of perfusion pressure & blood flow during CPB at greater than usual values to match the increase in cardiac output associated with pregnancy
2. The avoidance of severe hemodilution
3. The maintenance of normothermic perfusion. However, when hypothermia is indicated during CPB, the use of a moderate or even tepid hypothermic technique associated with an alpha-stat strategy for acid base management is recommended
Continuous cardiotocographic monitoring for fetal heart rate should be maintained throughout the procedure, and a prophylactic tocolytic regimen may be used

CARDIAC SURGERY IN PATIENTS WITH END STAGE LIVER DISEASE

Dr. Ahmed Mukhtar, MD

It is well recognized that morbidity and mortality rates after cardiac operations with cardiopulmonary bypass in patients with cirrhosis are significantly higher than those in the general cardiac surgical population. Several contributing factors peculiar to cirrhosis, such as compromised nutritional status, increased susceptibility to infections, and impaired coagulopathy, may be responsible for the poor prognosis. It is empirically agreed that cardiac operations using cardiopulmonary bypass are relatively contraindicated in patients with advanced cirrhosis. However, the population of cirrhotic patients who are referred for cardiac operations is still small and definitive indications for surgical interventions remain unknown. Moreover, cirrhotic patients have many distinctive anatomical and physiological features that influence postoperative course considerably. In this Lecture, we reviewed the literature with special reference to its clinical features and clinical outcomes after cardiac surgery that would help cardiac surgeons to decide therapeutic modality.

“LADIES FIRST”: GENDER-RELATED PATHOPHYSIOLOGIC DIFFERENCES IN CORONARY ARTERY DISEASE AND PERIOPERATIVE MANAGEMENT?

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Differences exist between women and men in their emotional, physiologic, genetic and reproductive build-up. However, until recently, it was assumed that women and men are physiologically similar, and females were evaluated and treated as males.

The fact that cardiovascular disease is a major cause of death in women is not well recognized. Women have smaller coronary arteries, more frequent diastolic dysfunction, present with vague symptoms of coronary artery disease and do worse than men after revascularization procedures. Women also have a shorter cardiac cycle, have a higher heart rate (4-5 beats/min), and are more prone to develop arrhythmias and react differently to antiarrhythmic drugs.

The medical literature has defined differences in cardiovascular anatomy, physiology, electrophysiology, pathophysiology, and surgical outcomes, in women as compared to men. There is a current controversy on whether the aforementioned recently recognized, gender-related pathophysiological differences, mandate changes in perioperative management of females or not. The changes were suggested in order to improve their perioperative cardiovascular risk, through better preoperative identification of women with probable coronary artery disease. In this context it is noteworthy that the symptoms of myocardial ischemia or infarction are different in women, where chest pain is not common and shortness of breath is the common presentation.

It was demonstrated that off-pump coronary artery bypass graft surgery significantly reduces the risk of adverse outcome in women.

Is there enough scientific evidence to mandate a gender-specific standard of care for female cardiac surgical patients? Currently, the answer is still elusive, but a review of the controversy might emphasize our recent awareness of gender-related differences and may help improve perioperative management.

HEMODYNAMIC CRISIS IN PATIENTS HAVING NEUROMUSCULAR DISORDERS

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Neuromuscular Disorders can be classified as Presynaptic, Synaptic and Postsynaptic.

1. Presynaptic

a. Up regulation

Denervation whether functional, pharmacologic or organic can result in:

- Somatic upregulation associated with extrajunctional spread of Ach receptors and change of their structure from the mature into the fetal type. SCh can result in severe hyperkalemia up to cardiac arrest.
- Autonomic upregulation associated with spinal cord injury can result in autonomic hyperreflexia secondary to an increased response to norepinephrine.

b. Down regulation

- Somatic down regulation in patients with neuromyotonia
- Autonomic down regulation secondary to excessive catecholamine release in cardiac patient and in pheochromocytoma.

Down regulation of adrenergic receptor occurs in 3 sequential steps: uncoupling, internalization and degradation, resulting in decreased response to adrenergic agonists and increased response to adrenergic blockers.

2. Muscle Dystrophy

Dystrophin deficiency, x-linked recessive can result in instability of both skeletal muscles' membranes resulting in rhabdomyolysis, as well as in cardiac muscle sarcolemma resulting in dilated cardiomyopathy.

1. Myotonia

Paramyotonia, congenital myotonia and myotonia dystrophica can be associated with conduction defects of the purkinje system resulting in heart block.

2. Myasthenia Gravis

Large thymoma may predispose to thoracic inlet syndrome, while pyridostigmine overdose can result in cholinergic crisis.

3. Malignant Hyperthermia

Can result in hypermetabolic syndrome which can culminate in cardiac arrest.

4. Critical Illness Neuromyopathy and Cardiomyopathy Which Can Terminate In Multiple Organ Failure.

RECOMBINANT ACTIVATED FACTOR VII IN THE MANAGEMENT OF SEVERE HEMMORHAGE FOLLOWING CARDIOPULMONARY BYPASS

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Introduction

With increase number of cardiac surgery in Egypt the risk of transfusions allergenic "bank" blood have come to represent an increased percentage of limitation and the overall risk of cardiac operations.

The Rational and Background

Uncontrolled medical bleeding represents a major challenge to the surgical team, the patient will be at risk. Life-threatening bleeding may persist despite conventional medical therapy and transfusions. Treatment of bleeding is frequently empiric and highly institution-specific not based on demonstrated laboratory abnormalities.

In the last few years there have been several reports of the use of recombinant activated factor VII (RFVIIA) in the management of massive hemorrhage with encouraging results not supplanted by any of the combination of therapies conventionally used The recommended dose of RFVIIA for hemophilia A or B patients with inhibitors is 90 mcg/kg given every two hours until hemostasis is achieved, or until the response has been judged to be inadequate.

Conclusion:

Evidence gained over the few years demonstrates that RFVIIA has a rule in the management of patients with haemophilia and inhibitors to coagulation factors.

It is capable of reducing hemorrhage in wide variety of clinical situations associated with excessive hemorrhage.

CLINICAL, ECHOCARDIOGRAPHIC AND LABORATORY ASSESSMENT OF THE CARDIOPROTECTIVE EFFECT OF DEFEROXAMINE IN PATIENTS UNDERGOING CABG

**Dr. Fawzia Aboul Fetouh(MD), Dr. Celestine Okwuone(MD),
Dr. Ahmed El Agaty(MD), Dr. Maged Salah Abdullah(MD),
Dr. Pierre Zarif Tawadrose(MD)**

Background:

Oxygen free radicals play an important role in the reperfusion injury and in the deleterious effects of cardiopulmonary bypass (CPB). Iron-catalyzed formation of hydroxyl radicals has been postulated to occur during reperfusion of ischemic tissues. To assess the role of iron-catalyzed oxidant production in ischemia-reperfusion injury to the myocardial muscle in patients undergoing elective CABG, we examined the effects of infusing an iron chelator deferoxamine after induction of anesthesia on oxidative stress reflected on the extent of lipid peroxidation and cardiac enzyme release and on myocardial performance.

Material and methods:

Forty patients undergoing elective on-pump CABG with ejection fraction >40% were randomly divided into two groups. The deferoxamine group (n=20) received deferoxamine infusion immediately after induction of anesthesia 30mg/kg dissolved in 250ml NS 0.9% for four hours, while the control group (n=20) received 250ml NS 0.9% infusion as placebo. Haemodynamic monitoring and measurement of lipid peroxidation were carried out before, during and after bypass. Left ventricular ejection fraction (EF) and wall motion score index (WMSI) were measured before and one hour after emerging from by pass using TEE.

Results:

There was highly significant decrease in the oxidative stress and lipid peroxidation in the deferoxamine group measured by MDA and decreased in troponin I release.

Conclusion

In patients undergoing CABG, deferoxamine infusion ameliorates oxygen free radical production and protects the myocardium against reperfusion injury.

Key words:

Myocardial reperfusion injury, deferoxamine, iron chelation, CABG.

ORGAN PROTECTION PROPERTIES OF SEVOFLURANE

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Introduction and background

Perioperative myocardial infarction (PMI) is associated with mortality rates of up to 40%. Non fatal PMI increases the risk of both cardiovascular morbidity and death in the first 6 months after major non-cardiac surgery.

Therapeutic strategies include

Coronary revascularization

Beta-blockers

Alpha2-adrenoceptor agonists

Aspirin

Statins

Cellular change during Ischemia

Altered membrane potential

Altered ion distribution (++ intracellular Ca/Na)

Cellular swelling

Cytoskeletal disorganization

Increased hypoxanthine

Decreased ATP

Decreased phosphocreatinine

Cellular acidosis

Manifestations of I/R injury

Vascular Injury and the “No Reflow” Phenomenon

Myocardial Stunning

Reperfusion Arrhythmias (VT, VF, idioV)

CNS /GI I/R injury

Multiorgan Dysfunction Syndrome

Ischemic Preconditioning

Exposure of tissues to brief periods of ischemia protects them from the harmful effects of prolonged I-R

coronary artery bypass grafting

reduce liver injury undergoing hepatic resection

Increases cellular adenosine production and confer protection by augmenting cellular energy stores and/or inhibiting leukocyte adherence

Sevoflurane and cardio protection

In patients undergoing CABG surgery with CPB, the cardioprotective effects of sevoflurane were clinically most apparent when it was administered throughout the operation

Sevoflurane and kidney protection

Sevoflurane has direct anti-inflammatory and antinecrotic effects in vitro in a renal cell type particularly sensitive to injury following IR injury

Sevoflurane and liver protection

Significant decrease in serum alanine and aspartate aminotransferase (ALT, AST) levels

Hepatic tissue blood flow (HTBF) was remarkably better in sevoflurane group
Tumor necrosis factor- α (TNF- α) and IL-1 β values were lowest in sevoflurane group

Conclusion

Easy titration anesthetic depth
Low incidence adverse airway events
Excellent bronchodilation
Safe use above 1 MAC
Hemodynamic stability
Proven beneficial cardiac profile
Rapid and predictable recovery

ROLE OF ENTROPY AS A MONITOR OF DEPTH OF ANESTHESIA

GE Healthcare Symposium

MECHANICAL AND ELECTRICAL SUPPORT OF THE FAILING HEART

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With an increasingly aging population, heart failure is a major health issue, affecting more than 10% of the population over 65 years of age.

Major advancements in the medical therapy of HF, combined with automatic implantable cardioverterdefibrillators and cardiac resynchronization therapy, have substantially reduced the mortality and morbidity of chronic HF.

Mortality remains high, and the availability of donor hearts for transplantation is limited.

There has been and continues to be a need for alternative therapies to support the failing heart.

Various surgical approaches have been examined in the hope of improving the outcome of congestive cardiac failure.

The development of mechanical pumps designed to assist or replace cardiac function started three decades ago with the National Heart, Lung, and Blood Institute's request for proposals to develop an artificial heart.

Significant progress has been made, with ventricular assist devices evolving from bulky extracorporeal devices to internalized miniaturized devices.

Improvements in durability, thrombogenicity, ease of implantation, and patient selection have allowed expanding indications for these devices.

LONG TERM POSTOPERATIVE NUTRITIONAL MANAGEMENT IN ISCHEMIC PATIENTS

Dr. Amr Abdel Monem, MD

Observational studies have shown that overweight, obesity, and visceral adipose tissue are directly related to cardiovascular risk factors concerning high cholesterol, increased LDL, high triglycerides, hypertension, increased fibrinogen, hyperinsulinemia, reduced HDL and increased plasminogen activator inhibitor.

Recently Complement 3 and acute phase proteins are the immunological link between central obesity and CHD.

Recent studies have shown that risks of nonfatal myocardial infarction and CHD death increase with increasing levels of BMI

In British, Swedish, Japanese and US populations, CHD incidence increased at BMIs above 22 and an increase of 1 BMI unit was associated with 10 % increase in the rate of coronary events

Recent study has found that obese CHD patients are younger and are hospitalized more frequently during the first 10 years of their illness than the non-obese

Do it yourself programs for nutritional management of these patients is not safe therefore ischemic patients should follow multidisciplinary plans for nutritional management considering the guidelines of the American heart association with the National Cholesterol Education Program Adult Treatment Panel III guidelines and international diabetes federation recommendations

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NON INVASIVE MECHANICAL VENTILATION FOR POST OPERATIVE CARDIAC PATIENTS

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Background: Noninvasive positive-pressure ventilation is a type of mechanical ventilation that does not require an artificial airway. The need for reintubation after extubation and discontinuation of mechanical ventilation is not uncommon and is associated with increased mortality after open heart surgery. Many of these patients have COPD, develop cardiogenic pulmonary edema, lung collapse or chest infection immediately after surgery. These selected patients benefit from the use of NIPPV following extubation.

In this review we present our experience in the past 2 years at Cairo University Hospitals.

ACUTE POST THORACOTOMY NEUROPATHIC PAIN, MECHANISMS, MANAGEMENT AND OUTCOME

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Definition of Neuropathic Pain;

Pain arising as a direct consequence of a lesion or disease affecting the somato-sensory system
Neuropathic pain tends to be burning, lancinating ,paroxysmal, sharp, shooting, Tingling and numbness are common, does not respond well to opioids,

Characters of Neuropathic Pain

Hypersthesia;

Increased appreciation of any stimulus

Hyperalgesia;

More intense appreciation of painful stimulus

Allodynia;

Sensation of pain by non painful stimuli

Neuropathic pain in thoracotomy incision occurs by;

Direct nerve surgical trauma by cutting.

Partial trauma by retractors

Which nerves:

Intercostals, phrenic, Parasympathetic (vagus), sympathetic ner Ves, and the brachial plexus

Pathophysiology of Neuropathic Pain

Chemical excitation of non-nociceptors-

-Recruitment of nerves outside of site of injury

-Excitotoxicity

-Sodium channels

-Ectopic discharge

-Deafferentation

-Central sensitization

-maintained by peripheral input

-Sympathetic involvement

-Antidromic neurogenic inflammation

Management of Post-thoracotomy Pain

Regional Blocks

Pharmacological Management

New Trends in The pharmacological Management of Post-thoracotomy Pain

Ketamine

COX-2 inhibitors

Gabapentin Pregabalin

Outcome of Neuropathic pain;

50-70% of patients will end up with a variable degree of chronic post thoracotomy pain.

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CARDIAC SURGERY IN THE ELDERLY

HOW WELL ARE WE DOING?

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The age of the adult cardiac surgery population has been increasing in recent years. In 2002 the average life expectancy for men and women in the UK was 76 years and 81 years respectively. The leading cause of death in those aged 65 years and older remains circulatory disease [1] A recent publication of UK cardiac surgery activity has shown an 8% increase in the proportion of patients aged 75 years and over undergoing cardiac surgery.[2]

There are a number of reasons for an increased risk associated with cardiac surgery in the elderly. These include;

- Greater incidence of significant co-existing cardiac disease
- Greater incidence of non cardiac co-morbidities
- Less robust general physical and mental health
- Convalescence and medium term care problems

Assessing the degree of risk has always been problematic. A number of risk scores have been devised. However, one of the most popular worldwide, and one used almost exclusively in the UK, is the Euroscore. A comparison of Euroscore with others (Parsonet, Cleveland Clinic, French,Pons, Ontario Province) showed Euroscore to be the most accurate, and the logistic Euroscore takes into account interaction between variables.[3]

The elderly population are therefore at greater risk, not only because increased age features as an independent variable in every score, but because of the increased comorbidities in this age group.

In order to assess outcomes in this group we conducted a review of our outcomes that was specifically designed to do the following;

- compare the preoperative and perioperative characteristics and post operative survival of patients
 - age 75 years and older with a younger cohort age 60-74 years
- identify factors associated with early (30 day) and late (1 year) mortality
- Identify the effect of age 75 years and older on these factors.

The study included consecutive patients, aged 60 years and older undergoing isolated primary CABG surgery with use of cardiopulmonary bypass () between August 1999 to December 2005.

The data is part of the dataset maintained by the Society for Cardiothoracic Surgeons of Great Britain and Ireland (SCTS), and were collected prospectively according to definitions provided in the SCTS database

In a study of this nature, complex statistical processing is required. This included the following;

- Significant differences between the groups was tested using Pearson's Chi-squared statistic ($p > 0.05$).
- Variables were treated as categorical and are presented as numbers and percentages. Changes in mortality rates over time were examined using the Cochran-Armitage test for trend.
- Kaplan-Meier curves are used to depict survival
- Cox regression was used to assess the association between variables and early and late mortality separately. Data is presented as risk ratios (RR) and 95% confidence intervals (CI).
- A multivariate Cox regression model was constructed to identify independent risk factors for
- early and late mortality. All variables significant at $p < 0.05$ were included in the separate models and discounted using backward stepwise analysis.

Tests for interaction between age and the other independent variables in the models were performed to identify whether age had a modifying effect

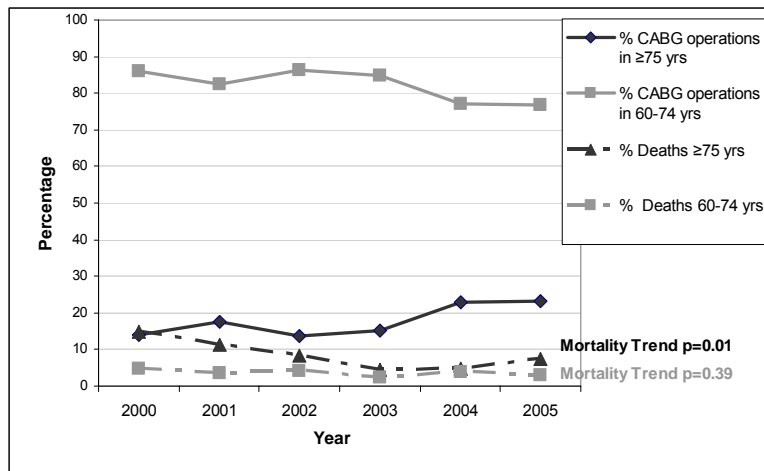
Results:

There were 3683 patients in this analysis of which 18% (659) were aged 75 years or older. The overall one year mortality in the elderly group (≥ 75 age) was 9% compared to 4% in the 60-74 age group. The rate of population decline (mortality) stabilised in both groups after the early postoperative period.

Although the Kaplan-Meier curve shows the significant (early and late) survival difference between the two groups, over 90% of elderly patients were alive one year after their cardiac surgery.

From 2000-2005, the proportion of patients aged 75 years and older undergoing primary CABG nearly doubled (13%-23%). There was a slight decrease in the proportion of patients aged 60-74 years undergoing primary CABG surgery.

The crude total 1 year mortality rates for those aged 75 years and over significantly decreased from 15% in 2000 to 7% in 2005 (test for trend $p = 0.01$). In patients aged 60-74 years mortality rates fluctuated between 2-4% over this period, (test for trend $p = 0.66$).



In comparing the preoperative data set, a number of important features were found;

- There were significantly more women in the ≥ 75 age groups
- The ≥ 75 year age group had a significantly greater proportion of patients with more severe cardiac symptoms such as heart failure (NYHA 3-4), angina (CCS 3-4), impaired ejection fraction(30-50%) and arrhythmia compared to the younger group.
- the prevalence of arteriopathy, carotid bruits and renal impairment was higher in the older age group.
- Multiple co-morbidities (>5) were significantly higher 17% in the of ≥ 75 age group compared to 12% in the younger group ($p<0.001$)
- The age adjusted Euroscore confirms the higher prevalence of risk factors in the older age group with 28% having a medium to high risk score (>4) compare to 14% of the younger group, despite removing the contribution of age from the overall risk score.
- The ≥ 75 age group had a significantly greater number of patients who required emergency treatment (e.g. ventilation, intravenous nitrates, inotropes, heparin or intra aortic balloon pump) prior to surgery
- Only 62% of surgery in the ≥ 75 age group was elective compared to 77% in the younger cohort ($p<0.001$).

Overall, we found that the proportion of patients aged ≥ 75 years increased by 10% over five years. One year mortality in the elderly showed a significant linear decrease from 15%-7% ($p=0.01$) while mortality in the younger cohort remained static at 2-4%. Early mortality in the elderly group was 5% compared to 1.8% in the younger group ($p<0.001$), while late mortality was 4.1% versus 1.8% respectively ($p<0.001$).

Factors independently associated with early mortality were age ≥ 75 years RR 2.0 (95% CI 1.28, 3.11), female gender, angina (CSS III-IV), cardiopulmonary bypass duration >97 minutes.

. In the late mortality model age was not significant, but ventricular ejection fraction < 30%, non-elective surgery and arteriopathy were significant factors.

Arrhythmia and renal impairment were common to both early and late mortality.

Discussion:

Previous studies have shown a variety of results. Retrospective analysis of 42 consecutive nonagenarian patients who underwent open-heart procedures over a 10-year period (1993 to 2002) showed a 7% in-hospital mortality [4]

A much larger study of 990 elderly patients (> or = 70 years) who underwent coronary revascularisation, 219 (22.1%) with off-pump surgery, showed that early but not mid-term mortality is higher in patients aged 75 or more years when compared with those aged 70-74 years. Off-pump coronary artery bypass surgery is safe and effective in the elderly population. [5]

A study of 1746 patients undergoing CABG surgery, including 155 pts >80 yrs old compared to 1591 patients < 80 years, showed that patients >80 yrs undergoing CABG required increased resources, had higher morbidity (postoperative renal failure, neurologic complications) and 30- day mortality. Age > 80 years was an independent predictor of increased resource utilization, postoperative morbidity, and mortality. [6]

Finally, a recent analysis of 54,397 patients undergoing isolated CABG surgery found that patients > 85 yrs more likely to have intraoperative and postoperative morbid events. The authors concluded that although very elderly CABG patients have more comorbidities and more acute presentation than younger patients and their in-hospital mortality rate is high, their long-term survival is surprisingly good. [7]

Conclusion:

Cardiac surgery, in particular primary CABG surgery, has shown some of the greatest improvements in outcome in recent years. Although good outcomes are achievable, in-hospital morbidity and mortality, and increased costs, appear unavoidable.

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DIASTOLIC DYSFUNCTION IN CARDIAC SURGERY PATIENT CHALLENGES IN ANESTHESIA AND INTRA OPERATIVE MANAGEMENT

Dr. Faisal Alghadam

A NOVEL RISK PREDICTION MODEL FOR POSTOPERATIVE BLOOD LOSS IN ADULT CARDIAC SURGERY PATIENTS

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Introduction:

Postoperative bleeding is a serious complication after cardiac surgery and leads to increased morbidity and mortality.

Haemostasis is multifactorial impaired by using the extracorporeal circulation (ECC) for “on-pump” cardiac surgery. Platelet dysfunction, activation and increased consumption of coagulation factors are suggested pathomechanisms. Early identification of patients with an increased risk for excessive blood loss is necessary to prepare efficient therapeutic strategies.

Methods:

Between March 2006 and May 2007 a total of n=222 patients (mean age, 67 years range, gender) undergoing elective “on-pump” cardiac surgery procedures were included in a prospective observational study. Patient variables (ECC datas and preoperative laboratory variables e.g. platelet count and function, activated partial thromboplastin time, prothrombin time and ROTEM™ Thrombelastometry, Pentapharm, Munich, Germany) and postoperative blood loss were registered. Independent predictors of exceeded postoperative chest tube bleeding defined as more than 200 ml within 2 hrs (early blood loss) and more than 800 ml within 24 hrs postoperative (late blood loss) were identified with multiple regression models.

Results:

Among all included patients (n=222), 30 % (n=66) showed excessive postoperative blood loss. Using thrombelastometry at the end of the cardiopulmonary bypass when ACT values were back in normal range, ROTEM FIB-TEM values less than 8 mm were related with 2.3 fold increased risk for early excessive postoperative blood loss. An impaired platelet function described as arachidon-induced aggregometry below 1000 AU/min was associated with 4.3 fold increased risk for early excessive blood loss. The combination of ROTEM FIB-TEM and

platelet impedance aggregometry achieved 92% specificity and 21% sensitivity in prediction of exceeded postoperative blood loss in routine adult cardiac surgery patients.

Conclusions:

Intraoperative ROTEM FIB-TEM and platelet function determination allows early identification of patients with impaired haemostasis function and high risk for non-surgical postoperative bleeding after routine cardiac surgery. The novel risk model of combined intraoperative ROTEM FIB-TEM analysis and platelet function determination at the end of the cardiopulmonary bypass has excellent predictive value to identify patients with preserved postoperative haemostasis function (94%) after routine cardiac surgery. Excessive postoperative blood loss in these patients is at high risk to be enforced by a surgical bleeding source and required early surgical re-evaluation before haemodynamic function is deteriorated.

OFF PUMP CORONARY ARTERY BYPASS SURGERY

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Off-pump coronary artery bypass grafting is a newly resurgent technique because of the constant Endeavour to make surgery safer for the patients. This method eliminates the use of cardiopulmonary bypass thus avoiding an unphysiological state and reducing the cost involved in the use of this circulatory support system. The rationale appears sound. the history, rationale, technique, systemic changes and comparative results, indications, limitations and contraindications of OPCAB will be based on available evidence, it is clear that OPCAB is safe and practical with comparable midterm outcomes. The results are reproducible by any average surgeon. The claim that this technique completely eliminates all the problem areas of CABG is unfounded. There is a definite trend towards lesser morbidity especially in high-risk groups even if not statistically proven uniformly. The myocardial necrosis is significantly less with OPCAB. The neurological complications may not differ unless OPCAB is done with a “no-aortic manipulation” technique. This method is definitely contraindicated in acutely unstable patients, in irritable hearts with frequent arrhythmias, heavily calcified arteries, very deeply placed intramyocardial vessels, grossly dilated hearts and in diffusely diseased small vessels. The rate of application of this technique will vary according to the experience, judgement, adventurousness and bias of the surgeon. It is important to realize that if the patient's interest will be better served by resorting to on-pump method, the conversion to CPB must be done electively without waiting for acute deterioration of hemodynamics to precipitate an emergent conversion.

Even though enough randomized trials are not yet available to prove any superiority of this technique, it should be practiced in all patients where its benefit is likely. Till we get the results of large studies done scientifically, we will not know whether off-pump bypass surgery is a step forward, backwards. This paper will describe the advantages, difficulties and anaesthetic management of this subject, and also what special requirements are needed from surgery and anaesthesia.

PATIENTS WITH CORONARY ARTERY STENTS PERIOPERATIVE CONSIDERATION

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Anesthesiologists are increasingly being confronted with patients with recently implanted coronary artery stents who are in need of surgery either cardiac or noncardiac. Continued antiplatelet therapy through the perioperative period might increase the risk of surgical bleeding, while its interruption predisposes to stent thrombosis. Previous studies have observed a high incidence of adverse events following surgery after bare-metal (BMS) or drug-eluted stent (DES) placement.

The objective of this presentation is to understand the design and rationale for development of drug eluting stents with all its perioperative risks, recognize the anesthetic implications of recent cardiac stent implantation, and review the guidelines for antiplatelet therapy and the timing of surgery after placement of bare metal or drug eluting stent.

When considering the risks and management strategy of noncardiac surgery in patients with coronary artery stent, the guidelines recommend delaying elective surgery for at least 6 weeks after BMS implantation and 1 year after DES with cautions that some risk does extend beyond these time frames. Discontinuing antiplatelet agents before surgery for as short a time as possible to reduce risks for excessive bleeding associated with any surgical procedure. For patients who already have a drug-eluting coronary stent and require emergent noncardiac surgery, aspirin therapy should be continued if possible and prescription agents (clopidogrel) resumed as soon as possible.

STATIN IN CARDIAC SURGERY

Dr. Abdel Hameed El-Samarkandi, MD

STATINS & Cardiac Risk

Preoperative Investigations

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 Professor of Anaesthesia
 College of Medicine, King Saud University
 Head of Cardiac Anaesthesia Division
 King Fahad Cardiac Center, King Saud University

Meta-analysis sensitivity and specificity of pre-operative tests for perioperative cardiac death and non-fatal myocardial infarction in patients undergoing elective major vascular surgery (24)

Non-invasive test	No. of patients	Sensitivity (%; 95% CI)	Specificity (%; 95% CI)
A-ECG	893	52 (21-84)	70 (57-83)
Ex-ECG	685	74 (60-88)	69 (60-78)
RNV	532	30 (22-39)	91 (87-96)
MPS	3334	83 (77-89)	49 (41-57)
DISE	850	74 (53-94)	86 (80-93)
DE	1877	85 (74-97)	70 (62-79)

* CI indicates confidence interval.
 † Tests are sorted according to ascending sensitivities: A-ECG: ambulatory electrocardiography; Ex-ECG: exercise electrocardiography; DE: dobutamine stress echocardiography; MPS: myocardial perfusion scintigraphy; RNV: radionuclide ventriculography; DISE: dipyridamide stress echocardiography.

FACTS

- The most Common Cardiac Disease is IHD
- Cardiac Disease being the single most common cause of death
- Mortality & Morbidity rates increases when subjecting such patients to higher risks without being protected
- The term primary prevention refers to interventions that aim to prevent cardiovascular events in people who have no clinical evidence of cardiac Disease

Different Risk Indices

Factor	ORSHAN		DIBBY ET AL.		LARSEN ET AL.	
	DEFINITION	no. of points	DEFINITION	no. of points	DEFINITION	no. of points
Ischemic heart disease	MI within 6 mo	10	MI within 6 mo MI more than 6 mo earlier CCS class III angina CCS class IV angina Unstable angina within 6 mo	10 5 10 20 10	MI within 3 mo No MI within 3 mo, but previous MI, angina pectoris, or both	11 3
Congestive heart failure	S ₂ gallop or papillary tendon distention	11	Pulmonary edema Within 1 wk Ever	10 5	Persistent pulmonary congestion No pulmonary congestion, but previous pulmonary edema Neither pulmonary congestion nor previous pulmonary edema, but previous heart failure	12 8 4
Cardiac rhythm	Rhythm other than sinus or PVCs on last preoperative ECG	7	Rhythm other than sinus or sinus plus PVCs on last preoperative ECG >5 PVC/min at any time before surgery	5 5	—	—
Substrate heart disease	>5 PVC/min at any time before surgery	7	Suspected critical aortic stenosis	20	—	—
General medical status	Impaired aortic stenosis PO ₂ <50 mm Hg or PCO ₂ >50 mm Hg; potassium <3.0 mmol/liter or bicarbonate <20 mmol/liter; BUN >50 mg/dl (10 mmol/liter) or creatinine >3.0 mg/dl (260 μmol/liter); abnormal AST; signs of chronic liver disease or patient hospitalized from noncardiac causes	3	Same as for original index	5	Serum creatinine >1.3 mg/dl (130 μmol/liter) Diabetes mellitus	2 3
Age	>70 yr	5	>70 yr	5	—	—
Type of surgery	Integumental, anastomotic, or aortic operation Emergency operation	3 4	Emergency operation	10	Emergency operation Aortic operation Other intraperitoneal or pleural operation	3 5 3

ACC/AHA Guidelines Cardiac Risk

CARDIAC RISK

- Clinical Predictors (*Disease Status*)
- Functional Capacity (*Exercise Tolerance*)
- Surgical Risk (*Site & Intervention*)

Revised Cardiac Risk Index

(RCRI)

- CAD
- Cerebro-vascular Accidents
- Renal Impairment
- DM
- High Risk Surgery

Risk Reduction Strategies

I. Perioperative Management

a. Anaesthetic techniques

- i. General versus regional anaesthesia
- ii. Invasive monitoring – PAC,TEE

b. Surgical approach

- i. Laparoscopic
- ii. Endovascular procedures

II. Medical Management

- a. Beta blockers
- b. Anti-ischemic medications

III. PCI

Strategies of Cardioprotection

Pharmacological management aiming

1- Reduce ischemic –reperfusion injury

2- Ischemic preconditioning

AGENTS that share both effects are the
NITRIC OXIDE releasing agents

General Effects of Statins


lipid-lowering properties

Pleiotropic effects that include:

- *Anti-inflammatory effects*
- *Improved endothelial function*
- *Plaque-stabilizing actions*
- *Antioxidant effects*

Peri-operative Cardiac Medications

- Anti-ischemic
- Anti-arrhythmic
- Anti-failure
- Anti-platelets
- Anti-coagulants
- Anti-hypertensive
- Anti-diabetics



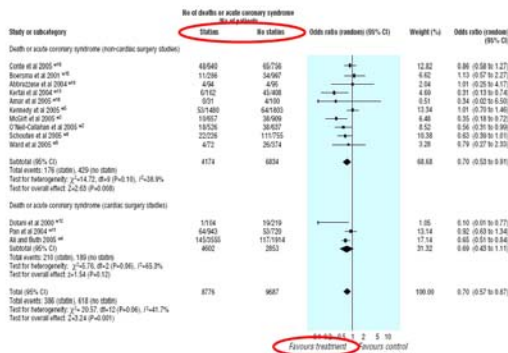
But where are the STATINS
Form our scope of interest

Specific Vascular Effects

Modulate Vascular Function

- Increasing expression of nitric oxide synthetase
- Enhancing nitric oxide production.
- Increases in nitric oxide reduce endothelial dysfunction
- Attenuate leukocyte–endothelium interactions
- Decrease platelet aggregation.

BMJ Strength of evidence for perioperative use of statins to reduce cardiovascular risk: systematic review of controlled studies
 Anmol S Kapoor, Hussein Kanji, Jaanette Buckingham, P J Devereaux and Finlay A McAlester



Favours treatment Favours control

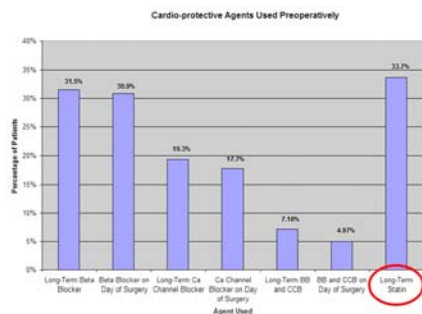
NHS
 National Institute for Health and Clinical Excellence

Issue date: January 2006

Review date: November 2008

Statins for the prevention of cardiovascular events

A meta-analysis of all placebo-controlled trials (primary and secondary prevention studies) published data indicated that therapy with a statin was associated with a statistically significant reduction in risk of all-cause mortality



Market Brands

Five statins currently have a marketing authorisation:

- Atorvastatin
- Fluvastatin
- Pravastatin
- Rosuvastatin
- Simvastatin

When to Start

Evidence Based Literature

Shows that long-term administration gives better results than short term (< 30 days) or immediate preoperative use

DOSING

Atorvastatin & Simvastatin

available as 10-mg, 20-mg, 40-mg and 80-mg tbs. starting dosage is 10 mg/day, increased at intervals of at least 4 weeks. The maximum dosage is 80 mg/day.

Home Message

With the increasing population of CAD &
With the increasing population of Diabetics and
resultant vasculopathies

**We have to stress upon any agent that will
modulate and protect vascular
endothelium to reduce the risk over our
cardiac patients**

UPDATE IN COAGULATION

Dr. Ayman Dessoki, MD

The ability of the body to control the flow of blood following vascular injury is paramount to continued survival. The process of blood clotting and then the subsequent dissolution of the clot, following repair of the injured tissue, is termed **hemostasis**. Hemostasis, composed of major events that occur in a set order following the loss of vascular integrity:

1. The initial phase of the process is vascular constriction. This limits the flow of blood to the area of injury.
2. Next, platelets become activated by thrombin and aggregate at the site of injury, forming a temporary, loose platelet plug. The protein fibrinogen is primarily responsible for stimulating platelet clumping. Platelets clump by binding to collagen that becomes exposed following rupture of the endothelial lining of vessels. Upon activation, platelets release numerous substances and proteins important for the coagulation cascade. In addition to induced secretion, activated platelets change their shape to accommodate the formation of the plug.
3. To insure stability of the initially loose platelet plug, a fibrin mesh (also called the clot) forms and entraps the plug. If the plug contains only platelets it is termed a white thrombus; if red blood cells are present it is called a red thrombus.
4. Finally, the clot must be dissolved in order for normal blood flow to resume following tissue repair. The dissolution of the clot occurs through the action of plasmin.

Two pathways lead to the formation of a fibrin clot: the intrinsic and extrinsic pathway. Although they are initiated by distinct mechanisms, the two converge on a common pathway that leads to clot formation. Both pathways are complex and involve numerous different proteins termed clotting factors. Nowadays the time based coagulation pathway takes the upper hand in describing the distinct mechanisms of the hemostasis process involving cells and coagulation factors into a homogenous pathway.

Blood coagulation

Is part of an important host defense mechanism termed **hemostasis** (the cessation of blood loss from a damaged vessel). Upon vessel injury, platelets adhere to macromolecules in the subendothelial tissues and then aggregate to form the primary hemostatic plug. The platelets stimulate local activation of plasma coagulation factors, leading to generation of a fibrin clot that reinforces the platelet aggregate. Later, as wound healing occurs, the platelet aggregate and fibrin clot are broken down. Mechanisms that restrict formation of platelet aggregates and fibrin clots to sites of injury are necessary to maintain the fluidity of the blood.

Hemorrhage

Can result from trauma, vascular defects, peptic ulcer disease), platelet abnormalities, or deficiencies of one or more of the plasma coagulation factors.

Thrombosis

Is a pathologic process in which a platelet aggregate and/or a fibrin clot forms in the lumen of an intact blood vessel or in a chamber of the heart. If thrombosis occurs in an artery, the tissue supplied by the artery may undergo ischemic necrosis (e.g., myocardial infarction due to thrombosis of a coronary artery).

SCREENING FOR RISK FACTORS

Dr. Karim Mashhour, MD

A NEW PORTABLE ECMO SYSTEM FOR MECHANICAL LIFE SUPPORT IN RESISTANT CARDIOPULMONARY FAILURE

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²
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Introduction:

Severe cardiopulmonary failure resistant to critical care treatment leads to death of hypoxic organ failure. New treatment options for cardiopulmonary failure are necessary, especially for patients primary located in outlying medical facilities. We report our experience with a new developed, portable ECMO (Extracorporeal Membrane Oxygenation) system and describe emergency “out-of-centre” ECMO implementation and additional emergency medical service for referral hospital treatment.

Methods:

Between March 2006 and December 2008, we treated 21 adult patients with the new ECMO system (ELS-System™, MAQUET Cardiopulmonary AG, Hechingen, Germany). Diagnosis included cardio-circulatory failure (n=10) and pulmonary failure (n=11). Mechanical life support was achieved “bedside” using femoro-femoral veno-arterial vessel access in cardiocirculatory failure and femoro-jugular veno-venous cannulation in pulmonary failure. Caused by the tip-to-tip heparin coating of the circuits, full heparinization is not necessary. The whole ECMO system can work independent from wall connection points for oxygen and power supply.

Results:

Bedside cannulation was uneventful. On extracorporeal membrane oxygenation the systemic blood-flow and oxygenation were restored. Temporary limb ischemia due to the arterial cannula was observed in two cases. Estimated mortality rate before ECMO support was 88%. Hospital survival rate was 40%.

Conclusions:

The use of this new portable ECMO (ELS-System™) is safe and highly effective. Especially

patients in outlying medical facilities can now be first time treated with ECMO support without extended technical or personnel support. Mechanical life support is facilitated and cardiopulmonary failure has become a new treatment option. Survival rate in extremely ill patients could be improved.

VASCULAR REACTIVITY AND CARDIOPULMONARY BYPASS

Dr. Rob Feneck Mbbs Fesc Frca

Guts and St Thomas' Hospitals, London UK

Cardiac surgery utilising cardiopulmonary bypass has long been associated with alterations in vascular tone and function. These in turn may have important effects on vital organ blood flow, and in due course affect patient outcomes.

This lecture examines some of the factors that affect vascular biology in cardiac surgery patients. The subject will primarily assess the following;

- Physiologic effects of non-pulsatile hypotension
- Effects of relative hypothermia
- Effects of haemodilution
- Inflammatory mechanisms and pro-inflammatory mediators
- Pharmacologic effects of preoperative medications and anaesthetics

Physiologic effects of non-pulsatile hypotension

Blood pressure control is managed acutely by the baroreceptor system in the carotid sinus and aortic arch. These receptors are simple stretch receptors, and high pulsatile pressure will activate them and send signals along the efferent nerves to the vasomotor centre in the medulla. Increased signalling, associated with hypertension, has the effect of causing an inhibition of medullary discharge, leading to a reduction in VMC activity, and reduced sympathetic tone. In contrast, reduced baroreceptor activity (hypotension) will fail to inhibit medullary discharge, leading to an increase in VMC output and sympathetic nervous system activity. This has a primary vasoconstrictive effect, and a secondary effect on rennin and angiotensin release causing further vasoconstriction.

Thus non-pulsatile hypotension causes a marked increase in reflex vasomotor tone and increased serum vasopressor amines. In the post-operative period, this frequently manifests itself as hypertension.

Effects of relative hypothermia

If the skin temperature drops below 37°C a variety of responses are initiated to conserve the heat in the body and to increase heat production. These include

vasoconstriction to decrease the flow of heat to the skin, cessation of sweating, shivering to increase heat production in the muscles, and secretion of norepinephrine, epinephrine, and thyroxine to increase heat production.

If the skin temperature drops below 37°C a variety of responses are initiated to conserve the heat in the body and to increase heat production. These include

Vasoconstriction to decrease the flow of heat to the skin

Cessation of sweating

Shivering to increase heat production in the muscles

Secretion of norepinephrine, epinephrine, and thyroxine to increase heat production

Importantly, these effects may be further modified by cardiopulmonary bypass, which may lead to significant rises in plasma adrenaline and noradrenaline levels. [1-3]

These effects may be modified by modified by pulsatile flow. [4-9].

Thus the effects of the combination of non-pulsatile hypotension and hypothermia are additive, and only partially offset by modification of bypass flow and normal temperature.

Effects of haemodilution

The normal management of CPB involves a reduction of haematocrit from approximately 40% to 20%. This can be achieved by using a priming volume of 1000-1500mls crystalloid/colloid. Although of questionable benefit in modern practice, this may be aided by normovolaemic haemodilution pre-bypass.

The effect of haemodilution is to reduce blood viscosity which will, in turn, improve microvascular flow and reduce pressure. Both these processes may be aided by a dilution of endogenous pressor amines as a result of the pump prime.

Inflammatory mechanisms and pro-inflammatory mediators

In recent years an enormous amount has been written about the effect of inflammatory mediators in the surgical patient. The use of CPB focused interest on cardiac surgery patients, and the potential for blood activation in this setting is clear. Factors that are relevant inflammatory mediators in the cardiac surgery patient include cold [9-11], contact activation [12-16], the issue of surgery on or off pump [17-22], the presence of ischaemia, hypoperfusion, and infarction, and the duration of surgery and nature and severity of surgical trauma.[23-27]

However, a number of studies have suggested that mechanisms of inflammation in cardiac surgery patients are not restricted to CPB-related effects, and that blood contact with wound surfaces is a potent pro-inflammatory stimulus.[28-30]

Many of the inflammatory mediators have a common final pathway involving a receptor-mediated increase in the activity of inducible NO-synthetase, leading to enhance NO levels. This in turn causes pathological vasodilatation and myocardial depression by a number of mechanisms.

Pharmacologic effects of preoperative medications and anaesthetics

These are almost always vasodilator in their effects, and may produce intraoperative hypotension. Although this is usually simply manageable, there has been controversy about continuing or discontinuing some medications, especially ACE inhibitors and K⁺ channel openers, before surgery.

Conclusion:

There is no doubt that hypothermia and non-pulsatile perfusion have been the subject of much research. However, the simple vascular effects that these entities provoke are usually simple to control.

Of more difficulty, is the vascular response to cytokine release that appears to be related not just to bypass, but also to the extent of surgery, and is much less predictable both in its nature and severity. The drive towards avoiding CPB has not eradicated this problem. It will be interesting to see whether minimal access surgery is able to have a significant impact in the future.

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RO2: THE MONITOR OF MASS DEBATE

Dr. Hisham Hosny, MD

Lecturer of Anesthesiology, Faculty of Medicine, Cairo University, Egypt

Abstract:

Despite improvements in medical and technological procedures, morbidity affecting the central nervous system (CNS) perioperatively is still a challenge in cardiovascular surgery [1]. Complications involving the brain are of particular concern because of the devastating consequences and their impact on outcome.

Brain damage shows a wide spectrum of disorders after cardiac surgery. The extent of CNS involvement ranges from segmental deficit to more severe derangement. Stroke occurs in up to 6% of the cases, being the most evident clinical manifestation of brain injury. Neurocognitive dysfunction is the most frequent neurologic complication, occurring in up to 50–60% of patients, and is related to cognitive decline over time [2].

Cerebral NIRS is a noninvasive technique to monitor brain oxygenation by measuring regional cerebral venous oxygen saturation [3]. It is based on measuring intravascular oxyhemoglobin fraction in a small sample of cerebral cortex through the skull by means of nearinfrared light spectroscopy. Although measurement is performed on a small region of cranial microvasculature, the association between frontal-cortex oxygen desaturation and neurocognitive decline has been independently confirmed [4].

Neuromonitoring tools may guide both intervention and treatment, and are aimed at reducing brain damage during cardiovascular surgery, especially when combined in multimodality monitoring. Further prospective, double-blind, randomized outcome studies are needed to determine the optimal neurologic monitoring modality (or modalities) in specific surgical settings [5].

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THE BIOPHYSICAL PROPERTIES OF RED BLOOD CELLS DURING CARDIOPULMONARY BYPASS IN CYANOTIC VERSUS ACYANOTIC CONGENITAL PEDIATRIC HEART SURGERY

Fawzia aboul Fetouh, MD, Fadel Ali, PH.D, Mohamed Saleh, PH.D

Cardiopulmonary bypass (CPB) is a technique that isolates the heart and lungs and promotes a bloodless field to facilitate surgery on the heart and great vessels. Correction of congenital alterations is a fine and very complicated surgery. Certain congenital heart defects can disrupt the normal pediatric blood circulation, creating a transitional circulation in which right-to-left shunts. Under such circumstances, continued transitional circulation leads to severe cyanosis or hypoxemia which is severe decreases in tissues oxygen delivery. In correction surgery for congenital patients especially cyanotic patients; there are many parameters affecting the outcome of patients as patient's health, anesthesia, heart lung machine and postoperative managements. In this study Pediatrics were divided into three groups; normal healthy pediatrics (GpI), acyanotic patients (GpII) and cyanotic patients (GpIII).

Blood samples were collected from healthy, cyanotic and acyanotic patients for biophysical and some biochemical analysis. The osmofragility and solubilization of red blood cells (RBC's) membrane by nonionic detergent in addition to hemoglobin molecule structure as measured by dielectric relaxation, absorption spectra and electrophoretic mobilities were investigated for the collected RBCs before CPB. The effect of CPB machine on healthy blood was also investigated. The rheological properties of the collected blood was investigated by blood viscosity measurements, coagulation profile was also tested through measurements of prothrombin concentration and activated partial thromboplastin time.

The results showed that Cyanotic patient's RBCs were more soluble in nonionic detergent, with lower membrane elasticity with deformed morphological forms. However, the molecular structure for hemoglobin as compared to normal healthy pediatrics proved to be within normal structure. Moreover, cyanotic patient blood proved to have higher viscosity as compared with healthy blood. There was disturbance in coagulation profile compared to normal healthy pediatrics.

Acyanotic patient's results showed insignificant differences, but blood pictures showed changes in morphological shape of the RBCs compared to normal healthy pediatrics.

Homodynamics data for cyanotic patients showed to have lower values as compared with acyanotic patients, indicating poor cardiac function and consequently poor all organ's perfusion and functions. Clinical outcome estimation indicates less functioning kidney, less responding vasculature, and long

intensive care time referring to more morbidity for cyanotic patients compared to acyanotic patients. Circulating healthy blood in the machine indicated dramatic change in both RBCs membrane mechanical properties as well as changes in the cellular morphology.

So it was concluded from the present results that; deteriorating effects of hypoxia on RBC's characteristics result in protein toxins formation which affect the healthy blood when added to the cyanotic patient's blood during CPB. Moreover the use of the present pump for CPB causes harmful effects on both mechanical and structural properties of RBCs membrane.

COPD AND IMPLICATIONS OF LUNG VOLUME REDUCTION SURGERY IN THE CURRENT ERA

Dr. Tarek Mohsen MD, FRCS

Department of Cardiothoracic Surgery, Cairo University Hospitals

Introduction:

The objective of lung volume reduction surgery (LVRS) is the safe, effective, and durable palliation of dyspnea in appropriately selected patients with moderate to severe emphysema. An effective LVRS program requires participation by and communication between experts from pulmonary medicine, thoracic surgery, thoracic anesthesiology, critical care medicine, rehabilitation medicine, respiratory therapy, chest radiology, and nursing.

In this study we review LVRS and bronchoscopic lung volume reduction in the current era as well as our experience with patients undergoing LVRS.

ANAESTHESIA FOR OESOPHAGECTOMY

Dr. Ashraf El-Masry, MD

Lecturer of Anaesthesia, Faculty of Medicine Cairo University

Worldwide more than 90% of oesophageal cancers are squamous cell carcinoma (1). Oesophageal adenocarcinoma is the most rapidly increasing cancer in the USA (2). The changing epidemiology of oesophageal cancer is changing the profile of patients presenting for Oesophagectomy. Although a history of tobacco abuse remains common, the prevalence of obesity, gastro-oesophageal reflux and ischemic heart disease (IHD) are commonly met in patients presenting for oesophageal cancer (3, 4). At present 25% of candidates for potential curative therapies are American Society of Anaesthesiologists (ASA) grade III or IV (5).

Anaesthetic management in such patient is challenging and requires meticulous observations and interventions extending from preoperative assessment till discharge from intensive care unit (ICU). The evidence base for the management of patients undergoing Oesophagectomy is weak. There is accumulating evidence that intraoperative anaesthetic management can influence outcome.

The perioperative anaesthetic management and postoperative issues as pain and nutrition will be highlighted according to best available evidence.

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ASSESSMENT CRITERIA FOR LUNG RESECTION

Dr. Fawzia A. Fetouh

Prof. of cardiothoracic anesthesia, Cairo University

Introduction

After determining the anatomic resectability of lung disease you have to answer this question As Incidences of complications and mortality varies according to The extent of the planned resection.,the pulmonary reserve of the patient, and the presence of comorbid factors.

Can the patient withstand the planned procedure and survive the loss of the resected lung?

An Overview of Pulmonary Function Tests

To determine the Severity of the Pulmonary Disease the percentage reduction from the normal values is the most popular method used

Preoperative Evaluation of Patients

All patients undergoing lung resection surgery, irrespective of age or extent of the lesion

Initial evaluation studies

Pulmonary specific evaluation Aims at assessing

1. **the patient's physiologic pulmonary reserve**
2. **the extent of resection that can be tolerated.**
3. **Predicting complications..**

Pulmonary Specific Evaluation: Three stages

Stage I: Spirometry, Diffusion Capacity and Arterial Blood Gas

Stage II: Quantitative Ventilation-Perfusion Scan

Stage III: Exercise testing

Conclusions:

A low predicted postoperative FEV1 appears to be the best indicator of patients at high risk for complications, and it was the only significant correlate of complications when the effect of other potential risk factors was controlled for in a multivariate analysis. Pulmonary resection should not be denied on the basis of traditionally cited preoperative pulmonary variables, prediction of postoperative pulmonary function by a technique of simple calculation may be useful to identify patients at increased risk for medical complications

CHRONIC POST THORACOTOMY PAIN SYNDROME

Dr. Mohammad Yosry, MD

A. Professor of Algology & Anesthesia Faculty of medicine Cairo University, Egypt

Chronic post surgical pain syndromes are very common complaints of many patients. It is common and sever after different surgeries as amputations, cesarean section or hernia repair but the most common and sever is chronic post thoracotomy pain syndrome. Although it performs a very pig problem but still research work is very deficient for treating this issue. Chronic post-thoracotomy pain syndrome is defined as pain that recurs or persists along a thoractomy incision for at least 2 months following surgery. It detected for the first time by United States Army surgeons in the 2nd world war. Now, it is a Separate disease that needs management by itself with prevalence of 11–80% of post thoractomy patients. It is the commonest complication of thoracotomy and rarely mentioned in the medical literature so, it needs further work. No one technique of thoracotomy has been shown to reduce the incidence of chronic post thoracotomy pain. As any neuropathic pain; treatment is difficult and unsatisfactory. Early referral to pain management specialists is recommended once malignancy recurrence has been excluded. In the first instance, treatment includes; NSAIDs, tricyclic antidepressants, antiepileptics, opioids. IF FAILED, Intercostal nerve blocks, epidural analgesia, sympathectomy, spinal cord stimulation are of value. Recent techniques is Thoracic transforaminal Injections and Radiofrequency Nerve Ablation are the most successful methods.

TEE CME Course



**The 5th Annual International Conference of
The Egyptian Cardiothoracic
Anesthesia Society
(E.C.T.A.S)**

*13 February, 2009, The learning Resource Center
Faculty of Medicine, Cairo University Egypt*

Friday, February 13, 2009

Session I 09:00-02:00

Chairpersons: Prof. Dr. Wafaa Al-Arosy, Prof. Dr. Ahmed Mukhtar

- 09:00-09:20** Physics and Echocardiography
Prof. Dr. Rob Feneck
- 09:20-09:40** Basic TEE views
Dr. Dina Soliman
- 09:40-10:00** TEE Assessment of Aortic Valve
Prof. Dr. Rob Feneck
- 10:00-10:20** Hemodynamic Assessment Using TEE
Dr. Maged Salah

10:20-11:00 Coffee Break

Session II 11:00-13:30

Chairpersons: Prof. Dr. Mahmoud Battawy, Prof. Dr. Medhat Hashem

- 11:00-11:20** Cardiac Masses and the Pericardium
Prof. Dr. Rob Feneck
- 11:20-11:40** TEE Assessment of Infective Endocarditis
Prof. Dr. Amal Khalifa
- 11:40-12:00** The Thoracic Aorta
Prof. Dr. Rob Feneck
- 12:00-12:30** Discussion
- 12:30-13:30** Prayer and Lunch

Session III 13:30-15:00

Chairpersons: Prof. Dr. Nabila Abdel Aziz, Prof. Dr. Hossam El-Ashmawy

13:30-13:50 Indications, Safety and Complications of TEE
Prof. Dr. Rob Feneck

13:50-14:10 TEE Assessment of Mechanical Valve
Prof. Dr. Hussein Heshmat

14:10-14:30 TEE Assessment of Mitral Valve Repair
Dr. Dina Soliman

14:30-15:00 Discussion

TEE Exam

Chairpersons: Prof. Dr. Rob Feneck, Prof. Dr. Maged Salah, Prof. Dr. Ahmed Mukhtar

15:00-16:00 Exam (paper 1)

16:00-16:30 Break

16:30-17:30 Exam (Paper 2)

ABSTRACT

PHYSICS AND ECHOCARDIOGRAPHY

Prof. Dr. Rob Feneck

BASIC TEE VIEWS

Dina Soliman

Assistant Professor, Cardiothoracic Anesthesia Unit, Cairo University

The TEE views recommended for a comprehensive TEE examination include:

*** The Midesophageal (ME) Views:**

- ***ME four Chamber (0-20 degrees):***
Required structures: LA, LV, MV, TV
- ***ME commissural view (60 degrees):***
Required structures: MV (AML between two scallops of PML), LA, LV.
- ***ME two Chamber view(80-100 degrees):***
Required structures: LA appendage, mitral valve, LV apex
- ***-ME long axis view (120- 160 degrees):***
Required structures: LA, LV, LVOT, MV, AV
- ***ME AV short axis view(30-60 degrees):***
Required structures: three leaflets of AV, commissures, coaptation point.
- ***ME AV long axis view(120-160 degrees):***
Required structures: LVOT, AV, ascending aorta
- ***ME RV inflow-outflow(60- 90degrees) :***
Required structures: RA, TV, PV, Main PA (at least proximal 1cm), RVOT.
- ***ME bicaval view(80-110 degrees):***
Required structures: RA appendage, SVC, interatrial septum
- ***ME ascending aorta short axis view (0-40 degrees):***
Required structures: ascending aorta, main PA, right PA
- ***ME ascending aorta long axis view:***
Required structures: ascending aorta, right PA.

***The transgastric Views:**

- ***TG basal short axis view (0 degree)***
- ***TG mid short axis view (0 degree)***
- ***TG two chamber view (90 degrees)***
- ***TG RV inflow view (90 degrees)***
- ***TG long axis view (90- 120degrees)***

- *Deep TG view (0 degree)*
- ***Descending aorta & Aortic arch views:**

- *Descending aorta short axis view (0 degree)*
- *Descending aorta long axis view (90 degrees)*
- *Upper esophageal aortic arch long axis view (0 degree)*
- *Upper esophageal aortic arch short axis view (90degrees)*

IMAGING THE RIGHT HEART (RIGHT VENTRICLE, TRICUSPID AND PULMONARY VALVES)

Prof. Dr. Rob Feneck

HEMODYNAMIC MEASUREMENTS USING TEE

Dr. Maged Salah

Perioperative use of transoesophageal echocardiography made uncomparable evolution in the management of critically ill patients. We still need to explore hemodynamic data provided by TEE and compare these data with that offered by other hemodynamic monitors to have the ability to use the proper monitor in the suitable situation.

TEE can be used for:

1- Assesment of systolic function.

A) Preload: It is maximum fibre length at end diastole and can be expressed by measuring end diastolic diameter, area and volume.

B) Afterload: It is the force impeding myocardial contraction and can be expressed by measuring systemic vascular resistance and wall stress.

C) Contractility: Can be expressed by measuring ejection fraction, fractional shortening and fractional area change.

D) Stroke volume and cardiac output.

E) dp/dt measured across mitral valve in the presence of mitral regurgite.

2- Assessment of diastolic function by Doppler analysis of blood flow through mitral valve and in pulmonary veins.

We are going to describe details of each parameter and its clinical application in critically ill patients. The role of TEE as a hemodynamic monitor needs much more studies and investigations as it may be the hemodynamic monitor of the future.

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CARDIAC MASSES AND THE PERICARDIUM

Prof. Dr. Rob Feneck

INFECTIVE ENDOCARDITIS, DIAGNOSIS AND COMPLICATION

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Despite advances in medical, surgical, and critical care interventions, infective endocarditis remains a disease that is associated with considerable morbidity and mortality.

The variability in clinical presentation of IE requires a diagnostic strategy that is both sensitive for disease detection and specific for its exclusion across all forms of the disease. In 1994, Durack and colleagues¹ from Duke University proposed a diagnostic schema termed the Duke criteria, which stratified patients with suspected IE into 3 categories: "definite" cases, identified either clinically or pathologically (IE proved at surgery or autopsy); "possible" cases (not meeting the criteria for definite IE); and "rejected" cases (no pathological evidence of IE at autopsy or surgery, rapid resolution of the clinical syndrome with either no treatment or short-term antibiotic therapy, or a firm alternative diagnosis).

However: The Duke criteria are meant to be a clinical guide for diagnosing IE and must not replace clinical judgment.

The diagnosis of IE in the Duke strategy is based on the presence of either major or minor clinical criteria. The Duke Strategy has included a positive echocardiogram for IE as Major criteria for the diagnosis of endocarditis. Endocardial involvement is the hallmark for the diagnosis of endocarditis and therefore an echocardiogram showing evidence of endocardial involvement was included as one of the major criteria for the diagnosis of endocarditis

Since late seventies Gilbert and colleagues defined echocardiographic criteria for IE as

- Oscillating intra-cardiac mass on valve or supporting valve structure, in the path of regurgitant jets, or on implanted material in the absence of an alternative explanation;
- or Abscess;
- or New partial dehiscence of prosthetic valve;
- new valvular regurgitation (worsening or changing of preexisting murmur not sufficient)

These are considered sufficient evidence of endocardial involvement.

Transesophageal echocardiogram (TEE) is considered more superior than transthoracic (TTE) in the detection of vegetation. Since the introduction of TEE in early nineties it has overcome the limitation of TTE. TEE detects vegetation with much higher sensitivity and specificity. Different studies showed that while the sensitivity of TTE ranged between 30-80, TEE ranged between 60-100%. The specificity of TTE was 80-90%, and that of TEE reached 100% for detection of endocarditis in different studies. For endocarditis of prosthetic valves TTE is considered inadequate.

Only large vegetations can be detected by TTE. The sensitivity of TEE is 95% for detection of prosthetic valve endocarditis; while its specificity is 85-98%.

TEE, TTE: False-Positive Results in diagnosis of IE

Valvular abnormalities that are not related to current infection, Previous scarring or severe myxomatous change; and as echocardiographic technology improves, with higher frequencies and refined beam-forming technology, more subtle findings continue to be recognized and may add to the category of indeterminate findings.

TEE, TTE: False-Negative Results for the diagnosis of IE

Small or embolized vegetations, Even TEE may miss initial perivalvular abscesses, particularly when the study is performed early in the patient's illness. In such cases, the incipient abscess may be seen only as nonspecific perivalvular thickening, which on repeat imaging across several days may become recognizable as it expands and cavitates. Similarly, perivalvular fistulae and pseudoaneurysms develop over time, and negative early TEE images do not exclude the potential for their development.

Intraoperative: The role of echocardiography is

Prepump: Identification of vegetation, mechanism of regurgitation, abscesses, fistulas and pseudoaneurysm.

Postpump: Confirmation of successful repair and assessment of residual valve dysfunction.

- *N.B Elevate afterload if necessary to avoid underestimating valve insufficiency or presence of residual abnormal flow*

Infective endocarditis complication:

Vegetation embolization, destruction of valvular or intra-cardiac structures with the deterioration of hemodynamic status of the patient and abscess collection are among the major complication of endocarditis.

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THE THORACIC AORTA

Prof. Dr. Rob Feneck

INDICATIONS, SAFETY AND COMPLICATIONS OF TEE

Prof. Dr. Rob Feneck

TEE ASSESSMENT OF MECHANICAL VALVE

Prof. Dr. Hussein Heshmat

TRANSESOPHAGEAL ECHO: A USEFUL GUIDE IN MITRAL REPAIR

Dina Soliman,

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Anatomy of the mitral apparatus:

The mitral apparatus describes structures associated with valve function and includes the fibrous skeleton of the heart, annulus, leaflets, chordae tendinae, papillary muscles and the adjacent myocardium.

Nomenclature Schemes:

***Classic Anatomic.**

***Carpentier.**

The most popular, it defines the three scallops of the posterior leaflet as P1, P2 and P3 and three corresponding areas of the anterior leaflet as A1, A2 and A3.

***Duran.**

It refers to the three scallops of the posterior leaflet as P1, PM (middle), and P2. The anterior leaflet is divided into only two areas, A1 and A2.

Systemic examination of the mitral valve:

The examination consists of four standard mid esophageal views (four-chamber, commissural, two-chamber and long axis) and two transgastric views (basal short axis, two-chamber).

Indications for mitral valve repair:

***Mitral regurgitation:**

The advantages of mitral repair over mitral replacement include:

- The preservation of LV function through preservation of the chordal attachments.
- Low rates of thromboembolism.
- The lack of a requirement for anticoagulant (beyond aspirin).
- Excellent durability.

***Mitral Stenosis.**

Repair Techniques:

- Quadrengular resection -Sliding valvuloplasty - Commissural placation - Chordal shortening- Chordal transfer-Annuloplasty ring.

****Mitral Valve Repair is considered category I indication for intraoperative TEE****

Intraoperative TEE Assessment during MV Repair:

2D Exam:

- 5ch view, 4ch view

- Commissural, 2ch, long axis views
- Transgastric basal short axis, midpapillary short axis & long axis views

***CFD of MV:**

- Jet area, vena contracta, PISA.

***Spectral Doppler:**

- (PWD) pulmonary veins
- (CWD) MV regurgitant jet

****Post-CPB assessment must keep in mind the most common**

Complications of MV repair:

- **Failed repair, persistent significant MR**
- **SAM**
- **Ring dehiscence**
- **Coronary artery injury**
- **Ventricular wall perforation**
- **MS**

****For Accurate TEE interpretation, Anesthesiologists should attempt to attain a hemodynamic profile approximating that of the ambulatory state for the patient.**

The decision to return to bypass & Reoperate:

- Surgeons make a judgment based on several considerations:
 - Baseline EF
 - Additional cardiac pathology (CAD)
 - Cross clamp time (CCT)
 - Ventr. Epicardial pacing (can ↑MR)
 - Age
 - Comorbidities

THANKS

The organizing committee of the 5th Conference for the Egyptian Cardiothoracic Anesthesia Society (ECTAS) would like to express its sincere thanks and appreciation to all companies and firms who have generously participated in the sponsorship of the conference.

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