ANESTHESIA FOR ENDOSCOPY AND LAPAROSCOPIC SURGERY IN BACH MAI HOSPITAL

Nguyễn Toàn Thắng, MD
Dept of Anesthesia and Critical Care,
Bach Mai Hospital

CONTENTS

- Introduction about anesthesia department
- Anesthesia for endoscopic and laparoscopic surgery.
- Difficulties in anesthesia for endoscopic and laparoscopic surgery.
- Problems in clinical practice.
- Summary.
Introductions

- Bạch Mai University Hospital: the oldest and biggest hospital in Việt Nam (with over 100 yrs of history, 2000 beds).
- Providing medical services at the high level of the Vietnamese healthcare system.

Introduction about Dept of Anesthesia

- Personal: 13 doctors + 60 nurses
- 11 operating rooms
- 14000 operations per year (2013)
- Anesthesia for:
  - GI, urologic, orthopedic surgery.
  - Obstetric & gynecologic surgery.
  - ENT surgery
  - Cardiovascular surgery.
  - Neurologic surgery.
  - Interventional Endoscopy.
Anesthesia for laparoscopic surgery

- **Surgeries includes;**
  - Urgent: appendicectomy, GI perforation repairs.
  - Elective: cholecystectomy, splenectomy, colectomy, hernia repair, catheter insertion for peritoneal dialysis...

- **Anesthesia technique:** general anesthesia
  - Induced by propofol or etomidate
  - Maintained: propofol (TIVA or TCI), isoflurane or sevoflurane, ↑ ventilation 10-15%, EtCO$_2$=35-40.
  - Postoperative analgesia: paracetamol, NSAIDs ± opioids, local infiltration = bupivacaine 0,25%.

Anesthesia for thoracoscopic surgery

- **Types of surgery**
  - Sympathectomy (hyperhidrosis)
  - Thymectomy (myasthenia gravis), lobectomy
  - Decortication, tracheal stent insertion, tracheal tumor or polyp, lung lavage, lung biopsy...

- **Anesthesia technique**
  - General anesthesia
  - Airway controlled by endotracheal tube, double lumen tube, LMAS.
  - Postop analgesia: paracetamol, NSAIDs ± epidural, intercostal, paravertebral blocks, IV opioids PCA.
Anesthesia for urologic surgery

- Types of surgery
  - Transurethral resection of the prostate (TURP)
  - Bladder Endoscopy for diagnosis and treatment
  - Retrograde ureteral lithotripsy
  - Laparoscopic ureterolithotomy

Anesthetic technique:
- Spinal: bupivacaine + fentanyl ± morphine
- General anesthesia
- Analgesia: paracetamol, NSAIDs ± spinal morphine, lidocaine gel.

Anesthesia for orthopedic surgery

- The type of surgery: knee and shoulder arthroscopy
- Anesthesia and postoperative pain relief:
  - Knee: spinal with bupivacaine + fentanyl ± morphine. Postoperative analgesia = paracetamol, NSAIDs ± spinal morphine or femoral nerve block
  - Combine epidural and spinal anesthesia, postoperative analgesia with a mixture Bupi 0.1-1.125% + fentanyl 2-4 mcg/ml + adrenaline 1/200.000 continuous infusion through a epidural catheter or IV PCA.
  - The shoulder: general anesthesia and/or brachial plexus block (interscalene access)
Difficulties in clinical practice

- Many beginners surgical application: proficiency, lack of experience.
- Conditions equipment: starting phase is not yet complete, now meet the basic requirements for endoscopic PT.
- Ability to coordinate between the surgeon and anesthetist in the course of surgery

Discussion topics

Contraindications for Laparoscopy

- **Absolute contraindication**:
  Shock, markedly increased ICP, retinal detachment, inadequate surgical equipments, inadequate monitoring devices.

- **Relative contraindication**:
  Bullous emphysema, history of spontaneous pneumothorax, life-threatening emergencies, prolonged laparoscopy more than 6 hours associated with acidosis and hypothermia, new laparoscopic procedures
Contraindications for Laparoscopy

Is Laparoscopic surgery safe when patients have co-morbidities?
- Patients with NYHA class II, III
- Patients with coronary artery disease, with or without stenting.
- Patients with a history of COPD, asthma ...
- Pregnancy
- Elderly

Discussion topics
Preop assessment and monitoring

- Regarding the indication of tests;
  - Cardiovascular: ECG, echocardiography, coronary arteriography...
  - Respiratory: chest X-ray, assessment of respiratory function, arterial blood gases ...
- Standard monitoring; anesthesiologist, SpO2, ECG, BP, body temperature + EtCO2
  The invasive monitoring?
Discussion topics
Issues related to pneumoperitoneum

- Pump pressure optimization:
  surgeon ↔ anesthesiologist
- Patient positioning.
- Respiratory effects.
- Cardiovascular effects.
- Pain, nausea, vomiting after surgery.

PHYSIOLOGICAL CHANGES
Complications of Laparoscopic Surgery

- Hypertension
- Hypotension
- Bradycardia, cardiac arrhythmias, cardiac arrest ...
- CO$_2$ subcutaneous emphysema
- Pneumothorax
- Pneumomediastinum
- Pneumopericardium
- Endotracheal tubes go into the bronchial
- Air embolism
- The risk of aspiration due to reflux

Discussion topics

Gas Embolization

- Laparoscopy associated with hysteroscopy – more frequent
- During the induction of pneumoperitoneum
- Previous abdominal surgery
- By the size of the bubbles & rate of intravenous entry of the gas
- Rapid insufflation of gas under high pressure → ‘gas lock’ in vena cava & RA
- VR obstruction → CO↓ → circulatory collapse
- Acute Rt ventricular HTN may open the foramen ovale (20-30%) → paradoxical gas embolization of the cerebral & coronary beds
- V/Q mismatch → physiologic dead space & hypoxemia ↑
- Must be started slowly (not greater than 1L/min)
Diagnosis of Gas Embolization

- 0.5ml/kg of air – change in doppler sound & increased mean pul. Arterial Pr
- 2ml/kg of air – tachycardia, cardiac arrhythmia, hypotension, increased central venous Pr
- Pul. Edema, mill-wheel murmur
- TEE, doppler, pul. artery catheter – most sensitive
- Pulse oxymetry, ETCO₂ (early detection)
- Aspiration of gas or foamy blood from a central venous line – definitive diagnosis

Treatment of CO₂ Embolization

- Immediate cessation of insufflation & release of pneumoperitoneum
- Steep head-down and left lateral decubitus
- Discontinuing N₂O
- 100% oxygen to correct hypoxemia
- Hyperventilation - CO₂ excretion
- Central venous or pul. artery catheter - gas aspiration
- CPR if necessary
- External cardiac massage & CPB
- Rapid reversal of clinical sign of CO₂ embolism
Case study...

SUMMARY

- Endoscopy and laparoscopic surgery is increasingly indicated for more complicated surgeries, sicker patients. Bach Mai Hospital do not develop beyond this trend.
- The anesthesia significantly contributed to the overall safety and effectiveness of endoscopy and laparoscopic surgery.
- It should have a clear understanding of the physiological changes in laparoscopic surgery, then choose appropriate anesthesia technique.