UNM HEALTH SCIENCES CENTER

Applies To: Responsible Department: Revised:

Title: ***Guideline for the Utilization of Doppler in Obsteterics***	**Policy**

Patient Age Group:	( ) N/A	(X) All Ages	( ) Newborns	( ) Pediatric	() Adult

POLICY STATEMENT

PURPOSE:

Indications for the use of Doppler in Obstetrics

A. Intrauterine Growth Restriction
B. Hypertensive Disorders of Pregnancy
C. Evaluation of Fetal Anemia

The use of Doppler in obstetrics has spread outside of specialist units and its use is widespread for decision making. Standardized protocols and systematic use greatly limit the probability of error of a technique that otherwise presents a great variability. Moreover, it is essential adequate knowledge of the pathophysiology and hemodynamic changes associated with the conditions that you are attempting to evaluate for a correct interpretation of what we will find and measure in each case.
Umbilical artery Doppler assessment is most useful in pregnancies complicated by fetal growth restriction and/or preeclampsia. Doppler velocimetry is recommended as a primary surveillance tool for monitoring these pregnancies.
A systematic review of well-designed observational studies provided compelling evidence that Doppler assessment of the fetal middle cerebral artery (MCA) peak systolic velocity is the best noninvasive tool for predicting fetal anemia in at-risk pregnancies

PROCEDURES

A. Umbilical artery Doppler should be available for assessment of the fetal-placental circulation in pregnant women with suspected severe placental insufficiency. (I-A). Depending on other clinical factors, reduced, absent, or reversed umbilical artery end-diastolic flow is an indication for enhanced fetal surveillance or delivery. If delivery is delayed to enhance fetal lung maturity with maternal administration of glucocorticoid, intensive fetal surveillance until delivery is suggested for those fetuses with reversed end-diastolic flow. (II-1B)
B. Umbilical artery Doppler should not be used as a screening tool in healthy pregnancies, as it has not been shown to be of value in this group. (I-A)
C. Measurement of the fetal middle cerebral artery Doppler peak systolic flow velocity is a predictor of moderate or severe fetal anemia and can be used to avoid unnecessary invasive procedures in pregnancies complicated with red blood cell isoimmunization. (II-1A)
D. Since inaccurate information concerning fetal Doppler studies could lead to inappropriate clinical decisions, it is imperative that measurements be undertaken and interpreted by expert operators who are knowledgeable about the significance of Doppler changes and who practice appropriate techniques.

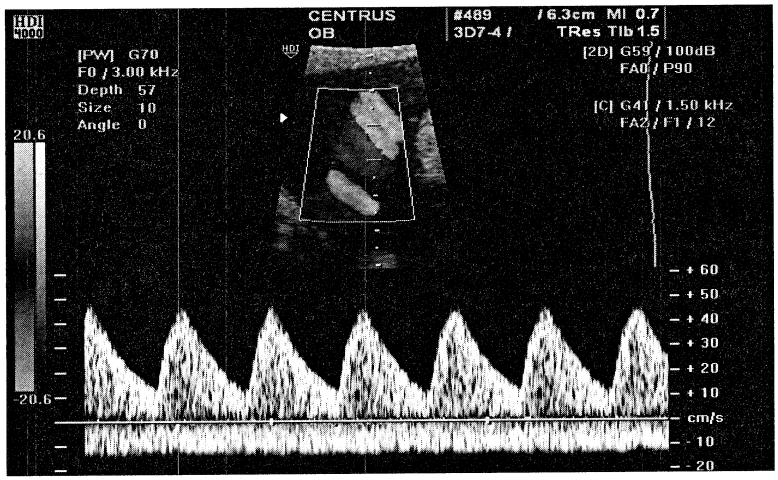
E. Duplex mode with pulsed Doppler and color Doppler flow mapping is the minimum required ultrasound equipment. (II-1A)

This is a Guideline for Doppler techniques in fetal medicine.

I. Umbilical Artery Doppler (UMB A)

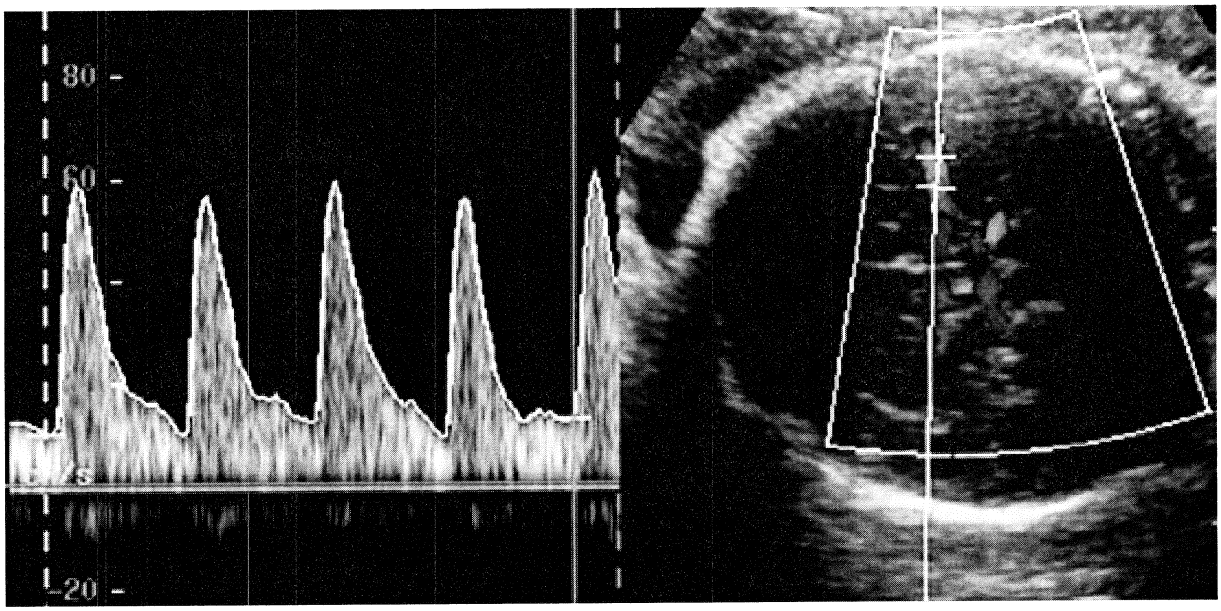
The UMB A can be studied at the paravesical are, in free loop of cord or in the insertion of the cord in the placenta. The shorter the distance from the placenta the lower pulsatility. We will use a free loop of cord for technical ease, and because the most reference curves have been developed utilizing this level. Understand that all randomized studies that have established the utility of Doppler of the UMB A have used this portion. In multiple pregnancies, and/or when comparing repeated measurements longitudinally, recordings from fixed sites, i.e. fetal end, placental end or intraabdominal portion, may be more reliable. As a general concept, in situations when we are tracking the condition of the fetus it is essential to continue to use the same location utilized in previous Doppler exams

- Technical Aspects
  - You must identify the vessel and use color Doppler mean velocity scales (between 20 and 40 cm / s) to initiate the selective identification of the vessel.
  - The angle of insonation should always be less than 30 °, which is easy in these vessels. Even if Doppler indices are mathematically independent of the angle, an angle of excessive insonation can affect the measurement accuracy.
  - The size of the Doppler sample must be equivalent to the diameter of the artery and must be placed in the center of the vessel.



II. Middle Cerebral Artery

- Technical Aspects
    - An axial section of the brain, including the thalami and the sphenoid bone wings, should be obtained and magnified.
    - Color flow mapping should be used to identify the circle of Willis and the proximal MCA
    - The pulsed-wave Doppler gate should then be placed at the proximal third of the MCA, close to its origin in the internal carotid artery (the systolic velocity decreases with distance from the point of origin of this vessel).
    - The angle between the ultrasound beam and the direction of blood flow should be kept as close as possible to 0◦
    - Care should be taken to avoid any unnecessary pressure on the fetal head.
    - At least three and fewer than 10 consecutive waveforms should be recorded. The highest point of the waveform is considered as the PSV (cm/s).
    - The PSV can be measured using manual calipers or autotrace. The latter yields significantly lower medians than does the former, but more closely approximates published medians used in clinical practice. PI (for IUGR) is usually calculated using autotrace measurement, but manual tracing is also acceptable.
    - Appropriate reference ranges should be used for interpretation, and the measurement technique should be the same as that used to construct the reference ranges.



I: Algorithm for IUGR

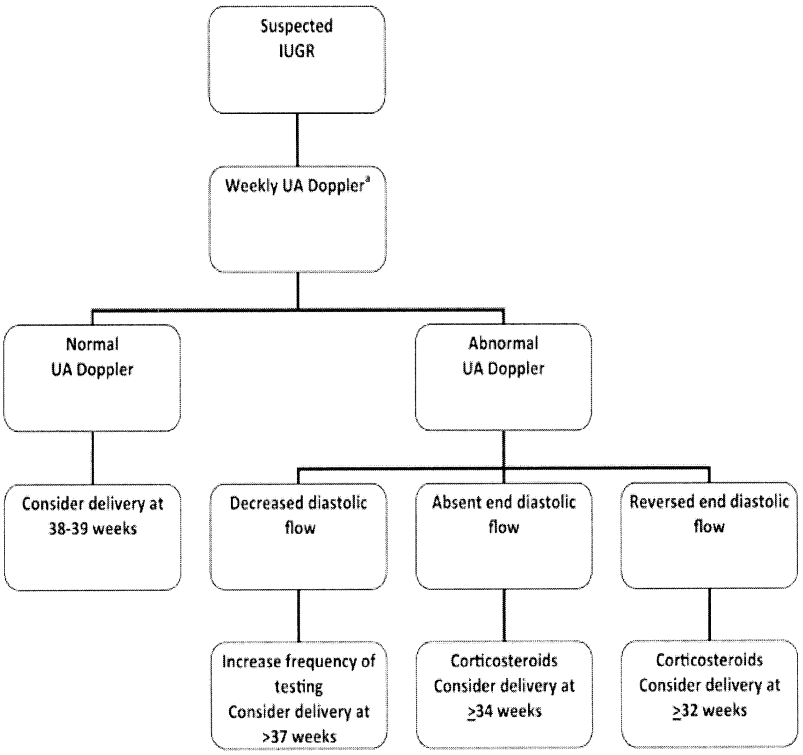
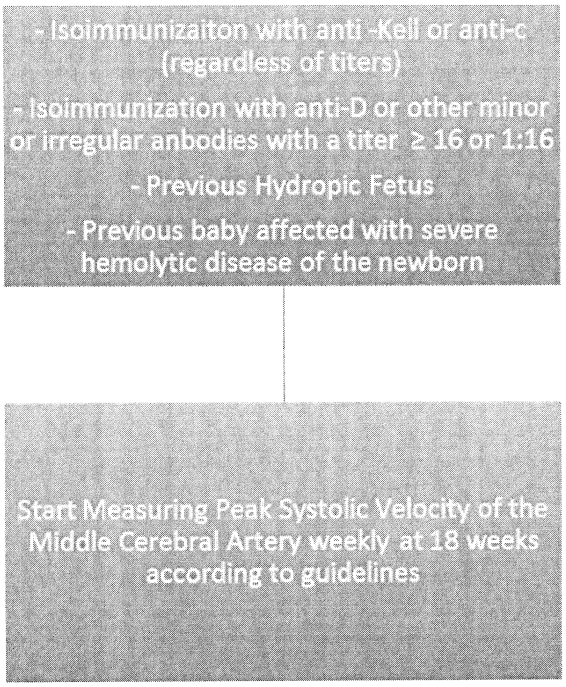


Fig. 6. Management recommendation for fetal growth restriction incorporating Doppler velocimetry. [a]In conjunction with antepartum testing. IUGR, intrauterine growth restriction; UA, uterine artery. Reprinted from Berkley E, Chauhan SP, Abuhamad A. Doppler assessment of the fetus with intrauterine growth restriction. AJOG 2012;206:300–8. Copyright 2012, with permission from Elsevier.

Copel. Practical Approach to Fetal Growth Restriction. Obstet Gynecol 2014.

Copel JA, Bahtiyar MO. A practical approach to fetal growth restriction. Obstet Gynecol 2014; 123: 1057-69.

II. Doppler for the Detection of Fetal anemia



Moise K. in Creasy and Resnik's, Maternal Fetal Medicine, Principles and Practice, 7th Edition. Elsevier Saunders. Philadelphia, PA, 2014

APPROVAL

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Approval: _____ 4/29/15
Chair, Department of Obstetrics & Gynecology Date

SOP # / Version #	Effective Date	Supersedes	Review Date	Summary of Change(s)