Management of the High-Risk Gravida

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Comprehensive prenatal care has become the hallmark of modern obstetrical practice. Awareness by both physicians and patients that such care is necessary for satisfactory perinatal outcome has led to the establishment of an obstetrical subspecialty, Maternal Fetal Medicine, to provide a higher level of prenatal care and to increase our knowledge of perinatal events. Many of the management techniques currently being used for high-risk pregnancies can be readily applied to the routine obstetrical population. The additional physician time and laboratory tests required are minimal, and the early identification and prevention of perinatal complications will eliminate the need for "crisis" medicine.

Identification of the High-Risk Patient

The first step toward initiating a management plan for a high-risk pregnancy is recognition that a poor perinatal outcome is possible. Early identification of the "at-risk" fetus begins with the first antenatal screening visit. Although most conditions associated with an adverse maternal or fetal outcome have long been recognized, I have found it helpful to use a risk-scoring approach that provides a semiquantitative risk estimate.[1,2] This method takes into consideration various historical, physical, and laboratory data to generate a numerical risk score; in general, as the risk score increases, the likelihood of an unfavorable perinatal outcome also increases. Depending on the clinical setting, one quarter to one third of all pregnancies will be identified prospectively as high risk and can be expected to experience the majority of perinatal mortality and morbidity. It is in this group of high-risk patients that recently developed methods of fetal surveillance are likely to find their greatest value. While details of this risk-scoring system are beyond the scope of this discussion, it should be mentioned that the Virginia State Department of Health currently has plans to implement a risk-scoring system into the state health care system.

Dr. Robert Petres has previously addressed the problem of identification of the high-risk gravida. Although his classification of pregnancies into various risk categories based on the worst single antepartum complication is a different approach from the numerical risk-scoring system, he accomplishes much the same result—prospective identification of the patient at risk for an adverse perinatal outcome.

Management

Ideally, every woman should be seen by an obstetrician prior to conception. At this time the physician may identify medical problems that should receive attention. The patient should be made aware of the importance of early prenatal care and be encouraged to seek an early diagnosis of pregnancy. The patient-physician relationship established at the preconception visit will encourage this.

Office management of the high-risk gravida begins with the initial visit. Postconception, patients should be seen as soon as possible in the office. It is difficult to convince patients of the importance of prenatal care if they must wait 3 to 4 weeks for their first postconception visit. If the physician is not readily available, the initial

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office screening should be performed by a nurse. The patient's blood pressure and urine should be checked, a pregnancy test performed to confirm pregnancy, and a check list history taken to identify any significant problems that may require immediate attention by the physician. If the patient is entirely normal with a negative history, she may be scheduled to see the physician at a later date; however, if a problem is identified on the screening visit, it should be dealt with as soon as possible.

Initial Visit

The objectives of the initial visit are to determine the health of the mother and fetus, to determine the gestational age of the fetus, and to initiate a plan for continuing obstetrical care. A thorough physical should be performed and a complete history taken. Special attention should be given to a chronological listing of all previous pregnancies and include length of gestation, fetal weight, route of delivery, and any maternal or fetal complications. Past obstetrical performance is the single most important historical fact that may predict potential problems during the current pregnancy. The date and character of the last two menstrual periods should be included at this time. Particular attention should be given to the funduscopic exam, thyroid, heart, lungs, breasts, fundal height, and to the presence or absence of fetal heart tones.

Routine laboratory work which should be performed on all pregnant patients is listed below:

1. CBC
2. Urine culture
3. Urinalysis
4. VDRL
5. Blood type and Rh titers
6. Atypical blood group antibodies
7. Pap smear
8. Gonococcal culture
9. Rubella titers
10. Two-hour postprandial blood sugar

Additional laboratory work may be needed in selected cases depending on the patient's history and physical findings. The more common additional studies to evaluate patients with hypertension or chronic renal disease include a SMA 12, SMA 6, and a 24-hour urine collection for protein and creatinine clearance. Diabetic patients will need blood sugar determinations and an ophthalmology consultation in addition to the tests for renal evaluation. Supplemental tests such as thyroid function tests, parathyroid function tests, and liver function tests should be obtained on those patients where historical or physical data suggest possible problems. The CBC, urine culture, and the two-hour postprandial blood sugar should be repeated at 32 weeks gestation because of the complications associated with undiagnosed anemia, pyelonephritis, and diabetes in the third trimester. In routine uncomplicated pregnancies no additional laboratory tests need be repeated. Atypical antibodies may develop in patients who become sensitized to various blood group antigens and many of these atypical antibodies can cause erythroblastosis and intrauterine fetal death. These patients need to be treated in a fashion similar to an Rh negative sensitized patient. The blood bank should provide information concerning which of the atypical antibodies are possible causes of erythroblastosis. Rubella titers should be included in all pregnant women; patients with positive rubella titers can be reassured that rubella will not be a problem during the course of pregnancy. Patients with negative rubella titers may be vaccinated in the *postpartum* period. If the two-hour postprandial blood sugar is greater than 120 mg/%, a glucose tolerance test (GTT) should be performed to rule out gestational diabetes. Since the demand for insulin increases with gestation a second two-hour postprandial blood sugar or GTT should be performed at 32 weeks.

The frequency of subsequent office visits must be determined according to the needs of the patient as should the need for additional laboratory work and possible antenatal hospitalization.

Regardless of the patient's high risk classification the objectives of prenatal management remain the same and include evaluation of the maternal condition, fetal condition, and gestational age. These must be considered on each prenatal visit. Although the number of additional visits, consultations and laboratory work necessary for proper evaluation should be individualized there are certain management techniques that apply to all patients in the first, second and third trimesters of pregnancy.

First Trimester

Maternal condition should be evaluated with a history and physical examination, routine

laboratory work, and selected laboratory work and procedures, when indicated, to establish a baseline medical status during the first trimester.

Fetal condition is difficult to assess in the first trimester and very little can be done to alter the course of pregnancy at this stage of gestation. Progressive fundal growth should be routinely documented as a means of assessing fetal condition. If uterine growth is abnormal or vaginal bleeding should ensue, ultrasonic evidence of a normal or abnormal gestation sac or fetus will provide prognostic data; this may lead to earlier intervention in cases of obvious pregnancy loss.

Gestational age must be accurately assessed during the first and second trimesters of pregnancy. The difficulty in accurately assessing gestational age in the third trimester is well known. The date, duration and character of the last menstrual period (LMP) should be clearly recorded in the chart. Additional information regarding the regularity of the patient's menstrual cycle and her most recent means of birth control should be documented. Uterine size during the first trimester of pregnancy is also useful in determining gestational age.

Second Trimester

Maternal condition should be evaluated routinely with blood pressure determination, maternal weight gain, and urinalysis for protein, glucose and acetone. The frequency of visits and the need for additional lab work and possible hospitalization must be determined at this time. The minimum interval between office visits for patients with otherwise uncomplicated pregnancies should be every four weeks.

Although very little can be done to alter the course of pregnancy at this stage in gestation, fetal condition can still be evaluated by monitoring progressive fundal growth and the development of fetal movement. Should problems arise, many of the more serious fetal conditions can be evaluated with a careful ultrasound examination.

The second trimester of pregnancy contains many gestational landmarks that are important in determining gestational age for future management. The appearance of the first fetal heart tones heard with an unamplified fetoscope is a reliable means of determining gestational age; these should be heard at 20 weeks, plus or minus 1 week, in the majority of pregnancies. From 17 weeks on patients should be seen weekly until fetal heart tones have been heard with the unamplified fetoscope. In addition, a patient should also be asked to mark the date when she first feels fetal movement. If towards the end of pregnancy fetal movement has been present for more than 22 weeks and fetal heart tones have been present for 20 weeks, the patient has a 95% chance of being at least 39 to 40 weeks pregnant. Fundal height should be recorded as accurately as possible in the second trimester of pregnancy because of the narrow range of standard deviation in uterine size that occurs at this time. The large difference in uterine sizes that occurs with infants who are small, average or large for their gestational age does not usually occur until the third trimester of pregnancy. If fetal gestational age can not be reliably determined, an ultrasound study for biparietal diameter should be obtained.

Third Trimester

The mother and fetus both require increased surveillance during this period of gestation as numerous complications may arise in previously normal pregnancies. Early recognition and proper intervention will decrease the perinatal morbidity and mortality associated with many of these developing problems.

Maternal condition should be evaluated every two weeks during the third trimester and every week during the last month. Closer observation may be required in selected patients. Maternal condition should be evaluated with routine blood pressure, urinalysis, and weight gain observation. Routine laboratory work which should be repeated early in the third trimester of pregnancy includes a CBC, a two-hour postprandial blood sugar, and a urine culture. More frequent evaluation of renal function tests, blood sugars and additional laboratory work will be necessary in selected patients.

Evaluation of fetal condition during the third trimester of pregnancy has become a major part of antepartum fetal management. Both biophysical and biochemical means of fetal monitoring are available. At the present time, the only useful biochemical test for evaluating fetal well-being is urinary or serum estriols. However, if estriols are to be used to predict fetal compromise, specimens must be collected daily and the results must be available to the

physician within 12 hours. An isolated or weekly estriol value should not be used to monitor fetal well-being in complicated pregnancies.

The biophysical tests of fetal well-being include nonstressed fetal heart rate monitoring (NST) and an oxytocin challenge test (OCT).[3] The decision as to when to start antenatal fetal heart rate monitoring should be based on the individual patient and the clinical situation. Monitoring may be indicated as early as 26 to 28 weeks of gestation in patients with advanced hypertension or diabetes, or delayed until 42 weeks in a previously uncomplicated post-term pregnancy. In general, antepartum fetal heart rate monitoring should not be performed prior to the time in gestation when the physician would consider terminating a pregnancy because of fetal indications. There are limited data available on the use of antepartum monitoring prior to 30 weeks of gestation.

Indications for antepartum fetal heart rate monitoring are any pregnancy at risk for uteroplacental insufficiency. There are no contraindications to the NST. The oxytocin challenge test is associated with the following contraindications: ruptured membranes, suspected abruptio placenta, undiagnosed uterine bleeding, placenta previa, previous cesarean section, incompetent cervix, previous premature labor and polyhydramnios. In addition, the OCT has not been shown to be of value in the management of erythroblastosis fetalis. In general, negative OCT or reactive NST allows the clinician to avoid unnecessary premature intervention and has a false-positive rate (fetal death in 1 week of monitoring) of 2 to 5 per 1000. A nonreactive NST or a positive OCT alerts the physician to possible fetal compromise and may be an indication for intervention before fetal death or irreversible damage occurs.

The NST has been shown to be as reliable as the OCT. Because of the reliability and simplicity of the NST, this monitoring technique has become the primary means of antenatal fetal monitoring here at the Medical College of Virginia. An outline of procedure for patient care is listed below.

1. The "at-risk" patient is identified using clinical risk assessment and scoring techniques at the first antenatal visit and as problems develop during gestation.
2. Based on the clinical situation the NST may be started as early as 28 weeks.
3. The patient is followed with weekly NSTs, as long as she remains reactive.
4. Any inadequate NST is repeated within 24 hours. Any nonreactive NST is evaluated the same day with an oxytocin challenge test.
5. If the OCT is negative, the patient is scheduled to have a NST the next week.
6. A suspicious, hyperstimulation, or unsatisfactory OCT is repeated within 24 hours.
7. Urinary or serum estriols may be obtained for additional information, depending on the clinical situation, and must be collected daily to be useful.
8. If a nonreactive NST is followed by a positive OCT, serious consideration must be given to delivering the fetus. At this time, amniocentesis may be performed and if the amniotic fluid indicates fetal maturity, or meconium-stained fluid is found, the fetus should be delivered.
9. If the amniotic fluid is clear and there is evidence of fetal pulmonary immaturity, a decision is made based on which risk is greater, prematurity or the in utero environment.
10. In the face of low or falling estriols, with a nonreactive NST and/or a positive OCT, we at MCV recommend delivering the fetus if it is viable.
11. If the estriols are stable and in the normal range, with a nonreactive NST or a positive OCT, the situation is ambiguous. A decision to await further maturation or to deliver the patient may be appropriate. Clinical judgment based on the overall assessment of the maternal status, pregnancy duration, and the condition of the fetus is required.

Determination of gestational age in the third trimester of pregnancy is indeed difficult. Ultrasound provides information about fetal size but does not differentiate between the small premature infant and the standard gestational

age term infant. To predict gestational age reliably, information from the first and second trimesters must be available. During the third trimester of pregnancy the emphasis shifts from gestational age to determination of fetal maturity. Without adequate clinical data concerning gestational age or when premature interruption of pregnancy is being considered prior to 39 weeks, I advocate amniocentesis for a lecithin-sphingomyelin (L/S) ratio.

Summary

Recognition of those patients at risk for a poor perinatal outcome is the most important step in reducing perinatal morbidity and mortality. Once at-risk patients are recognized, intensive observation with frequent assessments of maternal condition, fetal condition, and gestational age can be accomplished with minimal additional physician time and laboratory tests. The decision of when or when not to intervene in a pregnancy is not an easy one and should be based on all available data, an important part of which is information collected during the first and second trimester of pregnancy. Regional perinatal consultation services should be used more frequently for patients with management problems. Developing problems should be treated aggressively with antepartum hospitalization, intensive observation and evaluation, and consultation. Proper assessment of maternal condition, fetal condition, and gestational age will prevent many of the more serious complications and may allow the patient to remain in her own community under the direct care of her local physician. If, however, the patient requires a level of care that cannot be provided in her own community, she should be transferred to a regional perinatal center without hesitation.

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