

COMPLICATIONS ASSOCIATED WITH ANESTHESIA DURING PREGNANCY

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A wide range of obstetric and non-obstetric emergencies during pregnancy may need surgical interventions and thus administration of anesthesia may be required. Although the risk of surgery is similar to that of the general population, administering anesthesia during pregnancy is challenging.¹ Anesthesiologists need to take special precautionary measures to ensure the safety of both the mother and the growing fetus. To perform safe anesthesia, anesthesiologists must have a thorough understanding of all the physiological changes associated with pregnancy because small changes in the dose or type of anesthetic agent can affect maternal and fetal safety.²

Respiratory and cardiovascular issues are the most fatal anesthetic complications in pregnant women. Due to the hormonal and mechanical effects of pregnancy, the respiratory system undergoes several changes and therefore pregnant women often have a lower oxygen reserve than the general population. Anesthesia further reduces functional residual capacity because it decreases respiratory drive and respiratory muscular function.³ Consequently, even brief episodes of apnea can be fatal. Anesthesia can lead to reduced lung capacities, atelectasis, pulmonary edema, and acute respiratory distress syndrome in pregnant women. Aspiration of gastric contents to the airway is also one of the most prevalent anesthetic complications during pregnancy. Aspiration can further lead to chemical pneumonitis and thus can further compromise the respiratory function in pregnant women.⁴

Cardiovascular problems such as hypotension, bradycardia, cardiac arrhythmia, and even cardiac arrest can occur in pregnant women during anesthesia. Evidence suggests that anesthetic

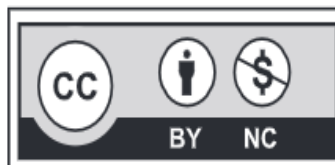
agents significantly reduce cardiac function and lead to hemodynamic instability during anesthesia.⁵ Hence, closely checking the mother's cardiovascular functions during the anesthesia process is recommended. Furthermore, because hypercoagulability is common in pregnancy, pregnant women who underwent anesthesia are at higher risk of deep venous thrombosis, stroke, and pulmonary embolism.⁶

In addition to respiratory and cardiovascular complications, other major anesthetic complications include post-dural puncture headache, neurological compromise, epidural abscess/hematoma, and convulsions. Though these anesthetic complications are less prevalent but have the potential for considerable morbidity and mortality. Post-dural puncture headache is more prevalent in pregnant women who receive anesthesia via central neuraxial blockades. If untreated, post-dural puncture headache can lead to life-threatening subdural hematoma.⁷ Neurological complications, though rare, can occur due to direct injury to the spinal cord, spinal nerves, and cauda equina during anesthesia administration. Furthermore, epidural abscess and/or hematoma during the administration of anesthesia can lead to neurological complications, if not managed on emergency basis. Similarly, convulsions are a less common complication of anesthesia in pregnant women but can occur if concentration of anesthetic agents exceed the critical brain tissue threshold.^{8,9} Nausea, vomiting, back pain, shivering, short term amnesia and headache are some additional anesthetic complications, however, these mild complications are generally self-limiting and spontaneously resolve within few hours to days.¹⁰

Though anesthetic agents have the potential to cross the placenta, however, there is no high-quality evidence available which support the teratogenic effects of the commonly applied anesthetic agents. Spontaneous abortion is the most commonly reported fetus related complication, particularly in women who underwent surgery and anesthesia in the first trimester of their pregnancy.¹¹ Some research studies reported that fetal hypoxia resulting from administration of anesthesia can be fatal in the first trimester of pregnancy and therefore it is safer to postpone surgery until the 1st trimester. Besides miscarriage, other obstetric related complications of administering anesthesia during pregnancy reported in the literature includes preterm labor, premature neonate, lower birth weight, eclampsia, septic shock and still birth.^{12,13} To sum up, it can be concluded that administration of anesthesia during pregnancy presents unique challenges to anesthesiologists because it can have potential side effects, some of which may be uncommon but can be lethal or permanently incapacitating. The risk of complications can be minimized by following the standard operating procedures and by ensuring that the patient is monitored closely throughout the procedure. It is important to note that the risks and benefits of anesthesia during pregnancy should be discussed with the patient and her obstetrician on a case-by-case basis.

REFERENCES

1. Bloom SL, Spong CY, Weiner SJ, et al. Complications of anesthesia for cesarean delivery. *Obstetrics & Gynecology*. 2005;106(2):281-287.
2. D'Angelo R, Smiley RM, Riley ET, Segal S. Serious complications related to obstetric anesthesia: the serious complication repository project of the Society for Obstetric Anesthesia and Perinatology. *Anesthesiology*. 2014;120(6):1505-1512.
3. Sobhy S, Dharmarajah K, Arroyo-Manzano D, et al. Type of obstetric anesthesia administered and complications in women with preeclampsia in low-and middle-income countries: A systematic review. *Hypertension in pregnancy*. 2017;36(4):326-336.
4. Wlody D. Complications of regional anesthesia in obstetrics. *Clinical obstetrics and gynecology*. 2003;46(3):667-678.
5. Hoefnagel A, Yu A, Kaminski A. Anesthetic complications in pregnancy. *Critical care clinics*. 2016;32(1):1-28.
6. Ramirez V, Valencia G, Catalina M. Anesthesia for nonobstetric surgery in pregnancy. *Clinical Obstetrics and Gynecology*. 2020;63(2):351-363.
7. Ankichetty SP, Chin KJ, Chan VW, et al. Regional anesthesia in patients with pregnancy induced hypertension. *Journal of anaesthesiology, clinical pharmacology*. 2013;29(4):435.
8. Cheesman K, Brady JE, Flood P, Li G. Epidemiology of anesthesia-related complications in labor and delivery, New York State, 2002-2005. *Anesthesia and analgesia*. 2009;109(4):1174.
9. Tsen LC. Neurologic complications of labor analgesia and anesthesia. *International Anesthesiology Clinics*. 2002;40(4):67-88.
10. Harris M, Chung F. Complications of general anesthesia. *Clinics in plastic surgery*. 2013;40(4):503-513.
11. Hawkins JL, Chang J, Palmer SK, Gibbs CP, Callaghan WM. Anesthesia-related maternal mortality in the United States: 1979–2002. *Obstetrics & Gynecology*. 2011;117(1):69-74.
12. Munnur U, de Boisblanc B, Suresh MS. Airway problems in pregnancy. *Critical care medicine*. 2005;33(10):S259-S268.
13. Polley LS. Anesthetic management of hypertension in pregnancy. *Clinical obstetrics and gynecology*. 2003;46(3):688-699.



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