Anesthesia Concerns in Laparoscopic Myomectomy

ABSTRACT

Recent advances in the practice of anesthesiology ensure that we move closer to our goal of zero morbidity. It is of critical importance that we couple our clinical expertise with the sophisticated monitoring equipment and get the best out of them.

Key words: Premedication, patient positioning, intraoperative monitoring, vasopressin

With advances in laparoscopy equipment and enhanced operative experience, complicated and controversial cases are increasingly coming within the ambit of laparoscopy.

Handling these cases has held its share of challenges for the anesthetists.

This article seeks to highlight a few concerns regarding anesthesia in laparoscopic myomectomy.

PREMEDICATION

The neurohormonal stress response to carboperitoneum increases the plasma concentrations of dopamine, vasopressin, epinephrine, norepinephrine, angiotensin, and cortisol. Hypercarbia and stimulation of the autonomic nervous system are the possible causes. Preoperative α2 agonists (clonidine / dexmedetomidine) given one to two hours prior have been shown to decrease this stress response.

PATIENT POSITIONING

Either supine or modified lithotomy position (if uterine manipulation is required) is advisable, with the patient’s arms flexed over the chest.

Although the Trendelenburg position is not frequently associated with stasis of blood in the extremities, the lithotomy position with general anesthesia and use of muscle relaxants may increase the predisposition to deep venous thrombosis (DVT). Graded compression stockings, sequential compression device, and subcutaneous low molecular weight heparin (usually 20 units of Enoxaparin) together reduce the incidence of DVT by almost 75%.

INTRAOPERATIVE MONITORING

Essential Monitoring in the OT comprises of NIBP (non-invasive blood pressure monitor), ECG (3 / 5 lead with ST analysis), pulsoximeter, and End tidal CO2 form. This can avoid 95% of the mishaps in the OT. Spirometry monitoring gives intrapulmonary pressures and dynamic lung volumes, compliance, and airway resistance, thus enabling adequate ventilation and early diagnosis of respiratory problems. Neuro Muscular Transmission (NMT) monitoring, which uses Train of Four stimuli (TOF) guides in adequate reversal of neuromuscular blockade. Entropy / Bispectral index (BIS) monitors measure the depth of the anesthesia and allow the anesthetists to adjust the dose of the anesthesia agent to the need of the patient. This not only

Address for correspondence:
Dr. Sheetal Chiplonkar,
BEAMS Minimal Access Surgery Center, Plot No. 674, 16th Cross Road, KharPali, Behind Khar Gymkhana, Mumbai - 400 052, India.
E-mail: beamsindia@gmail.com
minimizes the risk of intraoperative awareness, but also aids in prompt emergence from anesthesia.

**VASOPRESSIN**

It is an anti-diuretic hormone. It is a synthetic hormone injected into the myoma capsule to reduce blood loss. As it is a potent systemic vasoconstrictor, it often causes hypertension and bradycardia. It has a plasma half life of 10 – 20 minutes. Care should be taken to infiltrate a dilute solution with hemodynamic monitoring. To avoid unwanted surges in blood pressure, Nitroglycerine, which is a vasodilator can be given in small aliquots. In rare instances, vasopressin-induced sympathetically mediated tachycardia predominates with hypertension. Here, a short acting beta blocker like esmolol may be useful in stabilizing the hemodynamics. The anti-diuretic activity of vasopressin can last for two to eight hours. This can be easily reversed with an intravenous diuretic like Frusemide.

**INTRAOPERATIVE HYPOTHERMIA**

Prolonged laparoscopy under general anesthesia or combined general and regional anesthesia induces hypothermia, despite reduced bowel exposure during laparoscopic surgery. Using a closed circuit with low flows that give warm humidified gases, warm intravenous fluids, and a thermofoator reduces postoperative hypothermia and analgesia requirement.

**LARYNGEAL MASK AIRWAY OR ENDOTRACHEAL TUBE?**

Classic / Flexible / Supreme or Proseal Laryngeal mask airway (LMA) can be used effectively even in prolonged controlled ventilation during elective laparoscopy, depending on the anesthetist’s experience, patient profile, availability of intraoperative monitoring, and anesthesia ventilator. Pressure controlled ventilation with positive end-expiratory pressure (PEEP) has been successfully used with supreme LMA even in obese patients. At BEAMS, the world’s largest laparoscopic hysterectomy was completed in four hours thirty minutes and was done using a flexible LMA. Intraoperative spirometry and mechanical ventilation with end tidal CO\textsubscript{2} monitoring is necessary when conducting a prolonged laparoscopy using a laryngeal mask airway. Although endotracheal intubation with controlled ventilation has been the gold standard, it may cause more airway morbidity in difficult cases, greater hemodynamic variations at intubation–extubation, and increased analgesia requirement postoperatively.

**REPLACING THE BLOOD LOSS**

Crystalloids or colloids has always been a debate. Hypotension rarely occurs till almost 30% of the blood volume is lost. In our experience adequate crystalloid replacement through a wide bore cannula is the safest, minimizing the risks of volume overload and coagulopathy. Pneumoperitoneum-induced sympathetic stimulation gives enough time to replace the volume loss and create acute normovolemic hemodilution. Nevertheless, if one has to choose a colloid, the third generation HES (hydroxyethyl Starch) or tetrastarch offers a unique combination of safety and efficacy. The decision of blood transfusion should be individualized to the clinical situation and should take into consideration the patients’ health. In the course of normal operating room conditions, variables like hypotension, tachycardia, urine output, presence of lactic acidosis, signs of myocardial ischemia (new ST-segment depression >0.1 mV, new ST-segment elevation >0.2 mV), and so on, can suggest falling DO\textsubscript{2crit} (Oxygen delivery falling to critical level), and warrant a blood transfusion.

**INTRAOPERATIVE AWARENESS**

The problem of awareness under anesthesia started with the advent of muscle relaxants. Use of amnestic drugs like benzodiazepines (midazolam, etc.), and using 0.8 to 1 minimum alveolar concentration of anesthetic or more can avoid awareness. Nitrous oxide is an excellent agent to reduce awareness. Moreover, controlled studies have not found any clinically significant difference in bowel distention and postoperative nausea–vomiting, when nitrous oxide (N20)-oxygen was compared with air–oxygen.

**ANALGESIA**

Pain varies and depends upon the length of surgery, intra-abdominal pressure, and amount of dissection. Usually multimodal analgesia, consisting of a single preoperative dose of Dexamethasone, high-dose paracetamol with NSAIDs, with local anesthetic infiltration at the port sites is sufficient. Short acting opioids like Fentanyl / sufentanil can be used liberally. Pandey et al\textsuperscript{[1]} have found 600 mg of oral Gabapentin prior to ambulatory laparoscopies reduce postoperative pain and nausea. According to Shrami et al\textsuperscript{[2]} the pulmonary recruitement manoeuvre or giving manual vital capacity breaths toward the end of surgery before the deflation of the pneumoperitoneum reduces the trapping of CO\textsubscript{2} under the diaphragm and incidence of shoulder pain after surgery.

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