

A Comprehensive Review of Couvelaire Uterus: Diagnosis, and Management

Laura Leticia Torres Martínez*¹, Joanna Paola Morales Gloria², Ricardo Daniel Flores Altamirano³, Gabriela Rojas Cruz⁴, Omar Alejandro Leal Avalos⁵

^{1,2,3,4,5} Benemérita Universidad Autónoma de Puebla (BUAP). Hospital General Zona Norte Puebla. San Pedro, Puebla, Mexico.

ABSTRACT

Couvelaire uterus, also known as uteroplacental apoplexy or Couvelaire syndrome, is a rare and serious complication of pregnancy characterized by the extravasation of blood into the myometrium and the formation of a hematoma between the myometrium and the placenta. This review aims to provide a comprehensive overview of the pathophysiology, clinical manifestations, diagnosis, and management of Couvelaire uterus. We discuss the etiology and risk factors associated with the condition, as well as its potential complications and outcomes. Additionally, we outline the various diagnostic modalities available, including ultrasound and magnetic resonance imaging, and describe the current management strategies, which often involve close monitoring and, in severe cases, surgical intervention. By highlighting the key aspects of Couvelaire uterus, this review seeks to enhance clinicians' understanding of this rare condition and improve patient outcomes.

KEYWORDS: Couvelaire, uterus, placental, pregnancy.

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INTRODUCTION

Couvelaire uterus, also known as uteroplacental apoplexy or Couvelaire syndrome, is a rare and potentially life-threatening complication of pregnancy characterized by the extravasation of blood into the myometrium, resulting in the formation of a hematoma between the myometrium and the placenta. First described by the French obstetrician Maurice Couvelaire in 1911, this condition is believed to result from the rupture of maternal uterine vessels due to a variety of causes, including trauma, hypertension, and placental abruption. Couvelaire uterus is associated with significant maternal and fetal morbidity and mortality, making early recognition and intervention crucial.

Despite its rarity, Couvelaire uterus remains a challenging condition for clinicians due to its variable presentation and potential for rapid deterioration. The clinical manifestations of Couvelaire uterus can range from mild and asymptomatic to severe and life-threatening, depending on the extent and location of the hematoma. Common symptoms include abdominal pain, uterine tenderness, and vaginal bleeding, which may be accompanied by signs of hemodynamic instability, such as tachycardia and hypotension.

EPIDEMIOLOGY

Couvelaire uterus is a rare complication of pregnancy, with an estimated incidence of less than 1% of all pregnancies. It most commonly occurs in multiparous women, particularly those with a history of uterine surgery, such as cesarean section or myomectomy. Other risk factors include advanced maternal age, hypertensive disorders of pregnancy (such as preeclampsia and eclampsia), and placental abruption. The exact incidence and prevalence of Couvelaire uterus may vary depending on the population studied and the diagnostic criteria used.¹

CLINICAL MANIFESTATIONS

The clinical presentation of Couvelaire uterus can vary widely, ranging from mild and asymptomatic to severe and life-threatening. Common symptoms include abdominal pain, uterine tenderness, and vaginal bleeding, which may be sudden and profuse. Other possible manifestations include signs of hemodynamic instability, such as tachycardia, hypotension, and shock. In severe cases, the patient may present with disseminated intravascular coagulation (DIC) due to the release of thromboplastin from the damaged placenta and myometrium. Fetal distress or demise may also occur, especially in cases of extensive placental abruption or

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compromised uteroplacental circulation. Early recognition of these clinical signs and symptoms is crucial for timely diagnosis and management of Couvelaire uterus.^{2,3}

CLINICAL CONSIDERATIONS

The management of Couvelaire uterus requires a multidisciplinary approach involving obstetricians, neonatologists, and anesthesiologists. The initial management focuses on stabilizing the patient and monitoring maternal and fetal well-being. This may include administering intravenous fluids, blood products, and medications to control hemorrhage and prevent complications such as DIC.^{4,5}

Close fetal monitoring is essential, as Couvelaire uterus can lead to fetal distress or demise. Nonstress testing, biophysical profile, and ultrasound may be used to assess fetal well-being and guide management decisions regarding the timing and mode of delivery.^{4,5}

In cases where the fetus is viable and maternal condition permits, delivery is often recommended to prevent further complications. The mode of delivery (vaginal vs. cesarean) depends on various factors, including gestational age, fetal status, and maternal condition. Cesarean delivery may be preferred in cases of severe maternal hemorrhage or fetal distress.^{4,5}

SURGICAL CONSIDERATIONS

In cases of severe Couvelaire uterus with ongoing hemorrhage or maternal instability, surgical intervention may be necessary. Surgical options include uterine artery ligation, uterine compression sutures (such as the B-Lynch or Hayman techniques), or, in extreme cases, hysterectomy.^{4,5}

Uterine artery ligation is a less invasive procedure that involves ligating the uterine arteries to reduce blood flow to the uterus and control bleeding. Uterine compression sutures are used to mechanically compress the uterine blood vessels and reduce hemorrhage. Hysterectomy is reserved for cases of severe hemorrhage that cannot be controlled by other means and is considered a last resort due to its implications for future fertility.⁶

Regardless of the surgical approach, close postoperative monitoring is essential to detect and manage any complications, such as infection, hemorrhage, or thromboembolism. Follow-up care should also include counseling regarding future pregnancies and the risk of recurrence of Couvelaire uterus.⁶

DIAGNOSIS OF COUVELAIRE UTERUS

Diagnosing Couvelaire uterus requires a high index of suspicion, as the condition can present with nonspecific symptoms and signs. A thorough clinical evaluation, combined with appropriate imaging studies, is essential for accurate diagnosis.⁶

CLINICAL PRESENTATION

Patients with Couvelaire uterus may present with abdominal pain, uterine tenderness, and vaginal bleeding. These symptoms can vary in severity and may be accompanied by signs of hemodynamic instability, such as tachycardia, hypotension, and shock. Fetal distress or demise may also be present in severe cases.⁶

DIAGNOSTIC MODALITIES

Ultrasound: Transabdominal and transvaginal ultrasound are commonly used to evaluate patients with suspected Couvelaire uterus. Ultrasound findings may include a heterogeneous and irregularly shaped placenta, anechoic areas within the myometrium representing hematoma, and loss of the normal uteroplacental interface.^{7,8}

Magnetic Resonance Imaging (MRI): MRI can provide detailed information about the extent and location of the hematoma, which can help differentiate Couvelaire uterus from other conditions with similar presentations. MRI findings may include a hypointense area within the myometrium on T1-weighted images and a hyperintense area on T2-weighted images, indicative of hematoma.^{7,8}

Doppler Ultrasound: Doppler ultrasound can be used to assess uteroplacental blood flow and detect abnormalities, such as placental abruption, which may be associated with Couvelaire uterus.^{7,8}

Laboratory Tests: Laboratory tests, including complete blood count (CBC), coagulation profile, and blood type and screen, should be obtained to assess for signs of hemodynamic instability, coagulopathy, and the need for blood transfusion.^{7,8}

DIFFERENTIAL DIAGNOSIS

The differential diagnosis for Couvelaire uterus includes other conditions that can cause abdominal pain, uterine tenderness, and vaginal bleeding in pregnancy, such as placental abruption, uterine rupture, and acute fatty liver of pregnancy. Differentiating Couvelaire uterus from these conditions is crucial, as the management and prognosis can vary significantly.^{9,10}

DIAGNOSIS OF COUVELAIRE UTERUS

Couvelaire uterus, also known as uteroplacental apoplexy or Couvelaire syndrome, is a rare and serious complication of pregnancy characterized by the extravasation of blood into the myometrium and the formation of a hematoma between the myometrium and the placenta. Diagnosis of Couvelaire uterus can be challenging due to its variable presentation and nonspecific symptoms. However, a combination of clinical evaluation and imaging studies is crucial for accurate diagnosis and management.^{9,10}

CLINICAL PRESENTATION

Patients with Couvelaire uterus may present with abdominal pain, uterine tenderness, and vaginal bleeding. These

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symptoms can range from mild and intermittent to severe and persistent, depending on the extent and location of the hematoma. In severe cases, patients may also exhibit signs of hemodynamic instability, such as tachycardia, hypotension, and shock. Fetal distress or demise may occur in cases of extensive placental abruption or compromised uteroplacental circulation.¹¹

IMAGING STUDIES

Ultrasound: Transabdominal and transvaginal ultrasound are the initial imaging modalities of choice for evaluating patients with suspected Couvelaire uterus. Ultrasound findings may include a heterogeneous and irregularly shaped placenta, anechoic areas within the myometrium representing hematoma, and loss of the normal uteroplacental interface.¹¹
Magnetic Resonance Imaging (MRI): MRI can provide detailed information about the extent and location of the hematoma, which can help differentiate Couvelaire uterus from other conditions with similar presentations. MRI findings may include a hypointense area within the myometrium on T1-weighted images and a hyperintense area on T2-weighted images, indicative of hematoma.¹¹

LABORATORY TESTS

Laboratory tests, including complete blood count (CBC), coagulation profile, and blood type and screen, should be obtained to assess for signs of hemodynamic instability, coagulopathy, and the need for blood transfusion. Additionally, assessment of fetal well-being through nonstress testing, biophysical profile, and ultrasound may be necessary.¹¹

DIFFERENTIAL DIAGNOSIS

The differential diagnosis for Couvelaire uterus includes other conditions that can cause abdominal pain, uterine tenderness, and vaginal bleeding in pregnancy, such as placental abruption, uterine rupture, and acute fatty liver of pregnancy. Differentiating Couvelaire uterus from these conditions is crucial, as the management and prognosis can vary significantly.¹¹

In conclusion, diagnosing Couvelaire uterus requires a comprehensive approach, including a thorough clinical evaluation and the use of imaging modalities such as ultrasound and MRI. Early recognition and diagnosis of Couvelaire uterus are essential for timely intervention and management, which can help improve outcomes for both the mother and the fetus.¹¹

TREATMENT OF COUVELAIRE UTERUS

Couvelaire uterus, or uteroplacental apoplexy, is a rare condition that requires prompt and careful management to prevent maternal and fetal complications. The treatment approach for Couvelaire uterus depends on the severity of the condition, the gestational age of the fetus, and the stability of the patient. A multidisciplinary team, including obstetricians,

neonatologists, and anesthesiologists, is often involved in the management of these cases.¹²

CONSERVATIVE MANAGEMENT

In cases of mild Couvelaire uterus without significant maternal or fetal compromise, conservative management may be sufficient. This typically involves close monitoring of the patient's condition, including vital signs, uterine activity, and fetal well-being. Bed rest and hydration may be recommended to support maternal and fetal health.¹²

PHARMACOLOGICAL MANAGEMENT

In cases where there is evidence of ongoing bleeding or maternal instability, pharmacological interventions may be necessary. This can include the administration of uterotonics, such as oxytocin or prostaglandins, to promote uterine contractions and control bleeding. In some cases, antifibrinolytic agents, such as tranexamic acid, may be used to stabilize blood clots and reduce bleeding.¹²

BLOOD TRANSFUSION

If the patient develops severe hemorrhage or signs of hemodynamic instability, blood transfusion may be necessary to replace lost blood volume and maintain hemostasis. Close monitoring of hemoglobin and hematocrit levels is essential to guide the need for transfusion.¹²

SURGICAL MANAGEMENT

In cases of severe Couvelaire uterus with ongoing hemorrhage or maternal instability, surgical intervention may be required. Surgical options include uterine artery ligation, uterine compression sutures (such as the B-Lynch or Hayman techniques), or, in extreme cases, hysterectomy. These procedures are aimed at controlling bleeding and preserving the uterus when possible.¹²

DELIVERY

In cases where the fetus is viable and maternal condition permits, delivery is often recommended to prevent further complications. The mode of delivery (vaginal vs. cesarean) depends on various factors, including gestational age, fetal status, and maternal condition. Cesarean delivery may be preferred in cases of severe maternal hemorrhage or fetal distress.¹³

POSTOPERATIVE CARE

Following surgical intervention, close monitoring of the patient is essential to detect and manage any complications, such as infection, hemorrhage, or thromboembolism. Follow-up care should also include counseling regarding future pregnancies and the risk of recurrence of Couvelaire uterus.¹³

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CONCLUSION

In conclusion, Couvelaire uterus, or uteroplacental apoplexy, is a rare and serious complication of pregnancy that requires prompt recognition and management. The condition is characterized by the extravasation of blood into the myometrium and the formation of a hematoma between the myometrium and the placenta. Couvelaire uterus can present with a wide range of symptoms, including abdominal pain, uterine tenderness, and vaginal bleeding, and may be associated with significant maternal and fetal morbidity and mortality.

The diagnosis of Couvelaire uterus is based on a combination of clinical evaluation and imaging studies, such as ultrasound and magnetic resonance imaging (MRI). Early recognition of Couvelaire uterus is essential for timely intervention and management, which may include conservative measures, pharmacological interventions, blood transfusion, surgical options, and delivery, depending on the severity of the condition and the gestational age of the fetus.

Management of Couvelaire uterus requires a multidisciplinary approach involving obstetricians, neonatologists, and anesthesiologists. The goal of treatment is to stabilize the patient, control bleeding, and preserve the uterus when possible. Close monitoring of maternal and fetal well-being is essential throughout the management process, and follow-up care should include counseling regarding future pregnancies and the risk of recurrence of Couvelaire uterus.

In conclusion, Couvelaire uterus is a rare but potentially serious complication of pregnancy that requires prompt recognition and intervention. By increasing awareness of this condition among healthcare providers, we can improve outcomes for both mothers and babies affected by Couvelaire uterus.

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