Case Report

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Anesthetic Management of Carcinoma Breast Surgery During Third Trimester of Pregnancy

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Abstract

Although malignancy during pregnancy is uncommon, if occurs, it adds challenge to ensure safety of both the mother and fetus. A 36-year lady was diagnosed with carcinoma breast and scheduled for modified radical mastectomy at 29 weeks of gestation. The case was conducted under general anesthesia with intraoperative pectoralis nerve block for postoperative analgesia. Care was taken to avoid hypotension, tachycardia and hypercarbia so that the placental perfusion was not hampered. The trachea was extubated and immediate postoperative obstetrician review revealed no abnormality in the fetal heart rate and activity. Postoperative course was uneventful. Pregnancy was continued till 34 weeks of gestation when elective cesarean section was done under subarachnoid block. A healthy baby was delivered without any adverse consequences. Anesthesia during last trimester of pregnancy can be safely performed, when precautions are taken with involvement of proper teamwork, and the benefit of surgery outweighs the risk of postponing it.

Keywords: Anesthesia; Mastectomy; Modified radical; Pregnancy

Declarations

Ethics approval and consent to participate: Not applicable

Consent for publication: Informed consent was obtained from the patient for publication.

Availability of data and materials: Data will be made available upon request.

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BACKGROUND

Breast cancer is the most frequently diagnosed malignancy among women. Pregnancy associated breast cancer (PABC) occurs with an incidence of 0.2 - 0.4% of all breast cancers and 15 to 35 cases per 100,000 births. Notably, breast cancer cases diagnosed during pregnancy are lower than those detected after childbirth [1]. On average, PABC tends to manifest at 33 years of age, with an average gestational age of 21 weeks.

The American College of Obstetricians and Gynecologists (ACOG), in its 2017 guidelines, emphasizes that medically necessary surgery should never be denied or delayed for a pregnant woman, irrespective of the trimester, as it can have detrimental effects on both the pregnant woman and the fetus [2]. However, performing surgery during pregnancy poses risks for the mother and the developing fetus, thereby presenting challenges for anesthesiologists. Maintaining normal maternal blood pressure during surgery is also crucial due to the passive dependence of uteroplacental circulation.

Regional anesthesia (RA) for breast surgery encompasses several nerve blocks, such as thoracic paravertebral, subpectoral, serratus anterior, and epidural blocks. RA is preferred when possible, during pregnancy, however, general anesthesia (GA) cannot be avoided for complex procedures or when the mother and fetus would experience excessive stress. The short-term effect of anesthesia on newborn are low birth weight and preterm delivery while neurodegenerative changes, learning and behavioral abnormalities are reported as long-term consequences [3]. The objective of this case report is to highlight the perioperative anesthetic management of non-obstetrics surgery during the last trimester of pregnancy in resource limited setting with limited intraoperative fetal well-being monitoring devices and safe delivery without adverse perioperative outcomes. Intraoperative fetal well-being in this case was monitored by measuring uterine contraction and fetal heart sound manually.

CASE

A 36 years lady, second gravida at 29 weeks of gestation presented with a history of lump in her right breast for one month. Examination showed a globular swelling of 2 x 1 cm in right upper outer quadrant. Radiological and pathological work up confirmed invasive carcinoma of breast with tumor markers estrogen receptor positive, progesterone receptor positive and epidermal growth factor 2 neu positive.

The patient was planned for modified radical mastectomy under general anesthesia. A multidisciplinary team including anesthesiologist, breast surgeon, oncologist, obstetrician and pediatrician was involved. Injection dexamethasone and injection hydroxyprogesterone were given two days prior to surgery for fetal maturity and uterine relaxation. During preoperative anesthetic assessment patient was counselled regarding the possibility of premature delivery. It was advised to keep the obstetrician and pediatrician, including the neonatal intensive care unit standby for possible delivery of the baby in the perioperative period. Premedication was done with intravenous injection of ranitidine and metoclopramide as aspiration prophylaxis one hour before shifting the patient to the operation theatre. On the theatre table the patient was kept in supine position with a lumbar wedge inclined at 30^0 on the right side for the left uterine displacement. Baseline vitals were within normal limit. Fetal assessment was done prior to induction of anesthesia. Ramping was done to ease intubation. She was preoxygenated for 3 minutes with 100% oxygen at 10 L/min. Modified rapid sequence induction was done with injection fentanyl 90 micrograms, injection propofol 100 milligrams and cricoid pressure was applied along with ventilation in between. Laryngoscopy and intubation were facilitated by injection rocuronium 40 milligrams intravenous. Trachea was intubated with 6.5 mm, oral, cuffed endotracheal tube using McCoy laryngoscope. Ventilator was set with volume-controlled mode, tidal volume of 400 ml, frequency 20 breaths, inspiratory: expiratory ratio of 1:2 and positive end expiratory pressure of 5 cm of water. Maintenance of anesthesia was done with isoflurane at 1.5 minimum alveolar concentration, vecuronium and 100% oxygen. One gram of acetaminophen was given at the time of incision. Intra operative vitals were: Heart Rate 90 - 110 beats per minute, blood pressure 90/48 - 114/67 mmHg, mean arterial pressure 62 - 82 mmHg, respiratory rate 16 - 18 breaths per minute, end tidal carbon dioxide of 30 - 35 mmHg and oxygen saturation 98 - 100%. Fetal heart rate was 148 - 154 beats per minute. Injection mephenteramine 6mg/ml (1 ml) was given intraoperatively for fall in systolic blood pressurebelow 90 mmHg. Since intraoperative fetal monitor was not available, the scrub nurse was advised to feel for uterine contraction at frequent intervals. Normal uterine contraction was present throughout the surgery. Injection ropivacaine 0.1% (20 ml total volume) was infiltrated in the pectoralis muscle plain by the surgeon for postoperative pain. Skin infiltration was done with 0.25% ropivacaine (20 ml total volume). Neuromuscular blockade was reversed with injection neostigmine and injection atropine. The trachea was extubated and she was

transferred to post anesthesia recovery room. Fetal heart rate was 146 beats per minute in post anesthesia recovery room.

Duration of anesthesia was 2 hours 40 minutes. Post-operative fetal assessment showed heart rate of 134 beats per minute with adequate Amniotic Fluid Index. Postoperative pain was measured using a numerical rating scale (NRS 0 – 10 point scale) at 2, 6, 24, and 48 hours which were 0, 1, 1 and 2 respectively. Injection acetaminophen 6 hourly was given till second postoperative day. The remaining course was uneventful and the patient was discharged on third postoperative day. Histopathology report of surgical specimen revealed invasive carcinoma of breast with metastasis to axillary lymph nodes(T4N3M1). First cycle of chemotherapy with cyclophosphamide 700 mg and doxorubicin 70 mg was started at 33 weeks of gestation. At 34 weeks of gestation elective cesarean delivery was scheduled due to anemia (hemoglobin 8 g/dl) and severe constipation. Cesarean section was performed under subarachnoid block and a live healthy child was born without any perioperative complications.

DISCUSSION

Elective surgeries are best avoided during pregnancy. If unavoidable, the second trimester is considered safe and ideal as fetal organogenesis occurs in first trimester, and the risk of preterm labor is less than in the third trimester [4]. Although neurotoxicity and teratogenic effect do not occur in fetus when in-utero exposure to anesthetic is limited (<3 hours), exposure of > 3 hours was found to be associated with effects on fetal neurodevelopment [2, 3]. Concentration of inhalational agent used may also lead to preterm labor [3]. In the case of PABC surgery needs to be performed at the time of diagnosis or in an appropriate interval after the end of neoadjuvant treatments [2].

During radical mastectomy, inadequate analgesia occurs from less effective block of medial and lateral pectoral nerves by thoracic paravertebral block (TPVB) [5]. In contrast, the Pectoralis (PECS) II block leads to complete block of medial and lateral pectoral nerves along with long thoracic and thoracodorsal nerves leading to better analgesia and reduces postoperative opioid consumption [5].

Maternal hypotension needs to be managed promptly by intravenous fluids and vasopressors like phenylephrine or ephedrine.The preferred left lateral position to prevent aortocaval compression is often not feasible in most cases of anesthesia for pregnant women undergoing surgery, requiring specific positioning based on the surgical technique. Also, in this contextthe supineposition with head elevation is an acceptable alternative [4].

First trimester chemotherapy poses risks of fetal malformation, growth restriction, prematurity, and intrauterine death. Any exposure to chemotherapy during pregnancy can impact fetal neurodevelopment due to ongoing brain development [6]. Many existing data and guidelines supported the safety of chemotherapeutic drugs during pregnancy after 12-14 weeks of gestation until the third trimester [7]. Relevant adverse effects of chemotherapy include myelosuppression, increased risk of intraoperative bleeding, and postoperative infection. A delay of 21 days or less has recently been shown to be superior in terms of overall survival and recurrence-free survival[4]. It is a common practice to deliver before term when PABC is diagnosed because of a delayed decision for chemotherapy until after delivery or to minimize the effect of chemotherapy on the fetus [6]. However, in our case after one week of chemotherapy elective cesarean section was performed as patient developed side effects of chemotherapy like anemia and severe constipation. Patients with a history of chemotherapy,tamoxifen use, and risk factors for hypercoagulability are at increased risk for venous thromboembolism, necessitating the consideration of thromboprophylaxis [4].

According to SAGE (Society of American Gastrointestinal Endoscopic Surgeons) guidelines, 2017, fetus between 22-24 weeks is considered viable and fetal heart monitoring should be done preoperatively and postoperatively during emergency abdominal surgeries in pregnancy.Post-operatively monitoring of fetus well-being is done by simultaneous electronic fetal heart rate and contraction monitoring. However, we could not objectively monitor the fetal heart rate or contraction intraoperatively due to lack of necessary equipment, but we did monitor the contraction and fetal heart sound manually during the surgery.

CONCLUSION

Although second trimester is considered safe to perform non-obstetric surgeries in a pregnant patient, it cannot be avoided in certain cases like PABC. With appropriate precautions and proper team co-ordination, anesthesia can be safely performed in the third trimester of pregnancy without adverse maternal and fetal outcome.Combining GA with RA decreased the postoperative pain and opioid consumption.

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