

Case Report

What shall we do for Anesthesia Management during Laparoscopic Surgery in a Pregnant Patient?

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Abstract

During pregnancy % 0.75-2 of patients need surgery and anesthesia. Ovarian torsion which requires emergency surgery is one of them. When surgery is needed during pregnancy period, anesthetic management should be planned to protect both mother and fetus. In order to provide optimal safety of mother and fetus, each case should be managed in a multidisciplinary approach.

In this case report we planned to present the anesthesia management of a 24 weeks pregnant patient who is scheduled for laparoscopic surgery due to acute abdomen, in company with literature.

INTRODUCTION

The ratio of the need for surgery or anesthesia due to non-pregnancy related causes during pregnancy is 0.75-2% [1]. These interventions are mainly emergency ones. Appendicitis ranks the first among the reasons requiring emergency procedure (1/1500-2000), followed by cholecystitis (1-8/10000), ovarian torsion, ovarian cyst rupture, maternal traumas and less commonly life threatening cardiac, neurosurgical diseases and malignancies [2].

Since all kinds of intervention on the mother will affect the baby during pregnancy, surgery and anesthesia in this period gains prominence. Surgery should be implemented only if it is necessary and anesthetic care should involve both mother and fetus. Anesthesia method should provide maternal safety, avoid teratogenic agents, continue uteroplacental perfusion and prevent preterm birth [2].

In this case report we aim to present anesthesia management of a 24-week pregnant patient who was scheduled for laparoscopic surgery due to acute abdomen.

CASE REPORT

A 32 year old female patient was admitted to our obstetrics clinic due to abdominal and inguinal pain for the last two days. Abdominal examination showed rebound and defense on her right side. The patient was consulted to general surgery and anesthesiology clinics. Preoperative evaluation revealed that the patient was 24-week pregnant. No systemic disease was found in patient's history. Laboratory analysis showed hemoglobin 12.2

g dL⁻¹, hematocrit 36%, WBC 16300 mm⁻³. With these findings the patient was scheduled for diagnostic laparoscopic surgery. Informed consent was taken from the patient before surgery.

The patient was administered 40000 IU subcutaneous enoksaparin and wore compression stockings for thromboembolism prophylaxis during preoperative preparation period. The patient was administered **metoclopramide hydrochloride** and ranitidine hydrochloride intravenously one hour before anesthesia induction. Standard monitorization (peripheral oxygen saturation, electrocardiography, noninvasive blood pressure, end tidal carbon dioxide pressure) was provided in the operating room. Right hip of the patient was elevated with a pillow before the induction of general anesthesia and 5-minute pre-oxygenation was performed using 100% oxygen. Intravenous induction was serially provided with lidocaine (1 mg kg⁻¹), propofol (2 mg kg⁻¹), rocuronium bromide (0.6 mg kg⁻¹), fentanyl (2µg kg⁻¹) and intubation was performed using 7.0 endotracheal tube accompanied with cricoid pressure. Anesthesia was maintained by 1.5% sevoflurane in air-oxygen (50%-50%) mixture. Arterial blood pressure was monitored using the left radial artery. During the operation, attention was paid to make necessary position changes (trendelenburg and reverse trendelenburg) for surgery. At the end of the operation neuromuscular block was antagonized by applying 0.03mg kg⁻¹ neostigmine, and 0.01mg kg⁻¹ atropine. When the patient had adequate spontaneous respiratory effort and muscle strength she was conveniently extubated. The patient was administered meperidine and paracetamol through patient controlled intravenous analgesia (PCIA) method for postoperative analgesia.

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The patient who had normal hemodynamic parameters and sufficient spontaneous respiration in postoperative care unit was transferred to the service as conscious and cooperated. She had no problems in service controls and was discharged on postoperative second day.

DISCUSSION

Surgery or anesthesia due to non-pregnancy related causes can be required during pregnancy. The surgeries performed are commonly emergency surgical interventions mainly including adnexial diseases. Surgery is frequently required for the diagnosis and treatment of ovarian pathologies and laparoscopic approaches have been increasingly used for these cases [3]. Ovarian torsion and ovarian cyst rupture are also common during pregnancy and surgery is unavoidable in these cases [3].

Although it is not appropriate to perform elective surgical interventions during pregnancy, if surgery is planned, it should be avoided in the first trimester. If elective surgery is scheduled during pregnancy, second trimester is considered as the optimal time for it. As for emergency surgeries, optimal timing should not be taken into account; primary aim should be to save the mother's life. Our patient was taken to surgery at 24th week of pregnancy due to acute abdomen.

Lower esophageal sphincter tonus decreases and gastric acidity increases due to increasing progesterone hormone levels in early pregnancy period. Nausea and vomiting can occur due to dysrhythmias of gastrointestinal smooth muscles. Therefore, H₂ receptor antagonists and gastric acid aspiration prophylaxis with non-particle antacids are recommended especially after 16th week of pregnancy [4]. Furthermore, since the risk of aortocaval compression will increase after week 16, the physician should aim to refrain from aortocaval compression and protect uteroplacental perfusion by positioning operation table 15° left preoperatively [5]. We administered antacid prophylaxis to our patient in the ward one hour before the surgery and elevated the right hip of the patient using a pillow on operation table to avoid supine hypotension syndrome.

It is known that there is general tendency for coagulation in pregnancy. The risk for thromboembolism is higher than normal women [6]. This risk is further increased due to venous stasis in lower extremities resulting from pregnancy related prothrombotic condition and laparoscopy related pneumoperitonium [5]. Therefore, interval pneumatic compression, which is effectiveness in thromboembolism prophylaxis, is recommended to be applied in pregnant women who would undergo laparoscopic surgery [2]. Similarly, our patient wore compression stockings in perioperative preparation and received prophylaxis with low molecular weight heparin.

It is reported in the literature that both general and regional anesthesia can be successfully applied for the surgeries that are performed due to non-obstetrics reasons [2]. So far, no study in the literature has shown that one technique is superior to the other in terms of fetal results. We planned to induce general anesthesia as we scheduled our patient for laparoscopic surgery. While general anesthesia is preferred for laparoscopic interventions, there are some rare cases in the literature which use epidural anesthesia [7].

It is recommended that low pneumoperitoneal pressures (1.1–1.6 kPa) should be recommended and necessary position changes (trendelenburg- reverse trendelenburg) for laparoscopy should not be performed quickly in pregnant women [2]. Furthermore, necessary monitorization should be performed and precautions should be taken to diagnose potential complications resulting from carbon dioxide pneumoperitonium and trendelenburg position [7]. Lung compliance and functional residual capacity (FRC) decreases; airway pressure and tendency to hypoxemia increases with pneumoperitonium and trendelenburg position. Pneumoperitonium, trendelenburg position, aortocaval compression reduces venous return and might cause decreased cardiac flow and hypotension [7]. The arising hypoxemia and hypotension can impair the general condition of the fetus by reducing uteroplacental perfusion. Animal studies confirm these concerns [8]. However, these risks can be reduced by clinical experience, attentive and experienced surgical and anesthetic approach. Maternal oxygenation, end tidal carbon dioxide (ETCO₂), acid base balance and hemodynamic condition should be maintained within physiological limits to maintain wellbeing of the fetus. We provided invasive arterial pressure and ETCO₂ monitorization in our patient to detect and treat hypoxemia and hypotension early and we prepared available vasopressors that might be necessary.

General anesthesia is usually maintained by air/oxygen or nitrogen/oxygen mixture together with a volatile anesthetic. Clinical studies on N₂O do not support concerns in favor of teratogenicity [4]. Furthermore, it was reported that regarding general anesthesia, a non-deep anesthesia can be dangerous for the fetus by impairing uteroplacental perfusion in relation with catecholamine discharge [4]. Since there is a linear relationship between partial pressure of carbon dioxide (PaCO₂) and fetal PaCO₂, end tidal carbon dioxide values are recommended to be maintained within normal limits during positive pressure ventilation. Maternal hypercapnia causes fetal acidosis and fetal loss by limiting carbon dioxide passage from the fetus to mother's uterus. For this reason, regular arterial blood gas analysis is recommended for laparoscopic surgeries that use carbon dioxide for pneumoperitonium [2]. In our patient, arterial blood gas samples were taken and analyzed during the follow-up of invasive arterial blood pressure.

Constant fetal heart rate (FHR) monitorization through transabdominal doppler enables the evaluation of intrauterine condition generally after 18th week of pregnancy. There is no consensus on constant fetal monitorization during anesthesia. According to American Association of Obstetrics and Gynecologists, this decision should be individualized on the basis of the patient. When unsafe FHR is detected, mother's oxygenation should be improved, blood pressure should be elevated. If it is low, deviation of uterus to the left side should be increased, pneumoperitoneal pressure should be decreased or tocolysis application should be started. In cases when changes persistently continue, cesarean might be necessary, physicians should be prepared in advance [9]. In line with the recommendation of Obstetrics and Birth Clinic, we did not perform FHR monitorization to our patient during the surgery.

Pain control is highly important during postoperative period. It was reported that inadequate pain control in postoperative

acute period increase the risk for premature birth and this risk equals to pregnant women who did not undergo surgery after postoperative first week [2]. Pain control can be achieved by regional methods or patient controlled intravenous analgesia can also be performed. Caliskan et al., reported that they achieved effective analgesia in postoperative period through thoracic epidural anesthesia and analgesia in a 26-week pregnant women due to abdominal resection and that they achieved minimal drug exposure for the fetus [10]. A large body of literature reports that non-steroidal anti-inflammatory drugs should be avoided alone or as multimodal analgesic as they might cause early closure of ductus arteriosus and development of oligohydramnios [11]. We avoided using non steroidal anti-inflammatory drugs for our patient and provided an effective multimodal analgesia by applying meperidine through PCIA and paracetamol.

In conclusion, when emergency surgery should be performed to pregnant women due to non-pregnancy related causes; it might not always be possible to eliminate all risks. Therefore, anesthesia method should be planned by making preparations very well in light of preliminary evaluations and through teamwork with related clinics.

REFERENCES

1. Van de Welde M. Nonobstetric surgery during pregnancy. In: Chestnut's Obstetric Anesthesia Practice and Principles. 4th ed. Philadelphia: Mosby Elsevier, 2009; 337-360.
2. Ní Mhuireachtaigh R, O'Gorman DA. Anesthesia in pregnant patients for nonobstetric surgery. *J Clin Anesth.* 2006; 18: 60-66.
3. Mathevet P, Nessah K, Dargent D, Mellier G. Laparoscopic management of adnexal masses in pregnancy: a case series. *Eur J Obstet Gynecol Reprod Biol.* 2003; 108: 217-222.
4. Wong CA, McCarthy RJ, Fitzgerald PC, Raikoff K, Avram MJ. Gastric emptying of water in obese pregnant women at term. *Anesth Analg.* 2007; 105: 751-755.
5. Reitman E, Flood P. Anaesthetic considerations for non-obstetric surgery during pregnancy. *Br J Anaesth.* 2011; 107: 72-78.
6. Rosen MA. Management of anesthesia for the pregnant surgical patient. *Anesthesiology.* 1999; 91: 1159-1163.
7. Carvalho B. Nonobstetric surgery during pregnancy. *IARS Review Course Lectures* 2006; 23-30.
8. Cruz AM, Southerland LC, Duke T, Townsend HG, Ferguson JG, Crone LA. Intraabdominal carbon dioxide insufflation in the pregnant ewe. Uterine blood flow, intraamniotic pressure, and cardiopulmonary effects. *Anesthesiology.* 1996; 85: 1395-1402.
9. Van De Velde M, De Buck F. Anesthesia for non-obstetric surgery in the pregnant patient. *Minerva Anesthesiol.* 2007; 73: 235-240.
10. Caliskan E, Sener M, Nursal TZ, Caliskan K, Türköz A, Bağış T. Thoracic epidural anesthesia and analgesia for gastric resection at 26 week pregnant woman. *Agri* 2006; 18: 20-23.
11. Cheek TG, Baird E. Anesthesia for nonobstetric surgery: maternal and fetal considerations. *Clin Obstet Gynecol.* 2009; 52: 535-545.

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