

Obstetric Anesthesia for the Parturient with Complex Medical Diseases

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Introduction

Maternal mortality is on the rise in the United States (US) and other resource-rich countries.¹ The reasons for this rise are debatable, but can be partly attributed to the increasing complexity of parturients.^{2,3} Undoubtedly, social determinants of health and systematic injustice also play a role in this phenomenon. Yet, data collected by the CDC suggest that as many as two out of three maternal deaths may be preventable.⁴ This rise in maternal mortality is occurring despite a decrease in the rate of anesthetic-related maternal mortality, though anesthetic techniques contribute to hundreds of maternal deaths every year.

Advances in obstetric anesthesia, including improved labor analgesia techniques, anesthesia for cesarean delivery (CD), and peripartum hemorrhage management, have significantly impacted maternal safety. However, more remains to be done.⁵ The obstetric anesthesiologist has a major role to play in managing complex parturients during the peripartum period.^{6,7} This chapter will outline the part played by the obstetric anesthesiologist in caring for a parturient with complex medical diseases, including the obstetric anesthesia consultation, the value of the anesthesiologist in the multidisciplinary care team, and tools for putting into action a care plan for a complex patient.

Valuable Clinical Insights

- The increasing prevalence of chronic medical conditions among pregnant women results in higher rates of maternal morbidity and mortality.
- Proper planning and coordination of care can help minimize maternal harm.
- An obstetric anesthesiology consultation is an essential tool for the early identification of medical issues vital to anesthesiologists.
- Patients with complex medical diseases often understand their disease better than many of their healthcare providers.

The Obstetric Anesthesia Consultation

Ideally, during the antepartum period, the anesthesiologist and the patient should discuss anesthetic options for vaginal or CD. Having the time to consider anesthetic choices while not in active labor, or worse, dealing with a peripartum emergency, can allow

a mother to have a more thorough understanding of the risks and benefits of anesthetic procedures in light of her personal preferences and medical history. However, in current practice, most obstetric preanesthetic evaluations are performed immediately before an anesthetic. For the parturient with complex medical diseases, such an evaluation is likely insufficient.

An obstetric anesthesia consultation has emerged as a means of addressing anesthesiologically relevant medical issues before a woman's delivery admission. The American College of Obstetricians and Gynecologists (ACOG) published a list of indications that should prompt antenatal consultation with an anesthesiologist.⁸ Their list encompasses a wide range of cardiac, hematologic, neurologic, and spinal pathologies that may influence anesthetic care during or after a woman's pregnancy (Table 1.1). This list is not exhaustive, and individual institutions may wish to establish unique lists of conditions that deem anesthetic consultation appropriate. Some argue that a consultation with an obstetric anesthesiologist should be standard of care,⁹ so that every parturient arrives at her delivery equipped with full knowledge of the anesthetic options. This may be the optimal approach in many ways, as it removes the burden of determining anesthesiologically relevant medical conditions from obstetric providers.

The form an obstetric anesthesiology consultation takes should address the needs of the patient, and the capabilities of the institution providing her care. Some minor conditions may be addressed with a phone consultation. In contrast, more complex issues (such as morbid obesity or congenital heart disease) are addressed better in-person, accompanied by a physical exam. Large academic centers may have groups of obstetric anesthesiologists or fellows in obstetric anesthesiology who can provide regular availability for antenatal consultations. Others may refer antepartum women to obstetrical triage offices where an anesthesiologist staffing a nearby labor and delivery unit can provide in-person consultation when not providing direct patient care. Institutions may choose to provide "walk-in" consultation hours where a woman can discuss anesthetic options with an obstetric anesthesiologist, regardless of whether she has preexisting medical conditions that would affect her care. For rural communities or communities without access to specialized obstetric care, telemedicine may be a powerful tool to leverage the expertise of obstetric anesthesiologists from academic institutions or larger delivery centers.¹⁰ If necessary, patients can be transferred to a

Table 1.1 Indications for obstetric anesthesiology consultation

Cardiac disease
Congenital and acquired disorders such as repaired tetralogy of Fallot and transposition of the great vessels
Cardiomyopathy
Valvular diseases such as aortic and mitral stenosis, tricuspid regurgitation, and pulmonary stenosis
Pulmonary hypertension and Eisenmenger syndrome
Rhythm abnormalities such as supraventricular tachycardia and Wolff–Parkinson–White syndrome
Presence of an implanted pacemaker or defibrillator
Hematologic abnormalities or risk factors
Immune and gestational thrombocytopenia
Coagulation abnormalities such as von Willebrand disease
Current use of anticoagulant medications
Jehovah's Witness
Spinal, muscular, and neurologic disease
Structural vertebral abnormalities and prior surgeries such as vertebral fusion and rod placement
Prior spinal cord injury
Central nervous system problems such as known arterial–venous malformation, aneurysm, Chiari malformation, or ventriculoperitoneal shunt
Major hepatic or renal disease
Chronic renal insufficiency
Hepatitis or cirrhosis with significantly abnormal liver function tests or coagulopathy
History of or risk factors for anesthetic complications
Anticipated difficult airway
Obstructive sleep apnea
Previous difficult or failed neuraxial block
Malignant hyperthermia
Allergy to local anesthetics
Obstetric complications that may affect anesthesia management
Placenta accreta
Nonobstetric surgery during pregnancy
Planned cesarean delivery with a concurrent major abdominal procedure
Miscellaneous medical conditions that may influence anesthesia management
Body mass index of 50 or greater
History of solid organ transplantation
Dwarfism
Sickle cell anemia
Neurofibromatosis

center designated by the Society for Obstetric Anesthesia and Perinatology (SOAP) as a Center of Excellence. This designation recognizes a high standard of obstetric anesthesia care for parturients with complex diseases.¹¹

When an obstetric provider identifies an anesthesiologically relevant condition, anesthesia consultation should occur as soon as possible. Pregnancy is highly unpredictable, and early

planning can help ensure optimal care if a patient goes into labor early or experiences a complication in the antepartum period. Early consultation can also allow for venue and resource planning. For instance, a patient with pulmonary hypertension may require subspecialty clinic visits before delivery, as well as advanced monitoring (e.g., central line, arterial catheter) during her delivery; she may also require personnel (e.g., intensive care nurses) or critical care following delivery. These requirements may necessitate transfer to a larger urban center. The earlier a patient knows of this requirement, the earlier she can make transportation and housing decisions to ensure she and her family have access to the necessary facilities. An early consultation helps to anticipate the needs of parturients with complex medical diseases.

The Multidisciplinary Care Team

This book aims to give those who provide anesthesia care for pregnant women insight into uncommon conditions during pregnancy. However, it is not a substitute for consulting with specialists and subspecialists who manage these conditions more often. Apart from the obstetric provider and anesthesiologist, many professionals may care for pregnant women with complex medical diseases. Maternal-fetal medicine physicians may be the first specialists involved in caring for high-risk pregnancies, due to their advanced training in maternal diseases. Cardiologists, especially those with expertise in obstetric patients, may advise on caring for women with congenital heart disease or pulmonary hypertension. Hematologists provide valuable insights on when it is safe to offer neuraxial analgesia (NA) to women with coagulopathies or how to manage postpartum hemorrhage (PPH) should it occur. Critical care specialists can assist with monitoring these women either before, during, or after pregnancy. In the patient with spinal pathology or prior spine surgery, neurologists and neurosurgeons can help minimize the risk of patient complications.¹² Social workers may offer assistance for those parturients with challenging social situations or those with substance abuse disorders. Neonatologists and fetal surgeons can evaluate how fetal physiology can affect the physiology of a healthy mother with a medically complex fetus. In addition, the involvement and expertise of obstetric and critical care nurses are essential to the care of these patients.

It is easy to see how the care of the parturient with a complex medical disease or critical illness can involve many different aspects of modern medical care. In consultation with these myriad specialists, it is crucial to consider the various contingencies that could arise over the peripartum period. What if a patient delivers early? What if a patient requires an operative delivery? What if a patient's planned NA fails and she requires conversion to general anesthesia (GA)? What if a patient experiences a PPH? In institutions where it is feasible, in-person multidisciplinary meetings may provide a valuable opportunity to share expertise among specialists. Such sessions can help alert providers to the upcoming deliveries of patients with complex medical diseases and provide opportunities for this type of contingency planning to occur.

Putting the Plan into Action

After the multidisciplinary development of a plan for a medically complex parturient, the next task for team members is to disseminate the plan to those involved in the patient's care. Detailed consultation notes, flags in the electronic medical record, phone trees, and email chains facilitate the implementation of a complex plan. Clinical simulation and practice runs may also be valuable tools in planning the care for a medically complex parturient, especially where providers may not use the processes or procedures involved very often.¹³ During a patient's admission, maternal early warning systems can help alert providers to significant physiologic changes and warn of impending maternal morbidity or mortality.¹⁴ Such tools may lead to frequent false positives, however, especially in patients with some conditions already described. This means that constant vigilance is indispensable in averting harm to the parturient with complex medical diseases.

Throughout the planning and implementation process, a patient's involvement in her own care is crucial for ensuring the plan's success. Patients with complex medical diseases often understand their disease more than many of their healthcare providers. Communication failures in obstetric anesthesia have not only been linked to adverse outcomes but also with malpractice claims.¹⁵ Patient-provider communication thus remains a critical part of caring for these patients.

Special Populations

The complex patients that providers care for are an increasingly diverse group, many of whom have higher complication rates than the general population.¹⁶ Below are just several examples of patient populations contributing to the diversity of obstetric anesthesia practice and they require special consideration by their anesthetic providers (Table 1.2).

Table 1.2 Special populations and anesthetic considerations

Patient population	Selected anesthetic considerations
Advanced maternal age	Increased incidence of PPH in patients > 45 years Increased risk of post-spinal hypotension
Parturients with physical/intellectual disabilities	Patient-specific concerns of failed/difficult NA Patient-specific concerns of anesthetic-related spinal injury Higher rates of CD and hypertensive disorders in women with intellectual disability
Cancer survivors/parturients with cancer	Patients with cancer are more likely to deliver early and undergo GA for CD Chemotherapeutic agents may cause immunosuppression, thrombocytopenia, renal toxicity, and cardiac toxicity Cancers that affect the mediastinum (e.g., lymphoma) can have significant cardiac effects when combined with the hemodynamic changes of pregnancy
Patients affected by systemic racism	Minority patients are less likely to have the same access to care as nonminority patients Historical mistreatment of Black women in the USA may create an environment of distrust of medical providers Implicit or explicit bias is driving maternal health disparities between racial/ethnic groups

Patient population	Selected anesthetic considerations
Transgender/gender-nonbinary parturients	Physiological effects of gender-affirming therapy on pregnancy are poorly understood Gendered language prevalent on delivery units may make nonfemale patients feel less supported Processes involved in birth (e.g., uterine contractions, cervical exams) may exacerbate gender dysphoria; this may be partially relieved by early NA

Advanced Maternal Age

The birthrate in women older than 40 years has grown steadily since 1990, and now constitutes > 1 in 100 women delivering babies in the USA.¹⁷ Despite this, little is known about the anesthetic considerations specific to this population. Recent studies have demonstrated an increased risk for obstetrical complications (e.g., hypertensive disorders) and PPH in parturients older than 45 years. Increasing maternal age may also be a risk factor for post-spinal hypotension.¹⁸ Further studies are warranted to better define anesthetic considerations in this patient population. (See: Additional Reading below).

Women with Physical or Intellectual Disabilities

Medical advances in recent decades have allowed many women with physical disabilities to survive well into childbearing years. As a result, the number of pregnant women with physical disabilities is increasing.¹⁹ These women require special consideration in the provision of anesthetic care, and providers must recognize the unique concerns in this population.²⁰ Similarly, women with intellectual disabilities may be at increased risk for pregnancy complications in addition to the challenges they face in obtaining just, compassionate care.²¹

Cancer Patients

Cancer survivors and women affected by cancer during pregnancy require a patient-specific multidisciplinary approach to obstetric care.²² Parturients who present with cancer are more likely to deliver early and to undergo GA for CD.²³ While chemotherapeutic agents are often deferred during pregnancy, a thorough understanding of the effects of chemotherapy is necessary, as these agents may result in immunosuppression, thrombocytopenia, cardiac toxicity, or renal toxicity. Involvement of the mediastinum, such as by lymphoma, can result in deleterious effects when combined with the hemodynamic effects of pregnancy.

Patients Affected by Systemic Racism

Significant racial disparities exist in maternal morbidity and mortality in the US. A recent CDC report reveals that pregnant or postpartum women of color are three to four times as likely to die as white women.²⁴ Many racial and ethnic groups experience disparities, but the differences are more significant and well-studied among Black women. Racism undoubtedly plays a role in these disparities, which may be a product of the historical mistreatment of Black women in the US and implicit or

explicit bias that these women may encounter in the peripartum period.²⁵ As leaders in patient safety and team communication, the obstetric anesthesia team is well positioned to address these underlying disparities, eliminating biases that affect patient outcomes.

Transgender and Gender-Nonbinary Patients

Patients who do not fit typical gender expectations may encounter substantial barriers to affirming care in the highly gendered labor and delivery environment.^{26,27} The physiological effects of gender-affirming therapies on pregnancy or birth are poorly studied. Moreover, the birth process or the procedures that surround it may exacerbate feelings of gender dysphoria for individuals who do not identify as female.²⁸ To ameliorate this, early NA may serve the unique needs of this patient population. Additionally, efforts to adopt the use of gender-inclusive language and provide multidisciplinary education remain key roles of the anesthesia team.

Conclusion

Parturients with complex medical diseases represent an increasing challenge in delivering safe obstetric anesthetic care. The role of the obstetric anesthesiologist in this process is indispensable as a key leader in the coordination and delivery of complex care. Armed with a thorough understanding of the conditions faced by these patients and the tools and resources required to manage them, the obstetric anesthesiologist can ensure that parturients with complex medical diseases,²⁹ and those with critical obstetric illness,³⁰ obtain the best possible care.

Additional Reading

Advanced Maternal Age

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