

# Risk Stratification in Obstetrics: An Integrated Approach to Maternal Health

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## Abstract

**Introduction:** Prenatal care is crucial for maternal and fetal health, highlighting the importance of obstetric risk stratification. This enables personalized care, avoiding unnecessary interventions and reducing costs. Conditions such as first trimester bleeding, spontaneous abortion, gestational trophoblastic disease, and ectopic pregnancy require specific approaches. Early identification of these complications is vital, especially in urgent and emergency obstetric cases, which demand immediate hospital attention. **Objective:** Comprehensive review of first trimester pathologies and gestational hypertension, focusing on obstetric risks and personalized prenatal management. **Methods:** Literature review on bleeding and gestational hypertension. **Results:** The study provides a detailed analysis of pathologies associated with first trimester uterine bleeding and hypertensive disorders, focusing on obstetric risk stratification. The main causes of maternal and fetal mortality are hypertensive disorders, hemorrhages, infections, childbirth complications, and abortion. Spontaneous abortion is common, with different classifications, ranging from threatened to missed abortion. Infected abortion is a severe complication. Brazil has restrictive abortion laws, but many unsafe abortions occur, resulting in high public health costs. Pharmacological treatment with misoprostol is a safe option. Other pathologies include gestational trophoblastic disease, ectopic pregnancy, and placenta previa. Preeclampsia and eclampsia are severe conditions requiring immediate treatment to avoid complications. **Conclusion:** Early identification and management of obstetric risk factors, such as uterine bleeding, are essential for positive maternal and fetal outcomes. A multidisciplinary approach is fundamental.

## Keywords

Obstetrics, Emergencies, Hypertension, Pregnancy-Induced, Uterine Hemorrhage, Pregnancy Trimester, First

## 1. Introduction

Prenatal care provides an opportunity for the healthcare system to act comprehensively in promoting women's health. By understanding the essential need for prenatal assistance, healthcare professionals can ensure satisfactory care for the maternal-fetal health.

Obstetric risk stratification emerges as a determining factor in reducing maternal mortality, ensuring that each pregnant woman receives specific care tailored to her needs with equity in care. This approach avoids unnecessary interventions and excessive use of technology, enhancing outcomes and reducing costs [1].

The Brazilian Ministry of Health, through the Manual of Reception and Risk Classification in Obstetrics, introduces us to the "Stork Network" (Rede Cegonha), which proposes the implementation of a model of care for childbirth and birth. Furthermore, it discusses the reception and classification of obstetric risks, guiding healthcare professionals' decisions based on qualified listening combined with clinical judgment grounded in scientifically based protocols presented in the same document to identify and prioritize severe cases [2].

Conditions that increase the risk of complications and may affect maternal-fetal mortality are stratified by individual and sociodemographic characteristics, reproductive history, previous clinical aspects, and current clinical occurrences. Early identification and risk stratification become crucial in pathologies requiring immediate hospital intervention [3].

First trimester bleeding includes spontaneous abortion, a common occurrence that affects approximately 25% of pregnancies. Abortion can manifest as threatened, inevitable, complete, incomplete, or infected, each requiring specific approaches. However, induced abortion, except in legal cases such as rape, maternal risk, or anencephaly, remains illegal in Brazil, representing a dangerous practice with complications [4].

In Brazil, there is an absence of public policies associated with abortion, where criminalization results in health risks to women's lives. Induced abortion is a taboo and has never been properly regulated. The concept of public policy should address cases of voluntary abortion due to unwanted pregnancies or lack of emotional, psychological, and financial conditions. A scientific study that used a bibliographic analysis of developed countries concluded that the criminalization of abortion is harmful and that its regulation as a public health policy would benefit the democratic system and autonomy [5].

Other pathologies, such as gestational trophoblastic disease (GTD) and ectopic pregnancy, can also trigger uterine bleeding and pose risks. Proper management is essential to ensure better outcomes. Obstetric risk stratification emerges as a crucial approach to reducing maternal mortality, allowing specific attention to each pregnant woman [6].

Within risk stratification, there are pathologies leading to urgent and emergency situations that must be evaluated in the hospital context. Urgency is the

term used to designate situations requiring rapid resolutions, and what differentiates urgency from emergency is the imminent risk of death in the latter, with the same necessity for prompt assistance. These two terms are used in obstetrics for situations that endanger the pregnant woman and/or the fetus, necessitating immediate response [7].

## 2. Objective

The objective of this study is to conduct a comprehensive literature review of the pathologies associated with first trimester uterine bleeding, as well as gestational hypertension, with a focus on obstetric risk stratification. It aims to investigate various conditions such as spontaneous abortion in its different categories (threatened, inevitable, complete, incomplete, and infected), gestational trophoblastic disease (GTD), and ectopic pregnancy, which can trigger bleeding and pose risks to maternal-fetal health. Additionally, it examines complications related to gestational hypertension, with the HELLP syndrome being the one with the highest morbidity and mortality.

This study analyzes the epidemiology, pathophysiology, and clinical manifestations of these diseases and management options, addressing their relationship with uterine bleeding and potential complications for the pregnant woman. It also evaluates the best management practices for each of these conditions, aiming for a personalized and effective approach in prenatal care. Furthermore, it differentiates the main pathologies of increased gestational blood pressure, such as gestational hypertension, preeclampsia, eclampsia, and HELLP syndrome, along with their respective treatments.

## 3. Methods

A review of the main comprehensive bibliographies on the topics of first trimester uterine bleeding and gestational hypertension was conducted. Relevant data were extracted and classified according to pathology, clinical manifestations, treatment options, and maternal-fetal outcomes.

First trimester uterine bleeding pathologies will be classified according to their nature and potential impact on the pregnant woman and fetus. The best practices for diagnosis, management, and treatment of each studied pathology will be evaluated, considering effectiveness, safety, and impact on maternal-fetal outcomes. The most recent clinical guidelines and evidence-based recommendations will be highlighted.

## 4. Results

The study provided a detailed analysis of pathologies associated with first trimester uterine bleeding and hypertensive disorders, with a focus on obstetric risk stratification. Within pregnancy-related pathologies, hypertensive disorders, hemorrhages, infections, childbirth complications, and abortion are the main causes of maternal and fetal death, accounting for 75% of maternal deaths

worldwide. [1]

First trimester bleeding syndromes include spontaneous abortion in the early weeks of pregnancy, a common occurrence affecting approximately 25% of pregnant women, often associated with the implantation of the ovum in the endometrium. This phenomenon is characterized by the interruption of pregnancy before the 20th week and can be classified into various categories. [3]

Threatened abortion is marked by light bleeding without the expulsion of ovular tissue, distinguishing it from inevitable abortion, characterized by heavy bleeding, severe cramps, and a uterus consistent with gestation. This can progress to complete abortion, where there is total expulsion of uterine contents, resulting in a smaller-than-expected uterus. Additionally, incomplete abortions occur when part of the uterine contents are not expelled, leading to persistent bleeding. The embryo can remain dead in the uterus with little or no bleeding, known as a missed abortion [3].

Infected abortion, a severe complication often resulting from incomplete abortion, can lead to infections such as endometritis, parametritis, and peritonitis, requiring urgent treatment to prevent sepsis. Care for women with spontaneous abortion varies according to the type of abortion and includes rest, psychological support, medication administration as prescribed, vital sign monitoring, and preparation for procedures such as curettage [3].

In Brazil, induced abortion is illegal except in cases of rape, maternal risk, or diagnosed fetal anencephaly, representing a dangerous practice that can lead to severe complications. Abortion is one of the leading causes of maternal mortality in the first half of pregnancy, especially among young women of reproductive age, and represents the third leading cause of obstetric hospitalizations. It is estimated that about 1 million induced abortions occur annually in Brazil in unsafe conditions, leading to high public health costs and risks to women [4].

There is an enormous shortage of data and reproductive health information related to episodes of single or recurrent spontaneous abortions. It is important to highlight the significance of the occurrence of negative feelings associated with the antagonism arising from pregnancy without the subsequent experience of motherhood. Identifying the feelings experienced and the defense mechanisms used by these women is crucial [8].

Pharmacological treatment with misoprostol is a safe and effective option for abortion, particularly in cases of incomplete or missed abortions. In cases of infected abortion, antibiotic therapy, and surgery to remove the infectious focus are required. Uterine evacuation techniques include curettage and manual vacuum aspiration, preferred for the first trimester of pregnancy [4].

The dosage of misoprostol used is 800 mcg vaginally every 12 hours, totaling 3 doses. The main side effects are nausea, vomiting, abdominal pain, and diarrhea, with the expulsion of the conceptus expected within the next 24 hours. However, in some cases, expulsion may be delayed to 48 to 72 hours without an increase in side effects [9].

Other pathologies associated with first trimester uterine bleeding include gestational trophoblastic disease (GTD) or hydatidiform mole, a proliferative anomaly affecting trophoblastic cells. GTD is a gestational complication with a low incidence in the population, occurring in 1 in every 1000 pregnancies. The main risk factors include maternal age over 35 and a previous history of GTD. Hydatidiform moles are non-cancerous but can develop into malignant gestational trophoblastic disease [6].

Diagnosis is based on the clinical presentation of the patient and ultrasound, which may show excessive uterine enlargement, absence of a fetus and heartbeat, vaginal bleeding, and hyperemesis gravidarum, with histopathological confirmation being essential. Initial treatment involves uterine evacuation, with the best option individualized for each gestational age and patient, along with strict post-evacuation follow-up. In 70% of cases, spontaneous remission can occur, with regression of beta-HCG levels and uterine involution [6].

Another pathology associated with uterine bleeding is ectopic pregnancy, a serious condition that can lead to uterine bleeding and abdominal pain, potentially with a delayed menstrual period, most commonly occurring in the fallopian tubes, and representing a significant cause of maternal mortality in the first trimester, responsible for 9% of maternal deaths. In cases of ectopic pregnancy rupture, signs of peritonitis and shock can arise, with intense pain, a distended abdomen, reduced bowel sounds, shoulder pain, and bulging of the vaginal cul-de-sac [7].

The fact that ectopic pregnancy has a high risk of maternal mortality, it is important to discuss the point of some specific diagnostic challenges that can increase the risk for the maternal health such as: ectopic pregnancy with atypical location (cervical, interstitial, abdominal cesarean scar and ovarian) and the varied clinical repercussions that can disrupt and prolong the diagnostic [10].

In view of the risk of maternal mortality, there are some methods that are applied to reach early detection of ectopic pregnancies and prevent bad prognostic for the maternal health. As a solution, serum measurement of the Beta fraction (B-hCG) and transvaginal ultrasound (TVUS) are exams that can provide a lot of information that turns the diagnosis less challenging [11].

Furthermore, the early diagnostic implied a significant change in therapeutic management with the development of less invasive methods, such as drug treatment administered systemically or by local treatment guided by TVUS or even surgeries such as salpingectomy via laparotomy or laparoscopic route [11].

Risk factors include a history of ectopic pregnancy, previous tubal surgeries, previous tubal infections, progesterone contraception, the presence of an intra-uterine device (IUD), pelvic inflammatory disease, chlamydia infections, assisted reproductive techniques, and smoking. Physical examination reveals a uterus smaller than expected for gestational age, with cervical softening and the presence of blood in the vaginal canal. Salpingectomy, involving total or partial removal of the fallopian tubes, is performed surgically after obtaining the pregnant

woman's consent [7].

Placenta previa, a condition of later bleeding, is defined by the partial or total implantation of the placenta in the lower uterine segment after the 28th week of pregnancy. It can be low-lying, marginal, or complete, depending on its position relative to the cervix. It affects about 1 in every 200 pregnancies reaching the third trimester and is associated with previous uterine scars, multiparity, advanced maternal age, smoking, and multiple pregnancies [7].

The diagnosis of placenta previa is suspected in cases of painless uterine bleeding in the second or third trimester, small in amount and self-limiting. Placenta accreta, where the placenta is deeply attached to the myometrium, poses severe hemorrhage risks, and can lead to uterine rupture, with intense, abundant sentinel bleeding. Management of placenta previa involves speculum examination, with abdominal ultrasound being the safest diagnostic method [1]-[7].

Treatment varies according to severity and may include early delivery in severe cases. Premature placental abruption, by contrast, is the separation of the placenta from the uterine wall before delivery, occurring after the 22nd week of pregnancy. It can be classified into three degrees, based on clinical and laboratory findings, with complications such as hemorrhage, anemia, prematurity, and perinatal death. Risk factors include gestational hypertension, abdominal trauma, and uterine scars [3] [4].

Furthermore, the fact that placenta previa and placental abruption are conditions that are associated with severe hemorrhages cases require specific management such as maintenance of volume status, often through transfusions of blood cell concentrate, rich in clotting factors preventing complications like kidney failure and coagulopathies. Severe cases must be monitored together with the hematologist for the correct and fast restitution of blood elements [12].

Gestational hypertension, including preeclampsia and eclampsia, is a severe condition affecting about 4.6% of pregnant women globally, with significant risks for mother and fetus. Acute Arterial Hypertension (AAH) in pregnancy can be an urgency or emergency, and controlling blood pressure is crucial to prevent complications such as heart failure and intracranial hemorrhage. Treatment includes antihypertensive therapy with medications [10].

The pathophysiology of pre-eclampsia involves endothelial dysfunction mediated by the placenta, with inadequate invasion of the uterine spiral arterioles by the trophoblast. Preeclampsia is characterized by high blood pressure and proteinuria after the 20th week of pregnancy, while eclampsia is a severe convulsive crisis occurring during pregnancy, requiring immediate treatment to maintain cardiorespiratory function and prevent recurrences. Magnesium sulfate is used in pre-eclampsia to prevent eclampsia and control seizures. In Brazil, it is one of the leading causes of maternal mortality, with prevalence varying by region. Risk factors include a previous history of the disease, primigravida, and clinical conditions such as diabetes and hypertension, among others [4]. Some premonitory warning signs of severity are blood pressure levels equal to or above

160/110 mm Hg, imminent eclampsia: headache, photophobia, phosphenes, scotomas, exacerbated reflexes, nausea and vomiting, epigastric or right hypochondrium pain (HELLP syndrome and its changes laboratory tests), eclampsia itself, urine output < 500 ML/day, chest pain, dyspnea (acute lung edema) [13].

HELLP syndrome, which can be considered the most severe form of preeclampsia, is diagnosed by clinical signs such as malaise, epigastric pain, and visual disturbances, with pregnancy interruption being crucial to prevent complications such as hepatic hematoma and requires immediate treatment to avoid complications. This syndrome deserves a more extensive and detailed approach beyond the scope of this article [10].

Occurring with hemolysis, elevated liver enzymes and low platelets, requires specific attention for each clinical manifestation presented, and early diagnosis is essential, starting with laboratory control of the parameters referred to in the name of the syndrome in all cases of pre-eclampsia with more difficult evolution. It can progress to liver rupture, disseminated intravascular coagulation, and several other conditions that require intensive and immediate treatment [14]. This syndrome deserves a more extensive and detailed approach beyond the scope of this article.

## 5. Conclusions

The study on obstetric risk stratification associated with first trimester uterine bleeding provides a comprehensive overview of the various conditions that can affect maternal-fetal health. The results reveal the importance of early identification of risk factors, as well as the proper classification and management of these conditions to ensure positive outcomes.

The detailed analysis of the pathologies highlighted the complexity and variety of clinical scenarios that can arise. The discussion on diagnostic and treatment practices underscores the importance of a multidisciplinary approach to optimize prenatal care. The study offers a solid foundation for improving clinical practice and enhancing maternal-fetal outcomes.

It is expected that this comprehensive approach to obstetric risk stratification will significantly contribute to the reduction of morbidity and mortality associated with gestational uterine bleeding. The management of hypertensive syndromes during pregnancy requires a multidisciplinary approach, with early identification, immediate treatment, and rigorous monitoring to ensure the safety of both the mother and the fetus.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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