1 Introduction

Bleeding in the second half of pregnancy is no longer a common cause of maternal death in the industrialized world, but it continues to be a major cause of perinatal mortality, and of both maternal and infant morbidity. Approximately half the women who present with bleeding in the second half of pregnancy are eventually found to have either placental abruption or placenta praevia. Often no firm diagnosis can be made for the other half.

2 Placental abruption

Placental abruption, or retroplacental hemorrhage, is a major contributor to perinatal mortality among normally formed fetuses. Although maternal mortality is fortunately rare now, maternal morbidity in the forms of hemorrhage, shock, disseminated intravascular coagulation, and renal failure is sufficiently frequent to justify intensive treatment.

The frequency with which placental abruption is diagnosed will vary with the criteria used for the diagnosis. The perinatal mortality rate...
with confirmed abruption is high, often over 300 per 1000. More than half the perinatal losses are due to fetal death before the mother arrives in hospital. Neonatal deaths are principally related to the complications of preterm delivery. Among surviving infants, rates of respiratory distress, patent ductus arteriosus, low Apgar scores, and anemia are more common than in unselected hospital series.

2.1 Clinical presentation
Abruption may occur at any stage of pregnancy. The diagnosis should be considered in any pregnant woman with abdominal pain, with or without bleeding. Mild cases may not be clinically obvious.

In severe abruption there may be heavy vaginal bleeding or evidence of increasing abdominal girth, if the blood is retained within the uterus. Uterine hypertonus is a common physical sign in the more severe grades of abruption, particularly when the fetus has died. In these cases the woman is usually in severe pain and may be shocked as a result of hypovolemia. Absence of clotting may be obvious in vaginal blood. Other signs of clotting defects may be bleeding from the gums or venepuncture sites, or hematuria.

The amount of blood loss may not be obvious – some may have been lost before admission, and large volumes of blood may be retained in the uterus. Clinical signs of hypovolemia may be masked by increased peripheral resistance. Cerebral and cardiac perfusion may be preserved, although renal blood flow is jeopardized. This will become manifest by diminished urine production.

Ultrasound examination of the uterus and contents has an important role in the differential diagnosis of antepartum hemorrhage. Most important is its ability to localize the placenta. A low-lying placenta brings placenta praevia into the differential diagnosis, while a posterior placenta might make the diagnosis of abruption more likely in a woman with back pain. The diagnosis of retroplacental hematoma by ultrasound is not always straightforward.

2.2 Treatment
In suspected mild abruption, the symptoms may resolve. If there has been bleeding, this may cease, with the fetal condition apparently satisfactory. It may be impossible to confirm the diagnosis. In this case, the woman may safely be allowed home after a period of observation, as is the case for bleeding of unknown origin.

In moderate and severe abruption, maternal resuscitation and analgesia are priorities. Restoration of the circulating volume and emptying
the uterus are the cornerstones of treatment. The use of whole blood has become traditional in volume replacement in these women. It is likely, however, that a crystalloid infusion to precede the blood would be beneficial. It is probably best to use fresh frozen plasma, at the rate of 1 unit for every 4–6 units of red cells transfused, to replenish clotting factors. No systematic attempts have been made to study alternatives to blood transfusion in this condition. Plasma substitutes, such as plasma protein, dextran, gelatin, and starch, may produce adverse reactions, and dextran, in particular, can interfere with platelet function in vivo and cross-matching in vitro.

A clotting defect should be sought, although defects of clinical significance are rare when there is a live fetus. The process of disseminated intravascular coagulation usually starts to resolve after delivery.

When the fetus is alive, a decision should be made about the optimal time and mode of delivery to improve the chances of survival, based on the estimated fetal maturity. In former years, the usual policy was vaginal delivery at all reasonable costs, because the newborn’s prognosis was so poor. More recently, policy has shifted to earlier resort to cesarean section in order to rescue the baby, and improved survival of the preterm newborn has often resulted. A recent series suggests, however, that an attempt to deliver vaginally, inducing or augmenting labor with oxytocin when necessary and using continuous electronic fetal heart rate monitoring, may result in a 50% reduction in the cesarean section rate without significant difference in the risk of perinatal mortality.

In severe abruption when the fetus is dead, vaginal delivery should be planned, except where there is an obvious obstetrical indication for cesarean section, such as transverse lie. Labor should be induced or augmented if needed, using oxytocin, or prostaglandins if there is no satisfactory response to oxytocin. Cesarean section is required in the rare cases in which uterine contractions can not be stimulated or when clinical shock associated with hemorrhage has been uncontrollable. Coagulation defects are common in this situation, and the maternal risks are considerable.

When cesarean section in a woman with disseminated intravascular coagulation is judged to be inevitable, it should be undertaken after close consultation with the anesthetist and a hematologist. Volume replacement and transfusions of whole blood, frozen plasma, and specific coagulation factors, should be given before and during the surgical procedure.
A well-equipped hospital should be able to provide adequate emergency treatment for the mother, and will often be able to achieve safe delivery of a fetus that is alive on admission. Survival of such live born infants depends to a large extent on the quality of neonatal care.

3 Placenta praevia

Placenta praevia is defined as a placenta that is situated wholly or partially over the lower pole of the uterus. The overall prevalence of the condition is slightly over 0.5%. The major cause of both mortality and morbidity is hemorrhage. Prevention and effective treatment of hemorrhage has reduced the gravity of the condition. With modern care, a perinatal mortality rate of 50–60 per 1000 is now attainable.

3.1 Clinical presentation

Although it is well recognized that a small proportion of women with placenta praevia do not bleed until the onset of labor, less than 2% of cases of placenta praevia present in this way. Painless vaginal bleeding in the absence of labor is the most common presentation. Some form of fetal malpresentation (transverse, oblique or unstable lie, and breech presentation) is found in approximately one-third of cases. In cephalic presentation, the presenting part is invariably high, and is often displaced slightly from the midline.

All placentae praeviae are asymptomatic before the first onset of bleeding. With routine ultrasound scanning in the early second trimester, approximately 5–6% of placentae are found to be low lying. Over 90% of asymptomatic placentae praeviae diagnosed by ultrasound in the early second trimester remain asymptomatic and become normally situated later as a result of anatomical changes in the lower-uterine segment in late pregnancy.

Women with low or cervical placental implantation found early in gestation should be rescanned between 30 and 32 weeks' gestation. Where an asymptomatic woman is found on ultrasound after 32 weeks still to have a placenta that appears to cross the cervix, she should be considered as having placenta praevia for purposes of subsequent care. Where there is a lesser degree of low placenta, the possibility remains that placenta praevia will not be present at the time of labor.
3.2 Treatment
A digital examination should never be performed when there is any possibility of placenta praevia, except in the operating room when termination of pregnancy is forced by bleeding or labor, or when the pregnancy has reached an adequate gestation for imminent childbirth to be safe. The really dangerous hemorrhage is often the one that has been provoked by ill-advised interference, such as digital examination of the cervical canal at, or very shortly after, the time of the warning hemorrhage. Rectal examination is even more dangerous than vaginal examination.

If bleeding is less severe or has stopped, confirmation of the diagnosis by ultrasound should be performed at the earliest opportunity. The early and accurate diagnosis of placenta praevia is imperative to spare women with a normally implanted placenta the economic, emotional, and social expense of long-term hospitalization.

The object of expectant care is to reduce the number of preterm births by allowing the pregnancy to continue until the baby has grown to a size and age that will give it a reasonable chance of survival. This form of care usually requires that the woman must remain in a fully equipped and staffed maternity hospital from the time of diagnosis until delivery, because of the risks to both mother and fetus from further major hemorrhage. Some clinicians have adopted a policy of permitting selected women to return home as part of expectant care, particularly when it can be assured that they will not be alone, and will have no difficulty in getting to hospital promptly if bleeding recurs. Many women sent home require re-admission to hospital for significant maternal bleeding, but no maternal deaths and no significant differences in perinatal outcome compared with those kept in hospital have been reported.

The two randomized trials that have compared policies of outpatient versus inpatient care for known placenta praevia, have not been large enough to permit definitive conclusions about safety.

Preterm birth continues to be a major problem, even when expectant management is used. Maternal and fetal well-being should be monitored. The mother should not be allowed to become anemic, and her hemoglobin should be maintained at a normal level by hematinics or, if necessary, by transfusion.

With every episode of bleeding, the Rh-negative woman should have a Kleihauer test performed for the presence of fetal blood cells, and be given prophylactic anti-D immunoglobulin.
The optimal timing for delivery remains controversial. Although expectant management until 37 weeks is most generally accepted, some clinicians have recommended elective preterm delivery after 34 weeks when amniocentesis has confirmed pulmonary maturity. No controlled trials to evaluate either approach have been reported.

3.3 Delivery
There is almost no indication for vaginal delivery for women with even marginal placenta praevia, whose babies have attained a viable age. The hazards of vaginal delivery include profuse maternal hemorrhage, malpresentation, cord accidents, placental separation, fetal hemorrhage, and dystocia, resulting from a posterior placental implantation. If the fetus is previable, malformed, or dead, vaginal delivery may occasionally be appropriate.

With improved ultrasound diagnosis, many authorities suggest elective cesarean section without prior digital confirmation. This approach has considerable merit, since digital examination may cause serious hemorrhage. Digital examination in the operating theatre does have a place, where ultrasound is not available, when the ultrasound appearances are equivocal, or the clinical signs of placenta praevia are not confirmed by ultrasound. If digital examination is indicated, it should be carried out only in the operating room, with the staff scrubbed and prepared for immediate cesarean section should catastrophic hemorrhage be provoked.

4 Bleeding of uncertain origin
Hemorrhage of undetermined or uncertain origin is the most common type of antepartum hemorrhage. Although in some cases the cause of bleeding later becomes clear, in the majority no cause can be demonstrated. The importance of this subgroup lies in its frequency, in the clinical problems it presents in diagnosis and management, and in the associated high fetal loss.

Hemorrhage of uncertain origin is a collective clinical category, and must include minor but unrecognized cases of all specific types of antepartum hemorrhage – localized abruption, marginal hemorrhage, cervical and vaginal lesions, and excessive show.

The clinical presentation of bleeding of unknown origin is painless antepartum hemorrhage, without evidence of placenta praevia. In the
majority of cases the blood loss is not great enough to cause serious concern, and usually it settles spontaneously. The most serious threat to the fetus is preterm labor and birth, but this is relatively infrequent.

The management of painless antepartum hemorrhage depends primarily on the gestational age of the fetus at the time of the initial bleed. An ultrasound examination for placental localization should be performed as soon as possible, and if placenta praevia is diagnosed or cannot be excluded, then care should follow the plan already discussed for placenta praevia. When the placenta is clearly defined in the upper segment, the woman should be allowed home after a period of rest and observation in hospital, provided that she has no recurrence of bleeding. The risk to the fetus in such cases is preterm birth and the great majority of perinatal deaths are due to preterm birth occurring within 7–10 days of the initial hemorrhage. After the bleeding has settled, and before discharge from hospital, both a speculum examination to exclude a local cause for the bleeding and a digital examination to exclude advanced cervical dilatation should be performed.

If a policy of expectant care is adopted, fetal well-being should be monitored. Although frequently recommended, routine induction of labor at 38 weeks should not be performed, and women should be allowed to go into spontaneous labor.

5 Conclusions

Bleeding in the second-half of pregnancy constitutes a possibly life-threatening condition. All professionals who care for women during pregnancy and childbirth must be aware of the causes and prognosis of such bleeding, and have a clear plan in mind for its differential diagnosis and management.

Sources

*Effective care in pregnancy and childbirth*
Fraser, R. and Watson, R., Bleeding during the latter half of pregnancy.

*Cochrane Library*
Neilson, J.P., Interventions for suspected placenta praevia during pregnancy.