TITLE: INTRAUTERINE RESUSCITATION
DURING LABOR

EFFECTIVE DATE: November 29th, 2013

POLICY STATEMENT
The ultimate goal during labor is birth of a healthy baby. Fortunately, for the overwhelming majority of women, the fetus tolerates the normal stress of labor and this goal is achieved.

BLOOD BORNE PATHOGEN
EXPOSURE CATEGORY: I (Involves exposure to blood, body fluids, or tissues)

FUNCTION: Care of Clients

EQUIPMENT:
1. Oxygen canister with maternal face mask
2. IV fluids and administration materials
3. Fetal doppler
4. AAT graph

POINTS OF EMPHASIS:
Sensitivity of external fetal monitoring is high, while specificity is low. The specificity limitations of EFM are related to its inability to evaluate fetal oxygen status directly. Fetal heart rate changes that are considered nonreassuring are not specific reflections of fetal acid-base status, and therefore many fetuses with these FHR patterns have normal, healthy acid-base values. These limitations present challenges to health care providers as they assess fetal status during labor and intervene to promote fetal well-being based on EFM data.

It is generally believed that these interventions improve maternal blood flow to the placental intervillous space and oxygen delivery to the fetus. There are data to suggest that these techniques can improve fetal oxygen status, but it is important to remember that there is no evidence that any of these techniques individually or collectively will reverse fetal asphyxia.

PROCEDURE:
1. To promote a healthy outcome, members of the perinatal team carefully monitor labor progress and maternal-fetal status. Please refer to the clinical practice guideline for Intermittent Fetal Monitoring.
2. While all nonreassuring FHR patterns may not indicate true fetal compromise, nurses, nurse-midwives, and physicians should initiate appropriate, timely interventions to promote fetal well-being. These interventions should be based on current evidence regarding the risk of acidemia that exists for specific FHR patterns.
3. There is little controversy concerning what constitutes a reassuring FHR pattern. Most clinicians agree on the definition of a reassuring FHR tracing:
   a. baseline rate within 110 beats per minute to 160 beats per minute
   b. moderate FHR variability
   c. presence of accelerations
   d. absence of decelerations
4. According to the expert participants in the NICHD workshop, patterns that are likely predictive of current or impending fetal asphyxia so severe that the fetus is at risk for neurologic and other fetal damage, or death include:
   a. recurrent late or variable decelerations
   b. substantial bradycardia, with absent FHR variability
5. Absent or minimal variability with late or variable decelerations was the most consistent predictor of newborn acidemia (although the association was only 23%).
6. Most fetuses have FHR tracings between these extremes, and there is no consensus on their presumed condition or clinical management. However, most clinicians do not wait until the FHR pattern is at the extreme end of abnormality before intervening with intrauterine resuscitation techniques designed to improve fetal status.
7. In effort to optimize a hemodynamically stable, well oxygenated mother and a well oxygenated fetus, the Nurse Midwife must utilize her knowledge-base to assess each woman’s cardiac output, blood pressure, hemoglobin levels, oxygen saturation, blood flow to the uterus and placenta, placenta function, uterine activity (avoidance of hyperstimulation), and umbilical blood flow to the fetus to determine her to be an appropriate candidate for homebirth.

a. Nurse-midwives should discourage the supine position for labor and birth, in effort to avoid aortocaval compression which causes decreased blood flow to the uterus and placenta, and more importantly, the fetus.

b. If the FHR is nonreassuring while the mother is in any one position, assisting her to the opposite position may improve fetal status by altering the relationship between the umbilical cord and fetal parts and/or the uterine wall relieving cord compression.

c. Position changes can also modify late decelerations that occur in the presence of moderate variability if the etiology is decreased uterine blood flow (usually secondary to supine positioning and inferior vena cava compression).

d. It is believed that the administration of IV fluids maximizes maternal intravascular volume and in turn uterine perfusion; therefore, a rapid volume expander, such as Lactated Ringer’s solution, can be administered to correct these clinical conditions and restore normal blood flow to the uterus. There are data to suggest increasing IV fluids will positively affect uterine blood flow and thus fetal oxygenation, even in women who are normotensive and well hydrated.

i. IV fluid boluses of glucose-containing solutions should be avoided because there is evidence to suggest that maternal IV administration of glucose can have potentially detrimental effects on fetal status, including increased fetal lactate and decreased fetal pH. IV solutions with glucose can cause fetal hyperglycemia and subsequent reactive hypoglycemia, hyperinsulinism, acidosis, jaundice, and transient tachypnea in the newborn after birth.

ii. Two recent studies found that the usual amount of IV fluids of 125 mL per hour is not sufficient to support adequate labor hydration. In these randomized clinical trials, women who received 250 mL per hour of IV fluids had shorter labors and were less likely to require oxytocin augmentation than women who received 125 mL per hour.

e. Maternal hemoglobin levels should be maintained to at least 10 grams per deciliter to be adequate for oxygen diffusion across maternal-fetal membranes in the intervillous space.

f. Maternal oxygen saturation should be maintained at least 95% to promote adequate fetal oxygenation, although Nurse Midwives are not encouraged to implement oxygen saturation as a routine assessment in the low-risk, homebirth client.

i. Maternal oxygen therapy is commonly used for intrauterine resuscitation and appears to be beneficial in improving fetal oxygen status during labor and resolving nonreassuring FHR patterns.

ii. 100% oxygen via facemask corrected nonreassuring FHR patterns by decreasing the baseline FHR during fetal tachycardia and reducing or eliminating late decelerations.

iii. Even though healthy women in labor have nearly 100% SpO2 (usually between 96% and 99%), increasing inspired oxygen increases blood oxygen tension and results in more oxygen delivered to the fetus. Fetal hemoglobin has a higher affinity for oxygen than adult hemoglobin, and fetal hematocrit is higher than adult hematocrit. These physiologic factors allow for a steeper increase in fetal oxygen concentration and fetal oxygen saturation during maternal oxygen therapy.

iv. When administering oxygen to the mother, it is important to use the method that provides the highest fraction of inspired oxygen (FiO2) to achieve maximum benefit. A non-rebreather facemask works best because the FiO2 at 10 L per minute is approximately 80% to 100%, as compared to a simple face mask or nasal cannula.

v. Maternal oxygen therapy as an intrauterine resuscitation technique for 15 to 30 minutes appears to be reasonable, based on the fetal response as noted by the FHR pattern.

g. Uterine activity should be within normal limits (no more than 5 contractions in 10 minutes, or no longer than two minutes). If the FHR is nonreassuring and uterine hyperstimulation is occurring, a reduction of contraction activity will optimize fetal oxygenation because more time between contractions will facilitate maximal perfusion of the placenta and delivery of oxygen to the fetus.
i. A subcutaneous dose of terbutaline 0.25 mg can be used to provide intrauterine resuscitation for a nonreassuring FHR pattern secondary to hyperstimulation.

h. Altering pushing efforts may be beneficial if there are recurrent FHR decelerations, a progressive decrease in variability, and/or a rising FHR baseline during second-stage labor. While most fetuses tolerate decelerations during pushing, some fetuses enter the second stage with less physiologic reserve than others. If the FHR pattern is non-reassuring during second-stage pushing efforts, the best approach is to stop pushing temporarily and let the fetus recover.

i. Avoid sustained coached closed-glottis pushing.

j. If the fetus continues to respond poorly and there is a compelling reason to continue pushing, maternal pushing efforts with alternate contractions can be effective in minimizing fetal effects. The fetal heart rate pattern should be used as an indicator of how well the fetus is tolerating the second stage and thus to guide care and interventions.

Placenta Pathology
8. Examination of the placenta can be helpful in establishing nonhypoxic and/or antepartum causes of neonatal encephalopathy and/or cerebral palsy. The nurse-midwife may consider transferring the placenta into the hospital with the neonate in the event of an antepartum or intrapartum risk factor.

Documentation
9. Avoid the use of ambiguous and/or imprecise terminology such as “fetal distress” and “birth asphyxia.”
10. ACOG promotes a full description of findings and interpretation of fetal heart rate patterns as “reassuring” or “non-reassuring” followed by documentation of the management plan.

REFERENCES:

Originated: July, 2011

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DATE: 7/12/2011

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