ANAESTHETIC CHALLENGES IN MANAGING OBSTETRIC EMERGENCIES

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1 to 2% of obstetric patients need non-obstetric surgery – ovarian cysts, appendicitis, cholecystitis, trauma...

Complications of pregnancy requiring surgery and anaesthesia
Clinical challenges – advanced maternal age, obesity, diabetes, Pre-eclampsia, specific (rare situations)

Pre-admission or pre-procedural assessment
Procedural Role
Emergency Management
Involved in Managing and reducing risk – safety role, conflict

Consulting role – interprofessional and interspecialty issues

SCOPE OF ANAESTHETIC INVOLVEMENT
indications may be obstetric, anaesthetic iatrogenic, general medical
• Minimal alteration in maternal physiology.
• Minimise effects of physiological trespass due to pathology or
  - Optimise utero-placental perfusion during surgery
  - Optimal oxygenation
  - Avoidance of iatrogenic (drug related?) harm
  - tocolysis if indicated
  - Prevention of bad things – hypoxia, hypotension, hypothermia,
    hyper/hypo metabolic, electrolyte and fluid states.
First trimester
Second trimester
Third trimester
Labour analgesia
Anaesthesia for interventionall/operative delivery
Post-partum period.

robust cardiovascular and respiratory physiology, may initially compensate well

PHASE OF GESTATION
“MATERNAL COLLAPSE”
- multidisciplinary communication
- safety of mother and foetus
- further referral and consultation when needed
- normal pregnancy findings may be confusing
- risk of airway and other difficulties
- preparation and resourcing

CLINICAL ASSESSMENT
- choice of technique in consultation with obstetrician midwives and paediatrician
- discuss options
- equipment and skilled assistance (e.g. airway)
- blood and blood products
- contingencies an alternative plans skills and drills training can improve outcomes in emergency situations.

PREPARATION
CONSIDERATION OF RISKS

- aorto caval compression
- nonsteroidal anti-inflammatory drugs and ductus arteriosus closure
- increased risk of inadvertent intravascular injection with epidural venous plexus dilatation
- difficult airway
- regional anaesthesia difficulties
- aspiration risk
- bleeding

CLINICIAN EXPOSURE/SELF SELECTION FOR OBSTETRIC PRACTICE, UNFAMILIAR REMOTE-FROM-OT ENVIRONMENT, RISK OF PRECIPITOUS DETERIORATION AFTER INITIAL COMPENSATION
FIRST TRIMESTER - DELAY SURGERY UNTIL SECOND TRIMESTER IF POSSIBLE

- embryological effects of drugs
- oxygenation, euvalaemia, stable haemodynamics
- increasing maternal and foetal metabolic demands
- decreased anaesthetic requirements
- faster inhalation of induction
- greater risk of hypoxia due to decreased FRC
- excessive ventilation may cause hypocapnia and decreased CO, UBF
- decreased plasma cholinesterase levels (neuromuscular monitoring)
- foetal monitoring
Category B: Animal studies indicate no foetal risk, but no human studies, or adverse effects in animals, but not in well-controlled human studies.

Category C: No adequate human or animal studies, or adverse foetal effects in animal studies, but no available human data.

Category D: Evidence of foetal risk, but benefits outweigh risks.

<table>
<thead>
<tr>
<th>Drug</th>
<th>FDA category</th>
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<tbody>
<tr>
<td>Bupivacaine</td>
<td>C</td>
</tr>
<tr>
<td>Lignocaine</td>
<td>B</td>
</tr>
<tr>
<td>Butorphanol/nalbuphine</td>
<td>C (in small doses)/D (in high doses)</td>
</tr>
<tr>
<td>Succinylcholine</td>
<td>C</td>
</tr>
<tr>
<td>Rocuronium</td>
<td>C</td>
</tr>
<tr>
<td>Thiopentone sodium</td>
<td>C</td>
</tr>
<tr>
<td>Propofol</td>
<td>B</td>
</tr>
<tr>
<td>Morphine/meperidine/fentanyl</td>
<td>B (in small doses)/D (in high doses)</td>
</tr>
<tr>
<td>Sufentanyl/remifentanil</td>
<td>C</td>
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</tbody>
</table>

FDA = Food and drug administration
Safe drugs

Insulin, glyburide, metformin
Ranitidine, cimetidine
Chlorpheniramine, diphenhydramine
Acetaminophen
Methyldopa
Levothyroxine
Azithromycin, cephalosporins, clindamycin, erythromycin, penicillins, metronidazole
Metoclopramide
Magnesium sulphate
relatively safer for emergency surgery
- difficult airway management
- increased aorto-caval compression
- thromboprophylaxis may be indicated
Surgical emergencies
Acute appendicitis
Cholecystitis
Intestinal obstruction
Torsion of ovarian cysts or masses
Cholelithiasis
Cortical renal tumour
Hernias
Complications of inflammatory bowel disease
or abdominal pain of unknown aetiology
Miscellaneous
- Regional anaesthesia preferred choice
- GA may be unavoidable
- Anaesthesia and breastfeeding
- Interventional radiology involvement
- Trauma and cardiac arrest - perimortem cesarean section

THIRD TRIMESTER
**Obstetric causes**
- Haemorrhage
- Category 1 Caesarean section
- Eclampsia
- Sepsis
- Embolism (amniotic fluid or pulmonary)
- Shoulder dystocia
- Uterine rupture

**Anaesthetic causes**
- Failed intubation
- High spinal
- Drug errors
- Local anaesthetic toxicity
- Anaphylaxis
Non-pharmacological techniques

Parenteral opioids – all have side effects

Inhalational anaesthetics

Neuraxial anaesthetic techniques
Other Drugs Used as Adjuvants:
Clonidine
Neostygnine
Dexmedetomidine

Doses – how much: it depends!!!!!
Increased number of LSCS
Regional safer than GA
Determinants: maternal preference, comorbidities, urgency
Mortality benefit with advanced anesthetic care

ANAESTHESIA FOR CAESAREAN SECTION

INDICATIONS FOR GENERAL ANAESTHETIC

- Parturient refusal
- Coagulation abnormalities (Plt count <100)
- Various contra-indications of regional anaesthesia such as severe active infection, neurological diseases, deformities of the spine, etc
- Foetal compromise necessitating urgent operative intervention.
Difficult airway
Aspiration risk
Consider Gen II supraglottic airway
Polypharmacy and anesthesia

GA RISKS – BALANCE AGAINST TIME ADVANTAGE
## Clinical features of a high spinal

<table>
<thead>
<tr>
<th>Cardiac</th>
<th>Respiratory</th>
<th>Neurological</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>Low oxygen saturations</td>
<td>High sensory block</td>
<td>Nausea and vomiting</td>
</tr>
<tr>
<td>Bradycardia</td>
<td>Apnoea</td>
<td>Paralysis or weakness of upper limbs</td>
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</tr>
<tr>
<td>Cardiac arrest</td>
<td>Difficulty coughing or speaking</td>
<td>Loss of consciousness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cranial nerve block</td>
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PPH

- Early tubal ligation in developing countries
- Increase blood volume: risk of CCF if pre-existing cardiac disease
- Caution with oxytocin rapid infusion may decrease SVR and raise PVR causing decreased cardiac output
- Ergometrine, PGF2-a may cause hypertension, tachycardia increased PVR cautioning cardiac patients

POSTPARTUM - TO 6 WEEKS
FLUID RESUSCITATION AND GOAL DIRECTED FLUID THERAPY

- Large Bore IV Access
- Warmed IV Fluids
- Blood and Blood products – guided transfusion therapy
- Laboratory, clinical expertise, clinical
- Avoiding the “BLOODY VIOCUS TRIAD” – Acidosis, Coagulopathy, Hypothermia
Laparotomy Exploratory
- Resection Bowel Large, Colectomy
- Whipple Pancreato-duodenectomy
- Hepatectomy
- Splenectomy
- Transplant Kidney
- Dissection Radical Neck

- Bypass Aorto-Femoral / Popliteal / Axillary
- Open Hysterectomy Abdominal Total / Bilateral Salpingo-oophorectomy
- Chemotherapy Hyperthermic Interperitoneal
- Laminectomy Fusion w/ Instrumentation (> 3 levels)
- Arthroplasty Hip, Knee, Elbow
- Excision Burn
- Cystoprostatectomy w/ Ileal Conduit
- Radical Cystectomy

GOAL DIRECFTED FLUID AND TRANSFUSION THERAPY
MINIMALLY INVASIVE HAEMODYNAMIC MONITORING – VENTILATED PATIENTS
ULTRASOUND – WHY DON’T WE USE IT MORE OFTEN?
TEG AND ROTEM – POINT OF CARE TESTING IN TRAUMA
WHAT ABOUT PPH?
Qualitative interpretation (InTEG)

- Normal
- Lysis
- Thrombocytopenia or low fibrinogen
- Heparin or factor deficiency
MATERNAL CARDIAC ARREST

- Rare: 1:20,000-1:30,000 pregnancies
- Resuscitation skills critical, deficient knowledge common
- Standard ALS plus preparation for Perimortem CS
- Lateral uterine displacement VIP!!!
- Consider obstetrician on the arrest team
- CS within four minutes of arrest (60s)
- Relieves aorto-caval compression
- Foetal survival more likely delivery within 5min of arrest
- Hypovolaemia (sepsis), cardiac disease including AMI arrhythmia, cardiomyopathy (older, obese obstetric population) PE, amniotic fluid embolism
Haemorrhage is the most common cause of maternal collapse
PPH, placental pathology, uterine rupture, ectopic pregnancy
3.7 per 1000 pregnancies
Occult bleeding especially post Caesarean section – NB physiological reserve
MTP response and training
Point-of-care coagulation testing
Appropriate transfusion strategy
Early coagulation factors
Low fibrinogen as indicator of severity: WOMAN (WOrldwide Maternal ANtifibrinolytic) Trial,
Early tranexamic acid (CRASH 2) – INCORPORATE AND STANDARDISE!
Aggressive management of uterine Atony
Surgical and interventional radiology treatments - consider the stability of patient
Definition based on immediate threat to life of either mother or foetus

- Urgency appropriate to risk of baby and safety of mother
- 30 minute decision to delivery interval intended as an audit tool
- Minimise time to decision - maximise outcome
- Good communication is critical
- Inform all team members in a timely manner
- Choice of anaesthetic technique consider GA vs “rapid sequence spinal”
- Failed intubation drill: rate as high as one of 300
- Mitigated by video laryngoscopy

CATEGORY ONE DILEMMAS
Most commonly- inadvertent IV administration of drugs intended or epidural

- Syringe swap errors
- Unfamiliar environment and stress
- Mitigated by double checking, colour and thread coding, drawing up from amoules and not prep tray wells, pump programming

DRUG ERRORS
EDUCATION, LEARNING, SIMULATION

- Regular multidisciplinary training improves outcomes
- Reduced decision to delivery interval in category one CS
- Early detection of deteriorating patients
COMMUNICATION
SHARED MENTAL MODELS

* CONFIDENTIALITY
* RESPECT FOR EACH OTHER
* COMMUNICATION
* TEAMWORK
* LEARNING - OK TO MAKE MISTAKES AND LEARN FROM THEM
Clinical Complexity and Organisational Challenges

Post-Incident Management: Debriefing, Learning, Implementing Change

Multiple stakeholders in management of Obstetric Emergencies:
- Midwives
- Obstetricians
- Emergency Medicine and Nursing
- Anaesthetists and OT Teams
- ICU
- Interventional Radiology

SEEKING GUIDANCE, CONSENSUS, COLLABORATION AND LEARNING