
The Ten Commandments in Multiple Pregnancies

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Multiple pregnancy represents a challenge for obstetrics and also poses significant psychological, social and economic problems. The chances of a successful outcome may be improved by appropriate preventive, diagnostic and management strategies, by the availability of specific skills and experience and by a multidisciplinary approach. In this paper are indicated and discussed, on the basis of current evidences, what can be considered the ten “commandments” in terms of providing optimal care in multiple pregnancies. In particular in this review we focus on the following topics: psychological support and clinical counseling; diagnosis and characterization of chorionicity; management at referral centers; individualization of care; avoidance of most frequent complications; consideration of specific pathologies; evaluation of fetal anatomy; monitoring of fetuses; planning of time and mode of delivery; monitoring of the mother during postpartum.

Multiple pregnancy includes twin gestation and multifetal gestation. Twin gestation is a common and constant occurrence in all racial groups, albeit with different frequency. Multifetal gestation refers to pregnancy with 3 or more fetuses. The incidence of multiple pregnancies has increased markedly over the past decade, most likely due to the increase of mothers over 30 years of age and the use of fertility-enhancing agents and/or assisted reproduction technologies.

Considerable medical and public attention is given to the higher order pregnancies, as they represent the extreme achievement and, at the same times failures, of human reproductive physiology. With the advent of assisted reproductive technologies and ovulation induction practices such pregnancies can no longer be considered rarities, and obstetric and neonatal services need to become adept at managing the problems they present.

Pregnancies associated with assisted reproductive technology (ART) or ovulation-inducing drugs are more likely to result in multiple births compared to spontaneously conceived pregnancies. All multiple births (twin, triplets and more) are at greater risk than singleton births to be preterm (< 37 completed weeks' gestation), low birth weight (LBW) (i.e., < 2500 g), or very low birth-weight (i.e., < 1500 g), resulting in higher infant morbidity and mortality. Because preterm and LBW infants often require costly neonatal care and long-term developmental follow-up, the continuing increase in triplet and higher-order multiple births causes great concern to health-care providers and policymakers. The relative increase in risk of monochorionic compared to dichorionic twin pregnancies is comparable to that of twins

compared to singletons. When a cause of death can be assigned, complications of monochorionic placentation accounted for 20–45% of stillbirth, perinatal and later mortality. What follows is 10 “commandments” in term of providing optimal care.

1. Psychological Support and Clinical Counseling

Counseling and psychological support is of fundamental importance. All parents should be aware that pathologies such as fetal growth retardation, congenital anomalies, abnormal placentation, abruptio placentae, fetal malpresentation and preterm delivery, occur more commonly in multiple than in singleton pregnancy and result in higher maternal and perinatal mortality and morbidity. Antenatal complications are three to five times higher in multiple pregnancy than in singleton pregnancy. Adequate psychological support from the first trimester onwards is required to help parents to cope with possible negative outcome and also with the socio-economic problems related to multiple birth.

2. Correct Diagnosis and Characterization of Chorionicity

Early diagnosis is critical in order to minimize the perinatal risk. Ultrasound is an accurate method for the confirmation of multiple gestation. When the diagnosis of multiple gestation is made early in pregnancy, the clinician can optimize prenatal care and perinatal management. Multiple gestation should be suspected when the uterus is larger than predicted by menstrual history. Other causes of an enlarged uterus include: 1) dating errors, 2) uterine leiomyomata, 3) polyhydramnios, and 4) ovarian tumors, all of which usually can be identified at the time of ultrasound assessment. Two or more gestational sacs can be observed by the 6th week of gestation, and the presence of cardiac activity usually can be identified within the subsequent 2 weeks using traditional abdominal ultrasonography. Vaginal sonography allows earlier detection of both multiple gestational sacs and fetal heart rate activity.

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Approximately one fifth of multiple gestations are monochorionic and four fifths are dichorionic. These ratios differ by maternal race. The likelihood of vascular anastomoses occurring in a dichorionic placenta is negligible. On the other hand, virtually all monochorionic placentas have some vascular connections. The antenatal knowledge of the type of placentation and chorionicity is helpful in the following three clinical situations: 1) The differentiation of twin to twin transfusion syndrome (TTS) from a twin gestation in which one fetus shows growth retardation; 2) the management of twins with congenital malformations, in which selective feticide may be considered as an option if the gestation is dichorionic (selective termination of a twin with a congenital malformation and monochorionic placentation poses a theoretic risk to the sibling); and 3) the management of single fetal death in a multiple gestation (the survivor is at risk for neurologic injury if the placentation is monochorionic, probably due to blood pressure fluctuations at the time of the death of the co-twin). Monochorionic monoamniotic twins are associated with up to a 50% of perinatal mortality for both twins, most often due to cord entanglement.

The following criteria must be fulfilled to diagnose monoamniotic twins: (1) No dividing amniotic membrane is present, (2) only one placenta is seen, (3) both fetuses are the same sex, (4) the fetuses must have adequate amniotic fluid surrounding them, and (5) both fetuses must move freely within the uterine cavity. Transvaginal sonography (TVS) may help in the assessment of chorionicity of multiple pregnancy in the 1st trimester: At 5 weeks — evidence of two or more sacs (dichorionic); at 6 weeks — determination of the number of embryos by heart activity and the number of yolk sacs; at 7–8 weeks — identification of the amnions: — A single sonolucent sac which contain both amniotic sacs (monochorionic-diamniotic pregnancy); — a single chorionic and amniotic sac containing both embryos. In multiple pregnancies of high order the sequential appearance of the embryonic structures holds true and their multichorionicity and amnionicity can also be assessed. In the 2nd trimester the assessment of chorionicity in multiple pregnancy consists of identifying the number of placentas; determining the sex of twin; determining if each fetus is within its own amniotic sac; describing the appearance of dividing membrane (in 85% of monochorionic twins the membrane is ~ 2 mm, in DC/DA the membrane is ~ 4 mm); and looking for the “lambda” sign which is an indicator of dichorionic pregnancy. A worldwide reduction in the frequency of dizygous twin births has been noted since the late 1950s. To date, there is no convincing explanation for this observation.

3. Management at Referral Centers

The management of MP poses specific problems both in diagnosis and fetomaternal surveillance requiring specific experience and skill in order to be able to plan appropriate management. It is therefore advisable that MP patients should be referred to secondary or tertiary centers with experience in this field in cases of suspected complications or, in any cases, the patients should be managed jointly with referral center.

4. Individualization of Care

All MPs are at increased risk of obstetric complications, it is not possible to define a standard management plan for all cases. Instead, each case should be individually assessed and specifically managed according to the presence of risk factors and evidence from fetal and maternal diagnostic screening and investigations. Steps in management of multiple pregnancies should include: TVS to detect the number of fetuses and chorionicity (considering fetal reduction); US morphologic examination; US biometric evaluation; possible use of prophylactic cervical cerclage from 20–22 weeks if cervical incompetence is suspected; activity reduction from 24 week; Doppler velocimetry evaluation from 24 weeks; hospitalization from 28 weeks especially with higher order pregnancies, and so on.

5. Avoidance of Most Frequent Complications

The obstetricians should be prepared to address complications such as: Preterm labour, cervical incompetence, polyhydramnios and some maternal complications. Complications of multiple pregnancies comprise: Abortion, vanishing twin syndrome, malformation, vasa previa, growth discrepancy, intra uterine growth retardation (IUGR), polyhydramnios, preeclampsia, premature rupture of membranes (PROM), preterm delivery, gestational diabetes mellitus and intrauterine fetal death. Neither fetal nor maternal complications can be truly prevented.

Premature Rupture of Membranes

Premature rupture of the membranes occurs more frequently in multiple gestation and often leads to premature labour and preterm delivery. This complication, coupled with fetal malpresentation and malposition, is responsible for the increase incidence of cord prolapse. Spontaneous rupture of one sac followed by birth of the first twin usually results in the pregnancy being terminated. There is an argument for a conservative approach if labour ceases following delivery of this first fetus before 28 weeks of gestation. Initial management should include clamping and ligating the umbilical cord as high in the cervix as possible and cervical cerclage. Conservative management includes corticosteroids (12 mg betamethasone (BD) once weekly), antibiotics, tocolytics and close fetal monitoring. Blood cultures and vaginal swabs should be checked frequently for pathogens.

The Cervix and Cervical Cerclage

Transvaginal sonographic (TVS) evaluation of the cervix in twin pregnancies is particularly valuable because digital examination of the cervix cannot usually estimate its true length and cannot see the shape of the internal uterine os (T, V or U shaped). At the end of the latent phase of labour and/or after a dilation of 3–4 cm and an “effacement” of 90–100%, the digital pelvic examination is superior to TVS in its accuracy. TVS evaluation of the cervix may help to diagnose precocious cervical dilatation and to select the special cases of multiple pregnancies where to perform preventive cervical cerclage. The risk (1–4%) of cerclage includes chorioamnionitis, premature rupture of membranes, and bleeding. Routine cerclage does not prolong twin pregnancy; after a cerclage, there may actually be a

greater risk of premature labour. Quite clearly, the risks of prophylactic cerclage outweigh its benefits.

Premature rupture of the membranes and delivery of the first fetus during the second trimester typically has a serious prognosis for the healthy fetuses remaining *in utero*. Using a combination of cervical cerclage, antibiotics and tocolysis, subsequent survival is possible. The impact of this approach to perinatal survival was recently assessed in a 7-year cohort of 1806 multiple births. A 4.7% incidence of first twin delivery between 28 and 26 weeks, of which 26% were considered potential candidates for attempted delivery delay using a combination of cerclage, antibiotics and tocolysis, was found. Eight attempts resulted in three survivors. This approach of 'iatrogenic asynchronous birth' has the potential to do more harm than good, and should only be considered in selected patients following careful discussion.

Preterm Delivery

Preterm delivery is very common in multiple pregnancies. The average length of gestation decreases inversely with the number of fetuses in utero. Modalities to help reduce the rate of preterm delivery in multifetal pregnancies comprise: Early diagnosis; bed rest; cervical cerclage; high progesterone administration; tocolysis; uterine activity monitoring. The benefit of bed rest in twin pregnancy is controversial. The theoretic importance of bed rest is the increase in uterine blood flow and also the relief of pressure on the cervix. This was thought to result in the reduction of intrauterine growth retardation and prematurity. Some authors have claimed bed rest to be beneficial in the antepartum management of multiple pregnancy. Recent data, however, suggest that bed rest does not affect rates of preterm labour, perinatal mortality, or birth weight at least in twin pregnancy. Moreover approximately 50% of the perinatal mortality associated with multiple pregnancy occurs before 30 weeks gestation. Therefore, if bed rest does improve outcome, it must be instituted prior to 28 weeks' gestation.

Prophylactic Tocolytics

No studies demonstrated a significant increase in the length of gestation or increase in birthweight in multiple gestation treated with prophylactic oral tocolytics. The most used tocolytics in multifetal pregnancies include: Indomethacin (oral or suppository); terbutaline (SQ or oral); magnesium sulfate (IV) and ritodrine (IV or oral).

Monitoring Uterine Activity

UAM is controversial as a mode of management of multiple gestations. To date there is no well designed prospective study demonstrating proven efficacy with this new technology in decreasing the incidence of premature birth, although it may be useful in certain cases, primarily because patients do not discern the majority of uterine contractions. Furthermore, uterine activity is greater at the same gestational age in patients delivering preterm than in those delivering at term or postterm. Finally, a cost/benefit analysis of home UAM demonstrated only limited maternal and neonatal cost benefit, in patients monitoring uterine activity, compared with controls, although there was evidence of cost benefit for the patients employing

home UAM when the analysis was limited to multiple gestations, especially high order.

Fetal Lung Maturity

There may be no need for tapping both twins to accurately evaluate fetal pulmonary maturity, since it appears that twins are generally concordant in this regard. A word of caution is necessary: although it may be unlikely to find a significant discrepancy in fetal pulmonary maturity between twins with either definitely high or low L/S ratios, those with borderline values need careful consideration. In multiple pregnancy administration of dexamethasone as recommended by NIH should be started in the attempt to reduce the incidence of RDS, irrespective of threatened preterm labour.

Pulmonary Edema

Pulmonary edema is the most common life threatening complication of intravenous tocolysis, occurring in as many as 3% to 9% of women undergoing betamimetic therapy. Of the reported cases of pulmonary edema, multiple gestation appears to have been a predisposing factor in over 20% of cases. Treatment of any of the complications of tocolytic therapy begins with discontinuation of therapy. Additionally, standard therapy for pulmonary edema should be instituted. This includes oxygen administration, intravenous furosemide, and intravenous morphine sulfate. Response to therapy can initially be based on the patient's symptoms, but subsequent serial monitoring of other diagnostic tests should be performed to monitor the patient's response. These tests include arterial blood gas measurements, a chest x-ray, serum electrolyte measurements, and an electrocardiogram (ECG). The patient should be monitored in an intensive care setting. Consultation with specialists in internal medicine, pulmonary medicine, cardiology, and respiratory therapy is appropriate. Careful recording of fluid intake and output is also essential. Invasive hemodynamic monitoring is indicated if there is not a rapid response to the initial therapeutic steps.

Anemia

The frequency of anemia is increased in multiple pregnancy to approximately 40%. There is a reduction of iron and folic acid stores in multiple pregnancy. Iron and folic acid supplementations are indicated when multiple pregnancy is diagnosed. It is important to treat anemia because multifetal delivery is associated with considerably more blood loss.

6. Consideration of Some Specific Pathologies

Twin to Twin Transfusion Syndrome (TTS)

The TTS is associated with a high rate of mortality and, among survivors, substantial morbidity. Diagnostic criteria include: Monochorionic pregnancy; same sex with growth discordance between the twins; oligohydramnios of the growth retarded fetus and polyhydramnios of the larger twin; an intertwin hemoglobin difference > 5mg/dl (after cordocentesis). Antepartum management of TTS is not without controversy, because no suggested therapy is without problems. Among the most popular are serial therapeutic amniocentesis to reduce hydramnios; indomethacin to reduce fluid reaccumulation; fetocide by pericardial tam-

ponade through cordiocentesis of the small twin or selective placental vasal occlusion by endoscopic laser technology.

The three types of vascular anastomoses, A-A, V-V and A-V, are generally present in monochorionic placentae. Any shift in the watershed zero flow area between the two twins' placental areas, results in unidirectional transfusion via superficial A-A or A-V anastomoses, which functionally become A-V anastomosis.

Twin Reversed Arterial Perfusion (TRAP) Sequence

The most extreme manifestation of twin to twin transfusion syndrome, found in approximately 1% of monozygotic twin pregnancies is acardiac twinning (acardius chorioangiopagus parasiticus). This disorder is often called twin reversed arterial perfusion (TRAP) sequence because the underlying mechanism is thought to be disruption of normal vascular perfusion and development of the recipient twin due to an umbilical arterial-to-arterial anastomosis with the donor or pump twin. At least 50% of donor twins die due to congestive heart failure or severe preterm delivery, the consequence of polyhydramnios. All perfused twins die due to the associated multiple malformations. Prenatal treatment is often accomplished by serial amniodrainage or the administration of indomethacin to the mother. Although such therapy can potentially prevent polyhydramnios-related preterm delivery, it does not reduce the risk of congestive heart failure and consequent intrauterine or neonatal death of the donor twin. More recently attempts at therapy have concentrated on surgical removal of the acardiac twin or occlusion of its umbilical cord.

Stuck Twin

The 'stuck' twin sign refers to the ultrasonographic finding of one of a monochorionic diamniotic twin pair in an oligohydramniotic sac fixed in a location adjacent to the uterine wall. This is frequently a manifestation of the twin-to-twin transfusion syndrome (TTS). At the same time the co-twin is in a polyhydramniotic sac. Management of stuck twin syndrome (polyhydramnios in one sac; oligohydramnios in the other) may include: Selective fetocide; umbilical cord ligation of one twin; laser occlusion of anastomosing placental vessels; serial amniocentesis.

Antepartum Management of Intrauterine Death of One Twin

In the case of late fetal death in multifetal pregnancy, monochorionic placentation appears to present a higher risk for fetal death. Three patterns of brain pathology have been described in monochorionic twins.

1. Hypoxic ischaemic lesions of white matter: Usually middle cerebral artery territory, associated with porencephaly, multicystic encephalomalacia, microcephaly (cerebral atrophy) and hydranencephaly.
2. Haemorrhagic lesions: These may be primary or they may complicate ischaemic lesions, and they may themselves be complicated by post-hemorrhagic hydrocephalus.
3. Congenital anomalies in which a vascular disruptive aetiology has been implicated (see above) include neural tube defect and optic nerve hypoplasia (placental anas-

tomoses would have to be functional very early in pregnancy for the former to occur).

Injury to the surviving fetus is theoretically thought to be associated with possible intrauterine coagulopathy. Now it is thought to be more likely to be associated with exanguination at the time of the death of the co-twin when compensatory vascular resistance is lost. The rate of preterm delivery of the surviving twin is high. Preterm delivery can be a cause of potentially preventable morbidity. Delivery should be induced if abnormal antenatal testing, maternal preeclampsia, or documented fetal lung maturity are present. Anticipate vaginal delivery in all cases unless other obstetrical indications are present. Examination of the placenta and membranes to confirm zygosity and vascular communications should be performed. Neonatal follow-up including neurological and renal evaluation and ultrasound, CT scan and/or MRI studies are necessary.

7. Close Evaluation of Fetal Anatomy

Methods and techniques to monitor multiple pregnancy are mainly: Transvaginal sonography (TVS) for determination of chorionicity; amniocentesis for identification of aneuploidies and malformations; *US* morphological examination for identification of malformations; *US* biometric examination for identification of discordant twins or intra uterine growth retardation (IUGR); Doppler velocimetry for monitoring fetal health; *US* biophysical profile for monitoring fetal health; *NST* for monitoring fetal health; fetal behaviour for monitoring fetal health; TVS evaluation of the cervix for recognition of risk of preterm delivery.

Fetal Malformations and Prenatal Genetic Diagnosis

The incidence of fetal malformations is two times higher in twin than singleton pregnancies, and the incidence of malformation in monozygotic twin pregnancies is twice that in dizygotics. The cause of the higher rate of malformations is unknown. The type of placentation does not influence the incidence of fetal malformation. In addition, chromosomal anomalies are no more common in twins than singletons. The anomalies unique to twin pregnancy include conjoined twins, acardiacus and fetus-in-fetu.

Anomalies not unique to twins but believed to be increased in frequency because of mechanical factors are positional defects (such as clubfoot and congenital dislocation of the hip) due to intrauterine crowding. Additional anomalies due to vascular consequences of fetal death are congenital skin defects, microcephaly, hydranencephaly, porencephaly, multicystic encephalomalacia, hydrocephalus, intestinal atresia and limb amputation. The presence of a dead monochorionic fetus should always alert the obstetrician to the possibility of disruptive structural defects in the survivor.

Since the incidence of malformations is reported to be 2.16% with a higher rate found in monozygotic twins compared to dizygotic twins, all monozygotic pregnancies should be offered prenatal diagnosis, irrespective of maternal age. Often a significant association was shown between congenital intestinal obstruction and the application of

methylene blue intra-amniotically as marker dye, indigo carmine as dye or no dye technique should be preferred.

Fetoplacental Markers in Twin Pregnancies Affected by Down Syndrome

Around one-third of twin pregnancies are monozygous and their rate of Down syndrome is relatively independent of race and maternal age. As they arise from cleavage of a single fertilised ovum, the age-related risk of Down syndrome will be the same as in a singleton pregnancy. In the case of a twin pregnancy, both fetuses will be trisomic. Dizygous twins are more common in older mothers and as they arise from separate fertilisation of two simultaneously shed ova there is double the age-related risk than for a singleton pregnancy that either twin will have Down syndrome (the chance that both dizygous twins will have Down syndrome is the square of the maternal age risk for a singleton pregnancy). This presumably accounts for the slightly increased rate of Down syndrome in twin pregnancies (1:1.28).

8. Close Monitoring of Fetuses

Biometry

The aim is to obtain serial assessment of fetal growth; singleton growth curves for *FL*, *BPD* and *AC* may be used to assess fetal growth prior to 28 weeks of gestation; after 28 weeks of gestation specific twin growth curves should be used; presence of fetal discordant growth can be due either to IUGR or to TTS. Fetal growth discordance is present in 12–47% of twin pregnancy; it can occur as early as 22–24 weeks. A weight discordance of 25% or more is considered significant; an *AC* difference of > 20 mm is suggestive of growth discordance; the *BPD* is not a reliable indicator of growth discordance.

Doppler Velocimetry

Its application in multiple gestations remains controversial. Recent studies have addressed the usefulness of this technique in predicting twin fetuses small for gestational age (SGA) or IUGR, twins with TTS, and those with discordant growth. Questions regarding its use in improving perinatal outcome are presently unanswered. The value of Doppler velocimetry of uterine arteries to predict PIH is still limited.

Cardiotocography

NST in the assessment of fetal health in multiple pregnancy is an easy and reproducible method. It is, however, not always easy to identify the twins and it is possible to perform two NSTs on the same fetus. Echographic location of the heart of each twin may be required. The best method is the simultaneous recording of FHR patterns on one tracing.

9. Planning of Time and Mode of Delivery

Careful intrapartum management of multiple gestations is essential to achieving optimal outcome. These gestations should be managed by experienced obstetric and pediatric personnel in centres capable of meeting *their* special needs. Delivery should be conducted by experienced midwifery and obstetric staff with anaesthetic support available and a pediatrician present in case neonatal resuscitation is required. There should be facilities for immediate Cesarean section. As

with all aspects of obstetric care, there is a need for teamwork and the development of suitable management protocols.

Twins have always been considered to be at higher risk at the time of delivery than singletons with the second twin being particularly so, especially when the presentation is not cephalic. However, much of the mortality results from the effects of prematurity and low birthweight, which are essentially antenatal issues.

Intrapartum monitoring of a twin gestation usually involves an external fetal monitor for each twin, with careful attention to the placement of each transducer to ensure accurate readings of each fetus. When feasible, a scalp electrode can be placed on twin A. After the delivery of twin A, electronic or sonographic monitoring of twin B should be carried out until its delivery. Uterine contractions can be monitored with two external transducers, one for each fetus. If an intra-amniotic catheter is in place, then this single catheter can be set up to read onto both fetal heart rate tracings. Recently made available for multiple gestations are specialised monitors that can print both *FHRs onto the same tracing, and one channel for uterine contractions.*

The use of fetal scalp sampling for a twin pregnancy is limited because only the presenting fetus can be sampled. This procedure may be clinically appropriate, however, if the FHR of the first twin is suspicious.

Presentations can be grouped into three broad categories: 1. vertex twin A, vertex twin B (42%); 2. vertex twin A, non-vertex twin B (38%); and 3. non-vertex twin A (20%).

1. Vertex twin A, vertex twin B may be safely delivered vaginally.
2. Vertex twin A, non-vertex twin B: Widespread disagreement exists regarding the intrapartum management of such presentation. A management plan that includes routine cesarean section for this group at all birth weights is an acceptable approach. However, we believe that there are two options available: a) External cephalic version and b) internal podalic version under US guidance and vaginal breech delivery of twin B — to avoid routine cesarean delivery for these twins. As for singletons, twin breech deliveries need to fulfil certain criteria before vaginal delivery can be attempted including an appropriate birthweight, a flexed neck and a normal maternal pelvis.
3. Non-vertex twin A: Cesarean section to be recommended for the group of twins in which the first twin is non-vertex. However, there is no reason that properly selected cases of breech first twins should not be allowed a vaginal delivery.

Anesthesia

Regional epidural anesthesia is optimal for two reasons. First, it can provide adequate relief of pain in labour. Suppression of pain can lead to lower levels of catecholamines and enhanced uterine blood flow and contractility. Secondly, an existing epidural anesthetic can be used to provide adequate anesthesia for version or delivery by either the vaginal or abdominal route.

10. Monitoring of the Mother During Postpartum

The postpartum period, or the puerperium, is commonly regarded as the time immediately after birth. However, conventional thought defines the puerperium as that time from the delivery of the child to 6 weeks after the birth. By the end of the 6 weeks, the reproductive tract and the altered physiologic states of pregnancy (with the exception of ovulation in woman who are breast-feeding) have returned to their normal, nonpregnant state.

There are no data to suggest that the involution of the genital and urinary tracts after a multiple gestation is significantly different from that occurring after a singleton pregnancy. Descriptions of the involucional changes may be found in major textbooks of obstetrics. However, postpartum hemorrhage and postpartum endometritis is significantly increased. For this reason, it is better to routinely use oxytocin infusion for a few hours after delivery.

The primary cause of postpartum hemorrhage in a patient with a multiple gestation is *uterine atony*. The overdistended uterus is likely to be *hypotonic* after either vaginal or abdominal delivery. The patient who has been subjected to prolonged oxytocin stimulation is also more prone to postpartum *uterine atony*.

The management of postpartum bleeding in the patient delivered of a multiple gestation must be considered an obstetric emergency. It is critical to activate a plan designed to identify the problem and correct the deficit. This plan should include the following steps:

1. Obtain help immediately. A physician is preferable but any medical attendant is valuable.
2. If you have diagnosed *uterine atony*, attempt to compress the uterus using the bimanual techniques.
3. Start at least two intravenous access lines with 15-gauge needles or angiocath.
4. Obtain blood for transfusion. Since all patients with multiple gestations should be screened and tested for the blood type before labor, blood should be readily available.
5. Add oxytocin to the second intravenous access line. If this does not effectively restore *uterine tone*, add 250 µg of prostaglandin F2a (carboprost tromethamine) intramuscularly. The prostaglandin may be administered at 15- to 90-minute intervals up to a maximum of 8 doses of ergometrine.

6. Explore the genital tract from the vagina to the cervix to the uterine cavity. If no lacerations are present in the vagina or the cervix, curettage of the uterine cavity with a banjo curette may be helpful.

Puerperal uterine infection involves the decidua and adjacent myometrium. An evaluation of the patient's temperature is usually suggestive of postpartum endometritis. Several commonly used definitions of febrile morbidity include a temperature of 38.0° C (100.4° F) or higher on any 2 of the first 10 days postpartum (exclusive of the first 24 hours), a temperature of 38.0° C (100.4° F) on two separate occasions 6 hours apart and 24 hours after delivery, or a temperature of 101° F (39° C) or higher occurring any time.

Postpartum endometritis should be suspected when the patient's temperature becomes elevated. A general physical examination should be performed to rule out sites of infection other than the operative site. The pelvic examination should include inspection of the perineum and a speculum examination of the vagina. The presence of a foul odor is an indication of either an intrauterine infection or the presence of retained products of conception within the uterus. The uterus should be explored. Specimens of blood and catheterized urine for culture should be obtained.

The therapy for postpartum endometritis involves broad spectrum antimicrobial agents that have an aerobic and anaerobic spectrum of activity. Parenteral therapy is indicated at this time and should be continued for a minimum of 72 hours and until the patient is afebrile for at least 24 hours. The use of clindamycin plus aminoglycoside has been a popular choice because these agents cover a wide spectrum of facultative and anaerobic bacteria. This regimen produces cure rates of approximately 90%.

The approach taken toward treating the patient who has been delivered of multiple infants should be logical and aggressive. Evaluations should be thorough, and appropriate antimicrobial agents should be used. The vast majority of these patients are cured with a 3-day course of antibiotics. If the patient's fever persists, a thorough reevaluation must be done.

Conclusions

Multiple pregnancy represents a challenge for obstetrics and also poses significant psychological, social and economic problems. The chances of a successful outcome are improved by appropriate preventive, diagnostic and management strategies and by the availability of specific skills, experience and on a multidisciplinary approach.