Common Pre-Natal Medical Procedures, their Benefits & Risks

We will be covering the following topics...

- Common Medical Procedures during pregnancy and labor
- The risks and benefits of these procedures

Common procedures

- Epidurals
- Ultrasound
- External fetal monitoring
- Internal fetal monitoring
- Glucose tolerance tests
- Percutaneous umbilical blood sampling
- alpha-fetoprotein screening (AFP)
- Amniocentesis
- Chorionic villus sampling (CVS)
Percutaneous umbilical blood sampling

• **Definition**
  – (PUBS) is a highly specialized prenatal test in which a blood sample is removed from the umbilical cord and tested for genetic problems or infections.
  – Percutaneous umbilical blood sampling can be done after the **18th** week of pregnancy.

• Results are usually available within **72 hours**
  – in some cases, in as little as two hours.
• Also, Percutaneous umbilical blood sampling can be used to deliver blood transfusions and medication to the baby through the **umbilical cord**.
Percutaneous umbilical blood sampling

• Percutaneous umbilical blood sampling is also known as
  – umbilical vein sampling,
  – fetal blood sampling
  – cordocentesis

• Why it's done
  – It's typically offered only when the test results may have a significant impact on the management of the pregnancy.

• Can be used to identify:
  – Chromosomal conditions
    • Down syndrome.
  – Blood disorders
    • anemia,
    • sickle cell disease
    • Hemophilia
  – Whether the baby has Rh+ Rh- blood.
Percutaneous umbilical blood sampling

• **Infections.**
  – In Mom such as *toxoplasmosis* or *rubella*
  – Whether the baby has the infection, too.

• **Restricted growth.**
  – To determine why a baby isn’t growing as expected.

Percutaneous umbilical blood sampling

• Percutaneous umbilical blood sampling can’t be used to test for neural tube defects, such as *spina bifida*.

Percutaneous umbilical blood sampling

• Sometimes used to supplement the results from other diagnostic screenings and tests, such as ultrasound.
• Use of percutaneous umbilical blood sampling is decreasing.
• Can get same information from tests that pose a smaller risk of miscarriage,
  – amniocentesis
  – chorionic villus sampling.
Percutaneous umbilical blood sampling

- **Risks**
  - Miscarriage.
    - 2 in 100 risk of miscarriage.
    - Higher than chorionic villus sampling and amniocentesis.
  - Bleeding.
    - Bleeding from the needle entry site is possible.
  - Slowing of the baby's heart rate
    - May slow temporarily after test.
  - Infection
    - May cause a uterine infection.

Alpha-Fetoprotein screening

- **What is an alpha-fetoprotein screening (AFP)?**
  - a blood test that measures the level of alpha-fetoprotein in the mothers' blood during pregnancy.

- AFP is a protein normally produced by the **fetal liver**
- It is present in the amniotic fluid
- It crosses the placenta into the mother's blood.
  - also called MSAFP (maternal serum AFP).
Alpha-Fetoprotein screening

• Abnormal levels of AFP may signal the following:
  – open neural tube defects (ONTD) such as spina bifida
  – Down syndrome
  – other chromosomal abnormalities
  – defects in the abdominal wall of the fetus

• Abnormal levels cont’d
  – twins - more than one fetus is making the protein
  – a miscalculated due date, as the levels vary throughout pregnancy

• Abnormal test results of AFP may indicate the need for additional testing.
  – Ultrasound is performed to confirm the dates of the pregnancy and to look at the fetal spine and other body parts for defects.
  – An amniocentesis may be needed for accurate diagnosis.
Alpha-Fetoprotein screening

• Is not diagnostic.
• Is not 100 percent accurate, and is only a screening test to determine who in the population should be offered additional testing for their pregnancy.
• False-positive results - indicating a problem when the fetus is actually healthy.
• False negative results - indicating a normal result when the fetus actually does have a health problem.

How is an alpha-fetoprotein test performed?
– Blood is drawn between the 15th and 20th weeks of pregnancy (16th to 18th is ideal).
– Results are usually available within one to two weeks or less, depending on the laboratory.

Amniocentesis

• What is an amniocentesis?
– A procedure used to obtain a small sample of the amniotic fluid that surrounds the fetus to diagnose chromosomal disorders and open neural tube defects (ONTDs) such as spina bifida.
Amniocentesis

- Generally offered to women between the 15th and 20th weeks of pregnancy who are at increased risk for chromosome abnormalities
  - women who are over age 35 years of age at delivery
  - abnormal maternal serum screening test (AFP), indicating an increased risk for a chromosomal abnormality or neural tube defect.

Amniocentesis

- **How is an amniocentesis performed?**
  - A long, thin needle is inserted through the mother's abdomen into the amniotic sac to withdraw a small sample of the amniotic fluid for examination.
  - The amniotic fluid contains cells shed by the fetus, which contain genetic information.
Amniocentesis

- The woman's abdomen is cleansed with an antiseptic.
- The physician may/may not give a local anesthetic to numb the skin.
- Ultrasound is used to help guide a hollow needle into the amniotic sac.
- A small sample of fluid is withdrawn for laboratory analysis.

Amniocentesis

- Strenuous activities should be avoided for 24 hours following an amniocentesis.
- Women may feel some cramping during the amniocentesis.

Amniocentesis

- Women with twins or other multiples need sampling from each amniotic sac, in order to study each baby.
- Sometimes the amniocentesis cannot be performed
  - Due to position of the baby and *placenta*
  - amount of fluid
  - patient's anatomy.
  - Results are usually available in about 10 days to two weeks, depending on the laboratory.
Amniocentesis

• Risks
  – Injury to mom and/or baby from the needle
  – Puncture of the placenta is the most common potential injury.
    • usually heals without any further problems.

• Infection
  – the procedure lets bacteria into the amniotic sac

Amniocentesis

• Mom’s blood can be exposed to baby’s blood.
  – an issue if mom’s blood is rhesus-negative and baby’s is rhesus-positive. Rh incompatibility
  – Rh disease (also known as Rh (D), Rhesus disease, RhD Hemolytic Disease of the Newborn, Rhesus D Hemolytic Disease of the Newborn or RhD HDN)

Amniocentesis

• Conflict in blood type between the fetus and the mother, causing the mother’s immune system to attack the fetus as a foreign body
• This risk is reduced when given an injection of the appropriate antibodies after test.
  – anti-RhD immunoglobulin (Rho(D) Immune Globulin)
Amniocentesis

• Risks
  – Miscarriage.
    • Early amniocentesis carries a slight risk of miscarriage, often due to rupture of the amniotic sac.
    • The risk is highest in early pregnancy before the two layers of fetal membranes have sealed.

• By the second trimester, however, the risk of miscarriage drops. For years, the risk of miscarriage was generally considered to be one in 200. Today, the risk is between one in 300 and one in 500.
• In later pregnancy to assess a baby's lung maturity, rupture of the amniotic sac causes much less concern because safe delivery is nearly always possible at that point.

• Leaking amniotic fluid.
  – Rarely, amniotic fluid leaks through the vagina after amniocentesis.
  – If the leak seals, the pregnancy may proceed normally.
  – Studies have shown leakage leads to
    • Respiratory distress
    • Orthopedic problems for the baby in early infancy and childhood.
      – Pez equinovarus (club foot)
      – Hip dislocation
Rhogam
• A vaccine-like compound, also known as Rh immunoglobulin
• IM injection at week 28
• Also CVS, amniocentesis, miscarriage, ectopic pregnancy, etc
• Within 72 hours after delivery

Intrauterine fetal blood transfusion for Rh disease
• An **intrauterine transfusion** provides blood to an Rh-positive fetus when fetal red blood cells are being destroyed by Rh antibodies.

• A blood transfusion is given to replace fetal red blood cells that are being destroyed by the Rh-sensitized mother’s immune system.
• This treatment is meant to keep the fetus healthy until he or she is mature enough to be delivered.
Intrauterine fetal blood transfusion for Rh disease (and ABO compatibility)

- Transfusions can be given through the fetal abdomen or, more commonly, by delivering the blood into the umbilical vein.
- Umbilical cord vessel transfusion is the preferred method because it permits better absorption of blood and has a higher survival rate than does transfusion through the abdomen.

Intrauterine fetal blood transfusion for Rh disease

- An intrauterine fetal blood transfusion is done in the hospital.
- The mother may have to stay overnight after the procedure.
- The mother is sedated, and an ultrasound image is obtained to determine the position of the fetus and placenta.

Intrauterine fetal blood transfusion for Rh disease

- After the mother’s abdomen is cleaned with an antiseptic solution, she is given a local anesthetic injection to numb the abdominal area where the transfusion needle will be inserted.
- Medicine may be given to the fetus to temporarily stop fetal movement.
- Ultrasound is used to guide the needle through the mother’s abdomen into the fetus's abdomen or an umbilical cord vein.
Intrauterine fetal blood transfusion for Rh disease

• A compatible blood type (usually type O, Rh-negative) is delivered into the fetus’s umbilical cord blood vessel.
• The mother is usually given antibiotics to prevent infection. She may also be given tocolytic medication to prevent labor from beginning, though this is unusual.

How Well It Works
– Fetal survival after transfusion depends upon the severity of the fetus’s illness, the method of transfusion, and the skill of the doctor who does the procedure. Overall, after intrauterine transfusion:
  – More than 90% of fetuses that do not have hydrops survive.
  – About 75% of fetuses that have hydrops survive.
Intrauterine fetal blood transfusion for Rh disease

• **Risks**
  – Uterine infection.
  – Fetal infection.
  – Preterm labor.
  – Excessive bleeding and mixing of fetal and maternal blood.
  – Amniotic fluid leakage from the uterus.
  – Fetal death.

Erythroblastosis fetalis

– Rh disease can lead to Erythroblastosis fetalis
  • anemia that develops in an unborn infant
– Less severe than hydrops

Hydrops Fetalis

• **What is?**
  – Severe, life-threatening problem of severe edema in the fetus and newborn.
  – There are two types of hydrops:
    • Immune
    • Non-immune
Hydrops Fetalis

• **immune** - results when the mother's immune system causes breakdown of red blood cells in the fetus. This is the most dangerous problem of blood group incompatibility between the mother and baby.

• **non-immune** - the most common type; can result when diseases or complications interfere with the baby's ability to manage fluid.

What causes hydrops fetalis?

– When too much fluid leaves the bloodstream and goes into the tissues.

• Immune hydrops
  – Rh disease in the mother.
  • When an Rh negative mother has an Rh positive baby, the mother's immune system sees the baby's Rh positive red blood cells as "foreign."
  • When the mother's antibodies attack the foreign red blood cells, they are broken down and destroyed, resulting in anemia.
Hydrops Fetalis

• **Immune hydrops** (cont’d)
  • Hydrops can develop as the baby’s organs are unable to compensate for the anemia. The heart begins to fail and large amounts of fluid build up in the baby’s tissues and organs.
  • not as common as it used to be since the widespread use of Rh immunoglobulin treatment for Rh negative women

Hydrops Fetalis

• **Non-immune hydrops**
  – Iron deficiency anemia
  – Parvovirus B19 (Fifth Disease) infection of the pregnant woman.
  – Maternal syphilis.
  – Turner Syndrome
  – Rarely, a tumor. The most common type of fetal tumor is a teratoma, particularly a sacrococcygeal teratoma.

Hydrops Fetalis

• Diseases or complications often associated with hydrops
  • severe anemias
  • congenital infections
  • heart or lung defects
  • chromosomal abnormalities and birth defects
  • liver disease
  – About half of unborn babies with hydrops do not survive.
Hydrops Fetalis

• **What are the symptoms of hydrops fetalis?**
  – During pregnancy
    • large amounts of amniotic fluid
    • thickened placenta
    • ultrasound of the fetus shows enlarged liver, spleen, or heart, and fluid buildup in the fetus’ abdomen

– After birth,
  • pale coloring
  • severe edema overall, especially in the baby’s abdomen
  • enlarged liver and spleen
  • respiratory distress (difficulty breathing)

• **How is hydrops fetalis diagnosed?**
  – ultrasound
  – fetal blood sampling
  – amniocentesis
Hydrops Fetalis

• Treatment for hydrops fetalis:
  – Depends on the cause.
  – During pregnancy, hydrops may be treatable only in certain situations.

Hydrops Fetalis

• Management of hydrops in newborn babies may include:
  – Help for respiratory distress using supplemental oxygen or a mechanical breathing machine
  – Removal of excessive fluid from spaces around the lungs and abdomen using a needle
  – Diuretic medications to help the kidneys remove excess fluid

Chorionic villus sampling

• Involves taking a sample of some of the placental tissue.
• This tissue contains the same genetic material as the fetus and can be tested for chromosomal abnormalities and some other genetic problems.
• CVS does not provide information on neural tube defects such as spina bifida.
**How is CVS performed?**
- CVS is usually performed between the 10th and 12th weeks of pregnancy.
- Begins with inserting a catheter through a woman's vagina and into her cervix
- Ultrasound is used to guide the catheter into place near the placenta.
- Tissue is removed using a syringe on the other end of the catheter.

**Transabdominal CVS,**
- Involves inserting a needle through the woman's abdomen and into her uterus to sample the placental cells.
- Women may feel some cramping during and after the CVS procedure.
- Results for both types of CVS are usually available in about 10 days to two weeks, depending on the laboratory.
CVS

- Women with twins or other multiples usually need sampling from each placenta.
- CVS is not always feasible or successful with multiples.
  - positioning of the placentas
- Some women may not be candidates for CVS
- Results that are not 100 percent accurate
  - may require a follow-up amniocentesis.
  - herpes or gonorrhea, will prohibit the procedure.
  - The physician obtains a sample that does not have enough tissue to grow in the laboratory
  - results are incomplete or inconclusive.

CVS

- Risks
  - Miscarriage.
    - 1 in 100 risk of miscarriage.
    - slightly higher when the tissue sample is taken through the cervix (transcervical) rather than the abdominal wall (transabdominal).
    - The risk of miscarriage also increases if the baby is smaller than normal for his or her gestational age.
CVS

• Cramping and vaginal bleeding.
  – Vaginal bleeding especially with transcervical sample.
• Rh sensitization.
• Infection.
  – Uterine infection.
• Defects in a baby’s fingers or toes.
  – Appears to be a concern only if the procedure is done before the ninth week of pregnancy.

MaterniT21

• Analysis of chromosomes 21, 18, 13, X and Y, occur with every test.
• The most common fetal trisomies are trisomy 21 (Down syndrome), Trisomy 18 (Edwards syndrome) and trisomy 13 (Patau syndrome).
• X, (Turner’s) XXY (Kleinfelter’s), XXX , XYY
• Positive or Negative

Fetal Monitoring

• What is fetal monitoring?
  – To monitor the fetal heart rate and other functions.
    • Check the rate and rhythm of the fetal heartbeat.
    • The average fetal heart rate is between 110 and 160 beats per minute.
    • The fetal heart rate may change as the fetus responds to conditions in the uterus.
    • An abnormal fetal heart rate or pattern may mean that the fetus is not getting enough oxygen or there are other problems.
    • An abnormal pattern also may mean that an emergency cesarean delivery is needed.
Fetal Monitoring

- Fetoscope

Fetal Monitoring

- Hand held Doppler device.
  - often used during prenatal visits to count the fetal heart rate.

Fetal Monitoring

- During labor, continuous electronic fetal monitoring is often used,
  - especially if an abnormal rhythm is heard with the fetoscope.
Fetal Monitoring

– Gel is applied to the mother's abdomen to act as a medium for the ultrasound transducer.
– The ultrasound transducer is attached to the abdomen with straps and transmits the fetal heartbeat to a recorder.
– The fetal heart rate is displayed on a screen and printed onto special paper.
– During contractions, an external tocodynamometer (held in place with a belt) can record the patterns of contractions.

Internal Fetal Monitoring

• More accurate reading of the fetal heart rate.
  – Amniotic sac is ruptured (if it already hasn’t)
  – Cervix must be partially dilated to use internal monitoring.
  – an electrode is then inserted through the dilated cervix and attached to the scalp of the fetus,
  • Called a fetal scalp electrode.
Internal Fetal Monitoring

- "The physiological risks of internal monitoring to both mother and infant are severe, extending far beyond the contraindicated supine position that this procedure necessitates.
- The insertion of the electrode requires the rupture of the protective membranes, whereas the electrode itself provides a convenient route for the entry of bacteria and viruses into the amniotic fluid and the fetal scalp" (Cunningham et al. 1989:301).

Consequently, the fetal infection rate in internally monitored women is double that in those who are externally monitored only:

- When monitoring continues more than 4.5 hours, the risk of infection is 50%. If it were not for antibiotics, the death rate from monitor-produced infections would be staggering... The baby is also at risk of infection from the scalp-implanted electrodes... of all internally monitored babies, 4-5% suffer scalp abscesses, lacerations, hematomas, and hemorrhages.
  - Brackbill et al 1984:11
Internal Fetal Monitoring

- Possibly the greatest risk to the infant comes from the sharp increase in the risk of prolapsed cord (a condition in which the cord delivers before the baby is born) which is often the direct result of the amniotomy which must be performed (if the bag of waters is intact) so that the electrode can be inserted (Cunningham et al. 1989:301):
- Many mothers leave the hospital firmly convinced that electronic monitoring saved their babies from otherwise certain death caused by cord prolapse when in fact it was the monitoring (and prerequisite amniotomy) that caused the prolapse in the first place. (Brackbill et al. 1984:11)

Glucose tolerance test

- **What is a glucose tolerance test?**
  - Usually conducted in the **24 to 28 weeks** of pregnancy
  - Abnormal glucose levels may indicate gestational diabetes.

Group B strep culture

- **What is a Group B strep culture?**
  - Group B Streptococcus (GBS) are bacteria found in the lower genital tract of 15 to 40 percent of all women.
  - Genital Swab is taken to test for bacteria
  - No treatment has been shown to completely prevent early onset of GBS.
Ultrasound

• What is an ultrasound?
  – Uses high-frequency sound waves to create an image of the internal organs.
  – A screening ultrasound is sometimes done during the course of a pregnancy to check normal fetal growth and verify the due date.
  – Ultrasounds may be performed at various times throughout pregnancy for different reasons:

  - In the first trimester:
    – to establish the dates of a pregnancy
    – to determine the number of fetuses and identify placental structures
    – to diagnose an ectopic pregnancy or miscarriage
    – to examine the uterus and other pelvic anatomy

  - Mid-trimester:
    – (sometimes called the 18 to 20 week scan)
    – to confirm pregnancy dates
    – to determine the number of fetuses and examine the placental structures
    – to assist in prenatal tests such as an amniocentesis
    – to examine the fetal anatomy for presence of abnormalities
    – to check the amount of amniotic fluid
Ultrasound

– to examine blood flow patterns
– to observe fetal behavior and activity
– to examine the placenta
– to measure the length of the cervix
– to monitor fetal growth

Ultrasound

• Third trimester:
  – to monitor fetal growth
  – to check the amount of amniotic fluid
  – as part of other testing such as the biophysical profile
  – to determine the position of a fetus
  – to assess the placenta

Ultrasound

• How is an ultrasound scan performed?
  – Abdominal ultrasound
    • Gel applied to the abdomen and the ultrasound transducer glides over the gel on the abdomen to create the image.
Ultrasound

• Transvaginal ultrasound
  – a smaller ultrasound transducer is inserted into the vagina and rests against the back of the vagina to create an image.
  – A transvaginal ultrasound produces a sharper image and is often used in early pregnancy.
• Ultrasound images may be captured in still photographs or on video to document findings.

Ultrasound

• As with any test, results may not be completely accurate.
• Not without risk

Ultrasound risks

• Ultrasound waves are known to affect living tissues in at least two ways.
  – The sonar beam heats the highlighted area by about 1°C (2°F).
  – Cavitation,
    • small pockets of gas that exist within mammalian tissue vibrate and then collapse.
    • In this situation temperatures of many thousands of degrees Celsius in the gas create a wide range of chemical products, some of which are potentially toxic.
Ultrasound risks

• A number of studies have suggested that these effects are of real concern in living tissues.
  – Cell abnormalities caused by exposure to ultrasound were seen to persist for several generations.

• Another study showed that, in newborn rats (who are at a similar stage of brain development as humans at four to five months in utero), ultrasound can damage the myelin that covers nerves indicating that the nervous system may be particularly susceptible to damage from this technology.

• In 1999, an animal study by Brennan and colleagues, reported in New Scientist, showed that exposing mice to dosages typical of obstetric ultrasound caused a 22 percent reduction in the rate of cell division, and a doubling of the rate of cell death in the cells of the small intestine.
Ultrasound risks

- Studies on humans exposed to ultrasound have shown possible adverse effects
  - premature ovulation
  - preterm labor or miscarriage
  - low birth weight
  - poorer condition at birth
  - Dyslexia
  - delayed speech development,
  - less right-handedness
  - a factor which in some circumstances can be a marker of damage to the developing brain.

Ultrasound risk

- In addition, one Australian study showed that babies exposed to five or more ultrasounds were 30 percent more likely to develop intrauterine growth retardation (IUGR)—a condition that ultrasound is often used to detect.

More risks

- Perinatal death rate quadrupled in ultrasounded group. (2,475 woman study by Davies et al., 1993); Midwifery Today.
- 1984 study shows ultrasounded babies developed more dyslexia, and twice as often showed delayed speech of unknown causes. (Stark et al 1984); Midwifery Today; Effects of Frequent Ultrasound During Pregnancy: A Randomized Controlled Trial.
More risks

• Males who were ultrasounded more likely to show signs of brain damage. *Journal Epidemiology December 2001.*

• Ultrasounded babies more likely to develop epilepsy and learning difficulties. *Ultrasound Abstracts.*

• Males babies exposed to two or more ultrasounds were 32% more likely to be left handed (which is thought to be caused by brain damage). *Ultrasound Abstracts.*

• Four hours after ultrasound, cell death doubles and rate of cell division drops by 22% in mammals and researchers believe results same in humans. *Ultrasound Abstracts.*

• Risk of miscarriage significantly increased among women who perform ultrasound more than 20 hours a week. (Taskinen et al., 1990); *Midwifery Today.*
More risks

• Babies who had serious problems and were ultrasounded died more often than non-ultrasounded babies with serious problems. Midwifery Today

• Ultrasounded babies who were growth retarded were three times more likely to be admitted to ICU than non-ultrasounded babies who were growth restricted. Midwifery Today

More risks

• Preterm labor more than doubled in ultrasounded women. (Lorenz et al., 1990); Midwifery Today

• Researchers who developed ultrasound admitted possibility of hazard from ultrasound and said that it should never, ever be used on babies under three months. Midwifery Today

More risks

• Cells exposed to single dose of ultrasound behave abnormally ten generations after insonation. Midwifery Today
More risks

• Ultrasound affects fetal weight, organ weight, immune systems, and blood platelets which allow blood to clot; researchers believe problems from ultrasound – including possibility of cancer, leukemia, and congenital malformations – could take as long as 20 years to surface. Ultrasound Abstracts; Effects of Frequent Ultrasound During Pregnancy: A Randomized Controlled Trial.

More risks

• Impaired brain function and decreased locomotion and exploratory activity in mice exposed to ultrasound. Effect of Fetal Exposure to Ultrasound on the Behavior of the Adult Mouse.

• Ultrasound’s gaseous cavitation increases free radical production in amniotic fluid and blood plasma, and provides a likely mechanism for DNA damage. Crum et al (1987); Ellisman et al (1987)

More risks

• Because babies’ heads are bowl shaped, radiation from ultrasound is magnified and can result in parts of the brain being subjected to extra high intensities of radiation. A Prudent Approach to Ultrasound Imaging of the Fetus and Newborn by Kenneth Taylor, M.D.
More risks

• Ultrasound measures 100 decibels in utero – that’s the equivalent of having an infant stand on a subway platform as a train comes roaring in and screeches to a halt – for the 20 or 30 or 60 minutes it takes for the ultrasound!!! New Scientist.

More risks

• As one writer notes, if you’ve ever heard of an opera singer breaking a sheet of glass with her voice, that is an example of what just one slow sound wave can do . . . but ultrasound uses ultra high frequency sound waves which bombard the child at an extremely high rate of speed. New Scientist.

The upside of Ultrasound

• Midterm Ultrasound
• Identifies abnormal anatomy
• Locates life threatening defects
  – Transposition of great vessels
  – Heart malformations
• Oligohydraminos-low amniotic fluid
Fetal fibronectin

• Fetal fibronectin is a protein that acts as a "glue" during pregnancy.
  – It attaches the amniotic sac to the lining of the uterus.

• Fetal fibronectin is often present in cervical secretions during early pregnancy.
• Fetal fibronectin also shows up again later in pregnancy
  – about one to three weeks before labor begins
• If preterm labor is a concern
  – a swab from the cervical canal is taken to look for presence of fetal fibronectin.
  – A positive fetal fibronectin test is a clue that the "glue" has been disturbed and there's increased risk of preterm labor.

The quad Screen

• Definition
• The quad screen is a prenatal test that measures levels of four substances in a pregnant woman's blood:
  – Alpha-fetoprotein (AFP), a protein produced by the baby's liver
  – Human chorionic gonadotropin (HCG), a hormone produced by the placenta
The quad Screen

- Estriol, another pregnancy-related hormone
- Inhibin A, another pregnancy-related protein
  - Suppresses FSH
- An elevated inhibin A along with an increased HCG, decreased AFP, and a decreased Estriol suggests Down syndrome

The quad Screen

- Typically, the quad screen is done between weeks 15 and 20 of pregnancy.

Quad Screen

- Why it's done
  - The quad screen is done to evaluate risk of carrying a baby who has certain developmental or chromosomal conditions, including:
Quad Screen

- **Spina bifida.** Spina bifida is a serious birth defect that occurs when the tissue surrounding a baby's developing spinal cord doesn't close properly.
- **Anencephaly.** An underdeveloped brain and an incomplete skull. A baby born with anencephaly may be stillborn or die within a few hours or days after birth.

Quad Screen

- **Down syndrome (trisomy 21).** Down syndrome is a genetic condition that causes mental retardation and other medical problems.
- **Edwards syndrome (trisomy 18).** Edwards syndrome is a condition that causes severe mental retardation. Edwards syndrome is often fatal by age 1.

The quad Screen

- If risk level is low, the quad screen can offer reassurance of a healthy pregnancy.
- If risk level is moderate or high,  
  – Amniocentesis  
    • to determine whether the baby actually has Down syndrome or other developmental or chromosomal conditions.
The quad Screen

- The quad screen is also known by various other names
  - quad marker screen
  - four-marker screen
  - multiple marker screen
  - maternal serum marker

Triple Screen

- only checks AFP, HCG and estriol
  - sometimes offered in place of the quad screen.
  - The quad screen is more sensitive.

Quad Screen

- Quad screen is optional
  - results only indicate whether there is an increased risk of carrying a baby who has certain developmental or chromosomal conditions
  - not whether the baby actually has the condition
• **What is genetic screening?**
  – Many genetic abnormalities can be diagnosed before birth.
  – Used if mom or dad has a family history of genetic disorders
  – Previous fetus or baby with a genetic abnormality.

• **Genetic disorders**
  – Genetic disorders that can be diagnosed before birth
  – cystic fibrosis
  – Duchenne muscular dystrophy
  – hemophilia A
  – thalassemia
  – sickle cell anemia
  – polycystic kidney disease
  – Tay-Sachs disease

• **Methods**
  – ultrasound scan
  – alpha-fetoprotein test (AFP) or chorionic villus sampling (CVS)
  – Amniocentesis
  – Percutaneous umbilical blood sampling
Epidural Risks

- Hypotension (Drop in blood pressure)
- Urinary Retention;
- Postpartum bladder dysfunction
- Uncontrollable Shivering

Epidural Risks

- Itching of the face, neck and throat
- Nausea/Vomiting
- Postpartum Backache
- Maternal Fever
- Spinal Headache
Epidural Risks

• Uneven, incomplete or nonexistent pain relief.
• Feelings of emotional detachment
• Postpartum feelings of regret or loss of autonomy
• Inability to move about freely on your own.

Epidural Risks

• Loss of perineal sensation and sexual function

Epidural Risks

Very serious risks
  • Convulsions
  • Respiratory paralysis
  • Cardiac Arrest
  • Allergic shock
  • Nerve Injury
  • Epidural abscess
  • Maternal death
Hypotension (Drop in blood pressure)

• Maternal Risks
  – The most commonly occurring risk:
  – 30 – 35%

• Why is this a problem
  – Mother’s blood pressure must be of sufficient levels to assure oxygenation of the fetal blood.
  – Reduces blood supply to the placenta; baby is distressed.

• At-risk babies may not have the reserves to handle an even small drop in mother’s blood pressure.
  – Maternal and fetal respiratory distress
• What is done about this
  – To help prevent epidural-induced hypotension, mom will receive 1 – 2 L. of IV saline before the epidural is placed.
  – Mom may lie on left side.

Hypotension (Drop in blood pressure)

– Ephedrine may also be given through IV to restore blood pressure.
– Stay off back. Compression of the abdominal aorta and the inferior vena cava may decrease uterine arterial pressure and increases uterine venous pressure.

Urinary Retention & Postpartum Bladder Dysfunction

– Virtually all women will have a urinary catheter to prevent urine retention and bladder distention during labor.
– 25% - 34% will have bladder dysfunction after childbirth
• Why this is a problem
  – Increase in urinary tract infection.
  – Full bladder inhibits dilation of cervix and rotation of the baby’s head
  – Bladder control may be lost for days, weeks, or months because of strain on numbed pelvic floor muscles

• What is done
  – Nurse will insert a urinary catheter to drain bladder.
  – Practice pelvic floor exercises (Kegels) before and after childbirth
  – A CSE is done instead,
    • Aka
      – combined spinal epidural
      – walking epidural
      – intrathecal epidural
    – more likely to feel the need to urinate and may also go to the bathroom yourself, if hospital policy allows.
Walking epidurals numb a woman’s abdominal nerves only; this enhances her comfort by allowing her to move about her delivery room.
• Walking epidurals also work fast: pain subsides within two minutes after the two-injection procedure.
• Traditional epidurals, also called spinal blocks, take 20 minutes to work and anesthetize the entire lower half of a woman’s body.

Uncontrollable Shivering
• Happens VERY frequently
• It’s uncomfortable for mom
• Treatment consists of
  – Use blankets
  – heat sources
  – massage

Itching of the face, neck and throat
• Quite Common
• More common with CSE epidurals because of the narcotics used.
• More of a nuisance than a serious medical problem.
• Mom may be given another drug to combat the itching, which may have side effects of its own.
Nausea and Vomiting

- Common
- Uncomfortable for mother.
- Usually lasts for a short time (30 minutes).
- Can waste needed resources and deplete mother of energy.
- Drugs may be given to treat nausea.
  - This sometimes makes the mother intensely sleepy.

Postpartum Backache

- Occurs in 10% 22%

- Why is this a problem?
  - May last a few days or continue for years. Possibly due to “stressed” positions in labor exacerbated by muscular relaxation and the absence of feedback pain to tell mom to get out of a damaging position.
  - May be caused by nerve damage.
  - Subluxation
Postpartum Backache

• What is done?
  – Change positions frequently
  – Stay off back
  – Practice pelvic and back strengthening exercises to prepare for childbirth.
  – CSE to allow more sensation and to avoid awkward positions.

Maternal Fever

• Occurs in 15% if epidural is in place longer than 4 hours.
• Percentage increases the longer epidural is in place.

Maternal Fever

• Why is this a problem
  – Epidural anesthesia affects ability to sweat.
  – If mom can't sweat, she can't as easily dissipate excess body heat.
  – Uncomfortable for mother.
Maternal Fever

– Baby’s heart rate may become distressed from mother’s fever, increasing odds of cesarean section.
– Babies are often separated from their mothers immediately after birth to check for infection.
  • May include a spinal tap to check for sepsis.
  • Baby may stay in hospital for several days for antibiotic treatment while mother goes home.

Maternal Fever

• What can be done
  – Mom should not accept epidural anesthesia before active labor is established (5 cms or more).
  – Try to keep cool. Mom should eat ice chips or drink ice water, keep ice packs under arms, under belly or between legs.
  – Have a birth attendant mist and fan mom during labor to promote heat dissipation.

Spinal Headache

• Occurs in 1% - 10%
• Most likely caused by postdural puncture and leaking cerebrospinal fluid.
• Can range from mild to debilitating and last from days to weeks.
• Mom should rest at home in a supine position
Drink caffeinated drinks unless she has PIH.
- Powerful CNS stimulant
- The cerebral vasoconstrictive properties of caffeine are transient
  - Symptoms may return in 48 hours

Spinal Headache

- May resolve on its own or may need a blood patch procedure.
  - The blood patch procedure consists of an injection at the spinal tap site of a small quantity of patient’s own blood.
  - The introduction of this blood acts to patch the hole in the dura that was created by the needle at the time of puncture

Uneven, incomplete or nonexistent pain relief

- Occurs 10% of the time
- Some mothers find incomplete, blotchy pain relief to be just as stressful as no pain relief at all.
Feelings of Emotional Detachment

• Some mothers report feeling “detached” from the experience of childbirth as a result of the full effects of epidural anesthesia. Some mothers may not feel like participants in their births.
• May affect mother-baby bonding.

Postpartum feelings of regret or loss of autonomy

• Mother may have felt pressured to have epidural anesthesia or regrets her decision. Mother may not have been well supported or respected during her labor.

Inability to move about freely on your own

• Inhibits labor progress.
• Increases likelihood of cascade of interventions:
  – Many maternity interventions have unintended effect.
  – Often these effects are new problems that are “solved” with further intervention, which may in turn create yet more problems.
  – Should wait until at least 5 cm dilated before an epidural.
Loss of perineal sensation and sexual function

• Most likely due to use of forceps and episiotomy, but may also be due to nerve damage.

Very Serious and rare risks of Epidural

• Convulsions
• Respiratory paralysis
• Cardiac arrest
• Allergic shock

Labor Side effects

• Prolonged First Stage of Labor
• Increase of malpresentation of baby’s head
• Increased need for Pitocin augmentation
• Prolonged Second Stage of Labor
**Labor Side effects**

- Decrease in the ability to push effectively
- Increased likelihood of forceps or vacuum extraction delivery
- Increased likelihood of needing an episiotomy
- Increase in cesarean section

**Prolonged First Stage of Labor**

- Very Common
  - The anesthetic in epidurals weakens all the muscles below the epidural site.
  - This can dampen the strength of uterine contractions.

**Prolonged First Stage of Labor**

- Why is this a problem
  - Can be exhausting, boring, or otherwise discouraging for both mother and father
  - Greater use of Pitocin needed to strengthen contractions can be stressful on baby and/or uterus, which may lead to cesarean section
  - Greater incidence of maternal fever.
Prolonged First Stage of Labor

- What can be done?
  - Give labor time to happen.
  - The risks increase the longer Pitocin and epidural anesthesia are in mom's system.
  - There is no "magic amount of time" for labor to be finished.

Increase of malpresentation of baby's head

- Occurs 20%-26% of the time
- Relaxation of the pelvic diaphragm predisposes mal-presentations, as does lack of mobility and switching positions.
- Waiting until 5cm dilated or choosing a CSE will cut this risk

Pitocin augmentation.

- Almost always occurs with an epidural
  - especially if epidural is given before 5 cms.
- Some babies simply do not tolerate pitocin-induced contractions, the result being abnormal fetal heart rate after administration of pitocin.
- Abnormal fetal heart rate may necessitate an emergency c-section.
Pitocin augmentation.

- What can be done
  – Refuse an induction and wait to go into labor on own unless the risks of continuing the pregnancy outweigh the risks of induction.
  – Wait until 5 cms dilation.
  – Wait at least 2 hours before Pitocin is started to give mom’s body a chance to adjust to the epidural.

Pitocin augmentation.

- Mom’s body must also process the IV fluids that were administered before the epidural. That much fluid very often dilutes the natural oxytocin resulting in weaker, spaced out contractions.

Pitocin augmentation.

- Pitocin has a myriad of side effects.
  – In the mother
    • Nausea
    • Vomiting
    • Cramping
    • stomach pain
    • irregular heartbeat
    • Dizziness
Pitocin augmentation.

- Lightheadedness
- Swelling
- severe bleeding (after childbirth)
- Seizures
- Headache
- blurred vision
- one-sided weakness.

Pitocin augmentation.

- Side effects in the newborn
  - irregular heartbeat
  - yellowing eyes or skin
  - bleeding in the eyes
  - seizures

Prolonged 2nd stage of labor

- Especially true for first time mothers
- May go against some care providers’ philosophy (ex: 2nd stage must be finished in 2 hours).
- Change positions and use downward gravity to help push baby out.
- Stay off back if possible
Fetal distress; abnormal fetal heart rate

• Unknown cause
• Fetal distress most likely caused by drop in maternal blood pressure or an awkward maternal position.

Fetal distress; abnormal fetal heart rate

• Increases the likelihood of an operative delivery (forceps, vacuum, or cesarean section).
• Mom should get off back or change positions immediately.
  – Mom may be given oxygen to help oxygenate placental blood.

Drowsiness at birth; poor sucking reflex

• Unknown cause
• Interferes with mother-baby bond immediately after birth.
• Can be extremely frustrating for mothers trying to learn to breastfeed.
• Mothers may be encouraged to formula feed newborns just to get "something" in the baby.
Drowsiness at birth; poor sucking reflex

- What can moms do?
  - Remain with baby.
  - Let baby sleep at her breast or next to her in bed.
  - She should try talking, singing to her baby.
  - Refuse artificial nipples or supplemental formula.

Poor muscle strength and tone in the first hours

- Unknown cause
- Greater chance baby and mother will be separated immediately after birth.
- Baby may go to neonatal nursery for observation and oxygen.
- May be caused by lack of adrenaline from mother.

Poor muscle strength and tone in the first hours

- What can mom do?
  - Request that her baby stay in her room for all newborn procedures and observations, if policy allows.
  - She or her partner go with the baby to the nursery and ask to hold the baby during all newborn procedures and testing.
Risks of cesarean section

- The estimated risk of a woman dying after a cesarean birth is less than one in 2,500
  - the risk of death after a vaginal birth is less than one in 10,000.

Risks of cesarean section

- Other risks
  - Infection. The uterus or nearby pelvic organs such as the bladder or kidneys can become infected.

Risks of cesarean section

- Increased blood loss. Blood loss on the average is about twice as much with cesarean birth as with vaginal birth. However, blood transfusions are rarely needed during a cesarean.
Risks of cesarean section

- Decreased bowel function. The bowel sometimes slows down for several days after surgery, resulting in distention, bloating and discomfort.

Risks of cesarean section

- Respiratory complications. General anesthesia can sometimes lead to pneumonia.

Risks of cesarean section

- Longer hospital stay and recovery time. Three to five days in the hospital is the common length of stay, whereas it is less than one to three days for a vaginal birth.
Risks of cesarean section

- Reactions to anesthesia. The mother's health could be endangered by unexpected responses (such as blood pressure that drops quickly) to anesthesia or other medications during the surgery.

Risks of cesarean section

- Risk of additional surgeries. For example, hysterectomy, bladder repair, etc.

Risks of cesarean section

- In cesarean birth, the possible risks to the baby include the following:
  - Premature birth. If the due date was not accurately calculated, the baby could be delivered too early.
Risks of cesarean section

- Breathing problems. Babies born by cesarean are more likely to develop breathing problems such as transient tachypnea (abnormally fast breathing during the first few days after birth).

Risks of cesarean section

- Low Apgar scores. Babies born by cesarean sometimes have low Apgar scores.

Low Apgar Score

Why would the baby have a low score?

- The low score can be an effect of the anesthesia and cesarean birth
- the baby may have been in distress to begin with
- perhaps the baby was not stimulated as he or she would have been by vaginal birth.
Risks of cesarean section

- Fetal injury. Although rare, the surgeon can accidentally nick the baby while making the uterine incision.

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