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Chapter

Placenta Abruption and Delivery Method

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Abstract

Placental abruption is a significant contributor to maternal mortality worldwide. Early and skilled medical intervention is needed to ensure a good outcome, and this is not available in many parts of the world. Abruptio placentae are defined as the premature separation of the placenta from the uterus. Placental abruption must be considered whenever bleeding is encountered in the second half of pregnancy, since it is a significant cause of third-trimester bleeding associated with fetal and maternal morbidity and mortality. If the bleeding persists, fetal and maternal distress may develop. Fetal and maternal death may occur if appropriate interventions are not undertaken. The severity of fetal distress correlates with the degree of placental separation. In near-complete or complete abruption, fetal death is inevitable unless an immediate cesarean delivery is undertaken.

Keywords: pregnancy, abruptio placentae, etiology, delivery, newborn

1. Introduction

Abruption of the placenta is the most common cause of late pregnancy bleeding. In humans, it refers to the abnormal separation after 20 weeks of gestation and prior to birth. It occurs on average in 0.5%, or 1 in 200, deliveries. Placental abruption is significant contributor to maternal and newborns mortality worldwide. Skilled medical intervention is needed to ensure a good outcome, and this is not available in many parts of the world [1].

The primary cause of placental abruption is usually unknown, but multiple risk factors have been identified. However, only a few events have been closely linked to this condition, including hypertension disorders. The risk of recurrence of abruption placentae is reportedly 4–12%. If the abruption placentae occur in 2 consecutive pregnancies, the risk of recurrence rises to 25%. If the abruption is severe and results in the death of the fetus, the risk of a recurrent abruption and fetal demise is 7% [2].

1.1 Pathophysiology

Abruption of the placenta occurs due to the burst of the spiral arteries located in the basal decidua. This bleeding is often called "high blood pressure bleeding". The amount and volume of bleeding may be different, resulting in different clinical pictures and different consequences for the fetus. The removal of the entire placenta or more than half of the placenta leads to the death of the fetus due to the interruption of oxygenation of the fetus. In partial placental abruption, the consequences for the

fetus correlate with the size of the placenta that is ejected from the function. After abruption of more than half of the placenta area, fetal asphyxia occurs [3].

In rare cases, bleeding can originate from the fetal blood vessels of the placenta. The blood that accumulates between the placenta and the wall of the uterus creates a retroplacental hematoma that can be located centrally or peripherally. Because of the location of the peripheral retroplacental hematoma, even a small amount of blood can be manifested as an external bleeding. With central retroplacental hematoma, it is possible that larger amounts of blood remain behind the placenta, with the absence of visible external bleeding. Only when the hematoma touches the walls of the placenta, the blood flows out between the mesometrium and the wall of the uterus in the vagina and out. Amniotic fluid may be more or less colored due to the penetration of retroplacental hematoma into the amniotic cavity. The release of thromboplastin from decidual cells causes the formation of thrombin, which, in addition to the effect on coagulation, can cause hypertension of the uterus and its contractions, the bursting of fetal mesometrium and the onset of birth [4].

1.2 Classification of placental abruption

Classification of placenta abstraction is based on the degree of separation (partial or complete) and the separation site (marginal or central) [5].

Class 0—asymptomatic abruption of the placenta.

In such cases, the abruption may go unnoticed, and the diagnosis is made retrospectively after delivery. The criterion for diagnosis is the existence of an old, organized hematoma.

Class 1—mild abruption of the placenta (represents approximately 48% of all cases).

First degree abruption is a mild form of abruption, which can occur without external bleeding or with mild bleeding and a slightly painful sensitive uterus.

Class 2—moderate abruption of the placenta (represents approximately 27% of all cases). Second-degree abruption is a medium-severity abruption that can occur without external bleeding, but can also be moderately profuse.

Class 3—severe abruption of the placenta (represents approximately 24% of all cases). Third degree abruption or massive abruption is characterized by painful, toned uterus and most often severe vaginal bleeding.

1.3 Frequency

The frequency of placental abruption significantly varies across parts of the world. The lowest frequency is reported in Finland, amounting to 0.33%. In the United States, the rate of abruption in 2007 was 1.2%. In addition, in all European countries there has been a decline in the frequency in recent years, while an increase is reported in North America. In rural areas of Pakistan, the frequency of abruption is 2.2–7%, with high perinatal mortality from 50.63 to 62.5% [6].

1.4 Etiology

Risk factors in abruption placentae include the following: maternal hypertension - most common cause of abruption, occurring in approximately 44% of all cases, maternal trauma (e.g. motor vehicle collision (MVC), assaults, falls)-Causes 1.5–9.4% of all cases, cigarette smoking, alcohol consumption, cocaine use, short umbilical cord, sudden decompression of the uterus, premature rupture of membranes, delivery of first twin, idiopathic (probable abnormalities of uterine blood

vessels and decidua), previous placental abruption, chorioamnionitis, prolonged rupture of membranes (24 h or longer), maternal age 35 years or older, maternal age younger than 20 years, male fetal sex, low socioeconomic status, elevated second trimester maternal serum alphafetoprotein (associated with up to a 10-fold increased risk of abruption), subchorionic hematoma [7–9].

1.5 Clinical picture

The clinical picture of abruption depends on the degree of bleeding. The mildest form is the abruption of zero degree that has a subclinical form. In such cases the abruption can remain undetected, and it is only diagnosed retrospectively, upon delivery. The criterion for diagnosis is the existence of an old, organized hematoma. Abruption of the first degree is a milder form of abruption, which can also pass without external bleeding or with slight bleeding and a slightly sensitive uterus. Abruption of the second degree is a moderate abruption that can also pass without external bleeding, but the bleeding can also be moderately abundant. The uterus is painful, the mother suffers from hypotension, tachycardia and hypo-fibrinogenemia and the fetus suffers from distress. Abruption of the third degree or massive abruption is characterized by painful, toned uterus, and most commonly, by severe vaginal bleeding. The mother has severe hypo-fibrinogenemia and coagulopathy, hemorrhagic shock and other complications are also common, often followed by fetal death. Massive abruption can cause blood flow through the myometrium to the uterine serosa and oviduct, and blood can also be found in the peritoneal cavity. The uterus is enlarged and dark purple to black in color. The described condition is called apoplexy of the uterus, or by the author who described it, it is also called Couvelaire syndrome. Rapid onset and rapid development of clinical picture is typical for severe abruption. The blood in the vagina can be liquid or clotted. A pregnant woman often does not feel fetal movements due to severe fetal distress or fetal death. Kayani and associates compared the intervention interval of 20 and 30 minutes. The authors report that the rate of neonatal morbidity and mortality is considerably lower in cases of previous interventions. A particular form of placental abruption is a chronic abruption in which the pregnant woman has relatively scarce, chronic, intermittent bleeding and indications of placental insufficiency with oligohydramnion and intrauterine stagnation of fetal growth [10–12].

1.6 Diagnosis

The diagnosis of placenta abruption is based on clinical and ultrasound imaging, laboratory findings and placental examination after delivery. Diagnosis is primarily clinical, and the other findings contribute to the diagnosis. An ultrasound finding that supports abruption is a retroplacental hematoma. It can be of different sizes and appearance, hyper-, hypo- or iso-hemogenic compared to the placenta. Ultrasound findings may be falsely negative especially in fresh, acute abruptions where the retroplacental hematoma has not fully developed [9].

The sensitivity of ultrasound for the diagnosis of abruption is only 25–50%. The positive predictive value is high (88%), especially in cases where typical symptoms of abruption are present [13].

Laboratory findings do not only help to establish the diagnosis of abruption, but they are also important for assessing hemorrhage and coagulation preservation. Fibrinogen shows the best correlation with the severity of mother's bleeding. Concentration of fibrinogen in pregnancy increases as pregnancy advances, and normal fibrinogen levels in the third trimester are from 373 to 619 mg/dL [14].

Values of 200 mg/dL and less, have a 100% positive predictive value for severe postpartum bleeding. Values higher than 400 mg/dL indicate that the coagulation status is still preserved. For severe abruption, a rapid development of disseminated intravascular coagulation (DIC) is typical [15]. Diagnosis of DIC is based on elevated values of thrombin, decreased values of fibrinogen and platelets, and elevated values of degradation products of fibrin and D-dimers. A frequent laboratory finding of placenta abruption is anemia. According to the World Health Organization (WHO), anemia in pregnancy is defined as a hemoglobin value below 110 g/L and a hematocrit value below 0.33. Also, according to hemoglobin values, the anemia is divided into mild (100–109 g/L), medium severe (70–99 g/L) and severe (less than 70 g/L), (WHO 1989). Hematoma of different sizes and locations can be noticed by the examination of placenta. If hematoma exists for a long time, a defect on the fetal surface of the placenta can be noticed after separation from the placenta. A histopathological examination often discovers placenta infarcts along with the presence of retroplacental hematoma. If a clinical diagnosis is unclear, histopathological finding can help to confirm chronic abruptions and atypical abruptions [16].

1.7 Treatment

In the treatment of abruption, consideration should be given to gestational age, clinical picture, maternal and fetal condition. Continuous fetal monitoring is needed, and in the pregnant woman the assessment of hemodynamic status by measuring heart rate, arterial pressure, diuresis, and blood loss. It is necessary to have a wide vein for taking blood samples and an adequate compensation of circulating volume. Following parameters are monitored from laboratory findings: complete blood count, coagulation parameters, acid–base status, creatinine and hepatogram, but if necessary, other parameters are monitored as well. If the blood loss ranges from 500 to 1000 mL, the lost blood has to be compensated by the fresh one. In the case of fetal death, all further procedures are determined according to the condition of the patient. Cesarean section is indicated if the hemodynamic status is unstable, and vaginal delivery is not expected to be rapid. In such cases, the preservation of coagulation status is of crucial importance because the uncontrolled DIC can compromise the surgical procedure. If the mother is hemodynamically stable, vaginal delivery is proposed. In cases where the fetus is alive and with a normal cardiotocography record, an immediate vaginal delivery is indicated. Very often the clinician makes a decision on how to end the childbirth, depending on the dynamics of clinical picture development, laboratory findings, estimation of the rate of progression of labor and the assessment of fetal condition. In cases of moderate abruption and severe abruption and the fetus is viable delivery is necessary. This approach is justified by a relatively low neonatal morbidity of neonates born after 36 weeks of pregnancy thus avoiding the risk of abruption exacerbation. Vaginal delivery is preferred, but if there are indications, a cesarean section is performed [1].

The method of delivery completion depends on all of the above criteria. The use of tocolytics is debatable and it is a persistent subject of discussions in terms of reducing contractions or subsequent bleeding intensification. According to some authors, the application of tocolytics is useful since it stops the labor, which in case of abruption can cause its progression as well as excessive bleeding. It also provides the time for the application of corticosteroids. Some authors state that the application of tocolytic increases the duration of pregnancy with complicated bleeding in the third trimester [17]. This would justify the application of tocolytics, especially nifedipine as the first choice. On the other hand, the negative effect of tocolytics

on the cardiovascular system, and consequent tachycardia and hypotension can mask the clinical picture, aggravate abruption, and cause additional hemodynamic instability. According to the above, it follows that the application of tocolytics is a matter of clinician's individual assessment [18, 19]. Sheehan's syndrome is a rare complication of postpartum hemorrhage. With advancement in obstetric care, Sheehan's syndrome has become uncommon except in developing countries. A high index of suspicion is necessary in diagnosing such patients. Acute renal failure related to rhabdomyolysis in a patient with Sheehan syndrome, while other diseases that could cause rhabdomyolysis were excluded. Treatment with thyroxine and glucocorticoids resulted in complete recovery after attaining euthyroid and eucortisolemic state. Review of literature revealed the rarity of the disorder, with only four cases reported so far. Multiple anterior pituitary hormone deficiencies in Sheehan's syndrome are responsible for pancytopenia; replacement of thyroid and cortisol hormones results in complete recovery [20].

Fetal morbidity is caused by the insult of the abruption itself and by issues related to prematurity when early delivery is required to alleviate maternal or fetal distress. Delivery is required in cases of severe abruption or when significant fetal or maternal distress occurs, even in the setting of profound prematurity. In some cases, immediate delivery is the only option, even before the administration of corticosteroid therapy in these premature infants. All other problems and complications associated with a premature infant are also possible. Treatment depends on the amount of blood loss and the status of the fetus. If the fetus is less than 36 weeks and neither mother nor fetus is in any distress, then they may simply be monitored in hospital until a change in condition or fetal maturity whichever comes first [21, 22].

2. Conclusion

Fetal and maternal death may occur if appropriate interventions are not undertaken. The severity of fetal distress correlates with the degree of placental separation. In near-complete or complete abruption, fetal death is inevitable unless an immediate caesarian delivery is performed.

Conflict of interest

No potential conflict of interest was reported by the authors.

Funding

None.

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