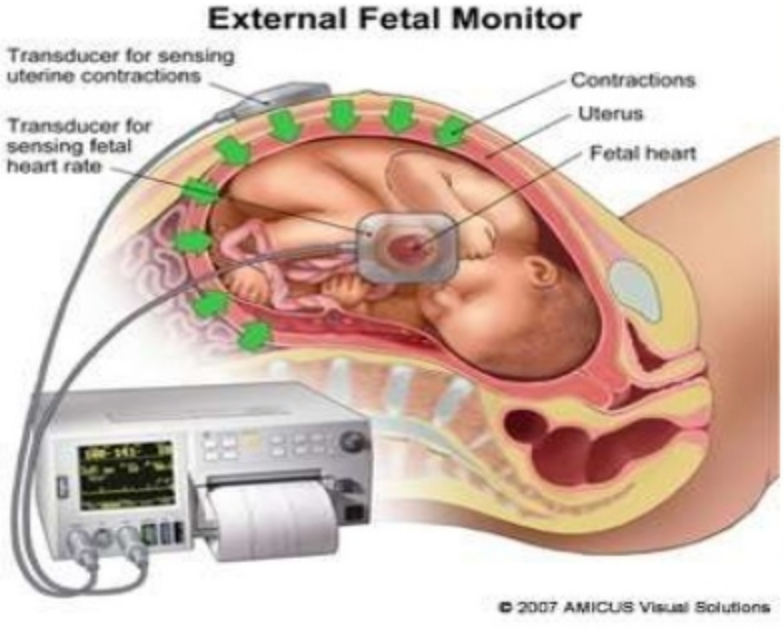
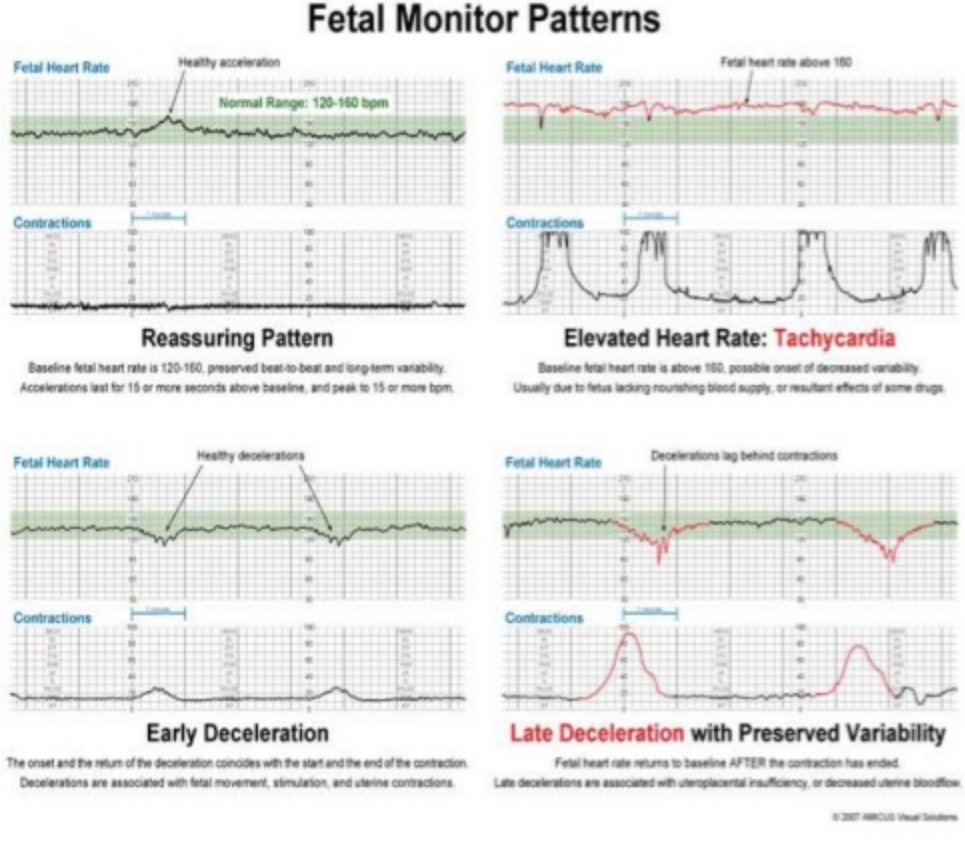


Assessment of fetal well-being in pregnancy and labour- evidence and guidelines.



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Antepartum fetal monitoring

- **Prevent fetal injury and death.**
- **Improve long-term neurologic outcome through optimal timing of delivery**
- **Avoiding unnecessary intervention, such as cesarean delivery or preterm delivery.**

ANTENATAL FETAL TESTING TECHNIQUES

(1) Fetal movement counting,

(2) Non-stress test,

(3) Contraction stress test,

(4) Biophysical profile and/or amniotic fluid volume,MBPP

(5) Maternal uterine artery Doppler, and

(6) Fetal umbilical artery Doppler along with other doppler parameters.

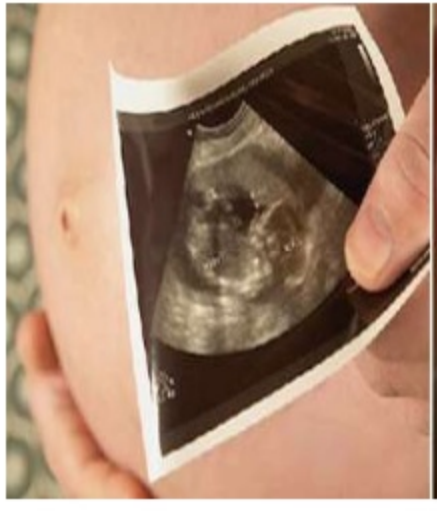
DFMC

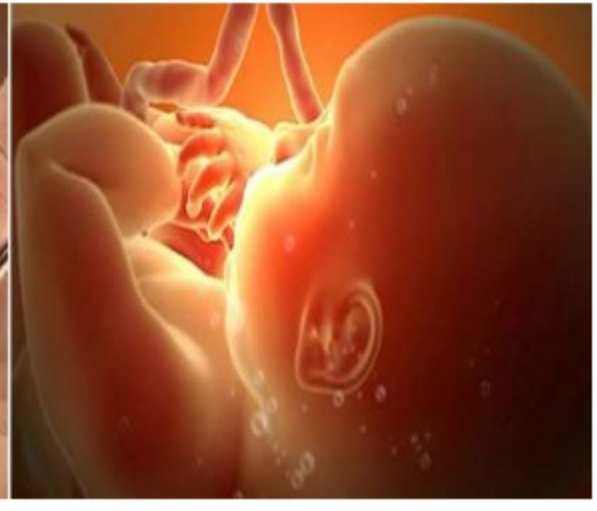
The only antenatal surveillance technique recommended for *all pregnant women, with and* without risk factors, is **maternal awareness of fetal movements.**

Adverse fetal and neonatal outcomes associated with antepartum asphyxia

Fetal outcome

- Stillbirth
- Metabolic acidosis at birth





Neonatal outcome

- Mortality
- Metabolic acidosis
- Hypoxic renal damage
- Necrotizing enterocolitis
- Intracranial hemorrhage
- Seizures
- Cerebral palsy
- Neonatal encephalopathy

Asphyxia is defined as hypoxia with metabolic acidosis

Obstetrical history associated with increased perinatal morbidity/mortality where antenatal fetal surveillance may be beneficial

• Maternal	• Hypertensive disorder of pregnancy • Placental abruption
• Fetal	• Intrauterine growth restriction • Stillbirth

current pregnancy conditions associated with increased perinatal morbidity/mortality where antenatal fetal surveillance may be beneficial

AT-RISK

- Post-term pregnancy (294 days,
- 42 weeks)
- PIH
- Pre-pregnancy diabetes
- Insulin requiring gestational
- diabetes
- Preterm premature rupture of
- membranes
- Chronic (stable) abruption
- Iso-immunization
- Abnormal maternal serum
- screening

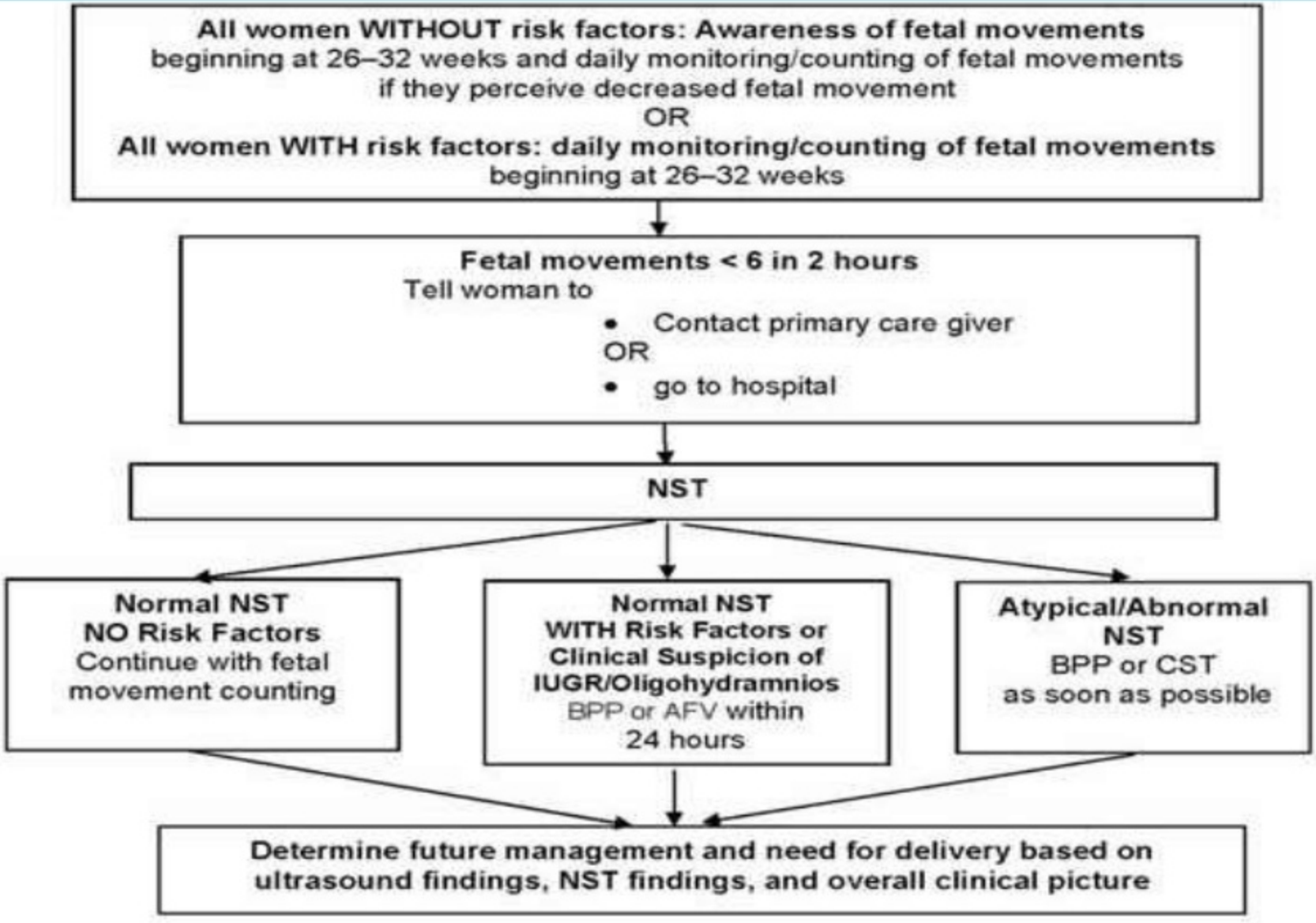
HIGH -RISK

- fetal anomaly
- Motor vehicle accident during
- pregnancy
- Vaginal bleeding
- Morbid obesity
- Advanced maternal age
- Assisted reproductive technologies
- Decreased fetal movement
- Intrauterine growth restriction
- Oligohydramnios/Polyhydramnios
- Multiple pregnancy
- Preterm labour

DFMC

- Sadovsky and Yaffee (1973) pre-eclamptic patients noticed decreased fetal movement prior to fetal demise.
- Women perceive most movement when lying down fewer when sitting and least while standing.
- Busy pregnant women: not concentrating on fetal activity: often report a misperception of RFM.

Recommendation 1: Fetal Movement Counting



Non-Stress Test

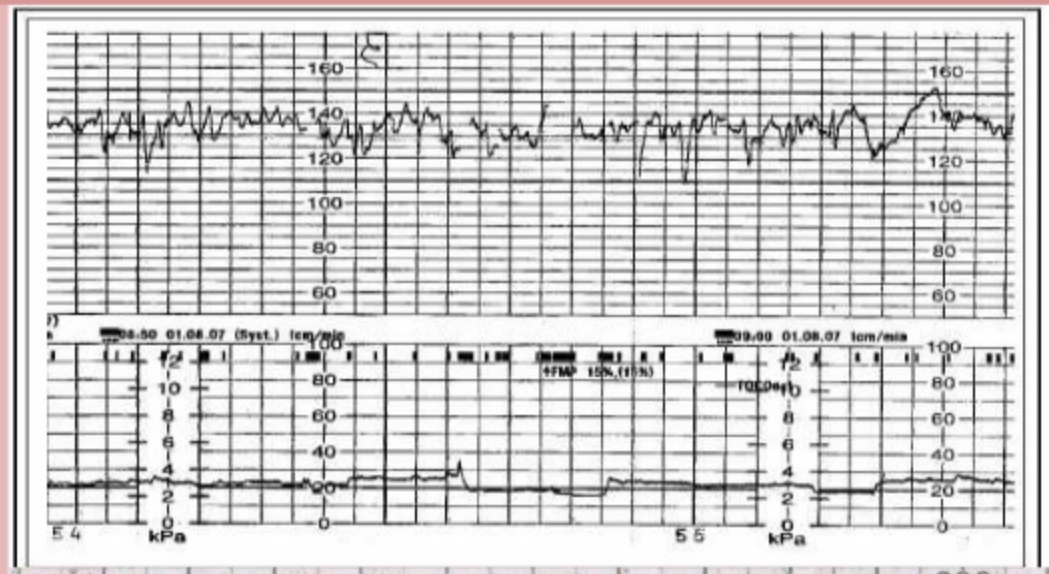
Despite widespread use, there is poor evidence that antenatal non-stress testing can reduce perinatal morbidity or mortality.

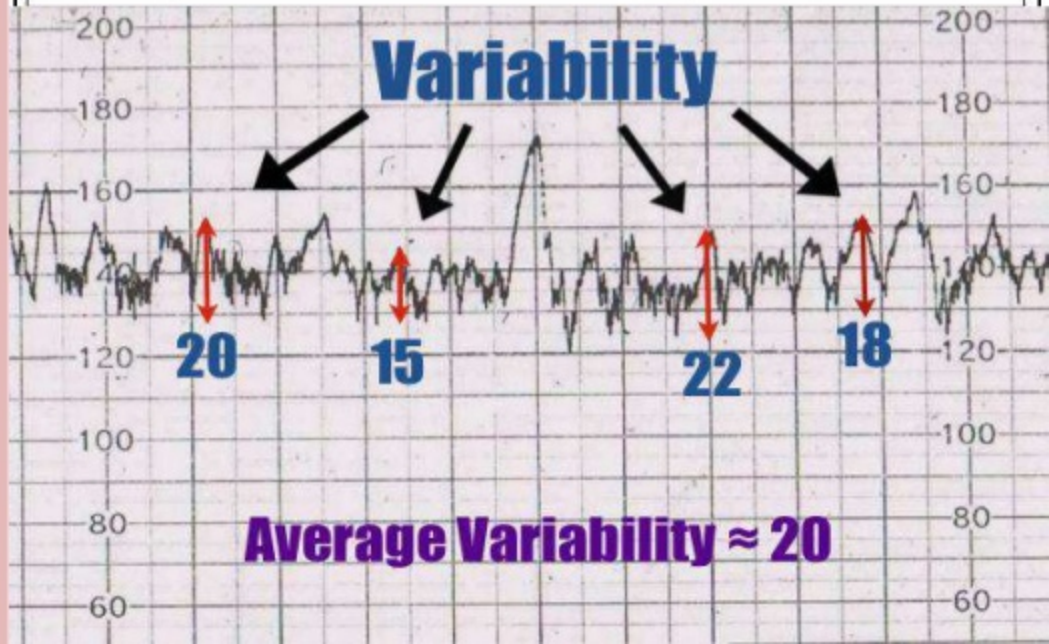
Pattison N, McCowan L. Cardiotocography for antepartum fetal assessment [Cochrane review]. In: Cochrane Database of Systematic Reviews1999 Issue 1. Chichester (UK): John Wiley & Sons, Ltd; 1999. DOI: 10.1002/14651858.CD001068.

In fact, the four blinded randomized trials evaluating the non-stress test, although small, demonstrated a trend to an increase in perinatal deaths in the cardiotocography group (OR 2.85; 95% CI 0.99–7.12).56

A negative predictive value of the test for fetal and neonatal death is 99% within one week of testing

- Baseline FHR: 110-150 b/m
- Baseline variability: 10-25 b/m
- At least 2 accelerations (>15 beats for> 15 sec in 20 min)
- No decelerations





Electronic fetal heart rate monitoring: research guidelines for interpretation. National Institute of Child Health and Human Development Research Planning Workshop. Am J Obstet Gynecol 1997;177(6):1385–90.

Recommendation : Non-Stress Test

- 1. Antepartum non-stress testing may be considered when risk factors for adverse perinatal outcome are present. (III-B)
- 2. In the presence of a normal non-stress test, usual fetal movement patterns, and absence of suspected oligohydramnios, it is not necessary to conduct a biophysical profile or contraction stress test. (III-B)
- 3. A normal non-stress test should be classified and documented by an appropriately trained and designated individual as soon as possible, (ideally within 24 hours).

Parameter	Normal NST (Previously "Reactive")	Atypical NST (Previously "Non-Reactive")	Abnormal NST (Previously "Non-Reactive")
Baseline	110–160 bpm	• 100–110 bpm • > 160 bpm < 30 min. • Rising baseline	• Bradycardia < 100 bpm • Tachycardia > 160 for > 30 min. • Erratic baseline
Variability	• 6–25 bpm (moderate) • ≤ 5 (absent or minimal) for < 40 min.	≤ 5 (absent or minimal) for 40–80 min.	• ≤ 5 for ≥ 80 min. • ≥ 25 bpm > 10 min. • Sinusoidal
Decelerations	None or occasional variable < 30 sec.	Variable decelerations 30–60 sec. duration	• Variable decelerations > 60 sec. duration • Late deceleration(s)
Accelerations Term Fetus	≥ 2 accelerations with acme of ≥ 15 bpm, lasting 15 sec. < 40 min. of testing	≤ 2 accelerations with acme of ≥ 15 bpm, lasting 15 sec. in 40–80 min.	• ≤ 2 accelerations with acme of ≥ 15 bpm, lasing 15 sec. in > 80 min.
Preterm Fetus (< 32 weeks)	≥ 2 accelerations with acme of ≥ 10 bpm, lasting 10 sec. < 40 min. of testing	≤ 2 accelerations of ≥ 10 bpm, lasting 10 sec. in 40-80 min.	≤ 2 accelerations of ≥ 10 bpm, lasting 10 sec. in > 80 min.
ACTION	FURTHER ASSESSMENT OPTIONAL, based on total clinical picture	FURTHER ASSESSMENT REQUIRED	URGENT ACTION REQUIRED An overall assessment of the situation and further investigation with U/S or BPP is required. Some

Contraction Stress Test

To unmask poor placental function

Biophysical profile/Modified BPP and Doppler interrogation of uterine or fetal vessels

- *Ray M, Freeman R, Pine S, Hesselgesser R. Clinical experience with the oxytocin challenge test. Am J Obstet Gynecol 1972;114(1):1–9.*
- *. Lagrew DC. The contraction stress test. Clin Obstet Gynecol 1995;38(1):11–25.*
- *Creasy R, Reznik R, Iams J. Maternal fetal medicine principles and practice 5th ed. Philadelphia: W.B. Saunders; 2003.*

Recommendation 3: Contraction Stress Test

1. The contraction stress test should be considered in the presence of an atypical non-stress test as a proxy for the adequacy of intrapartum uteroplacental function and, together with the clinical circumstances, will aid in decision making about timing and mode of delivery. (III-B)

2. The contraction stress test should ***not be performed when*** vaginal delivery is contraindicated. (III-B)

3. The contraction stress test should be performed in a setting where emergency Caesarean section is available. (III-B)

Sonographic Assessment of Fetal Behaviour and/or Amniotic Fluid Volume

Components of fetal biophysical profile

Component	Criteria
1. Breathing movements	At least one episode continuing more than 30 seconds.
2. Movements	At least three body or limb movements.
3. Tone	An episode of active extension with return to flexion of a limb or trunk, *or* opening and closing of the hand.
4. Amniotic fluid volume	At least one cord and limb-free fluid pocket which is 2 cm by 2 cm in two measurements at right angles.

Inclusion of NST brings the maximum possible score to 10 when the NST is normal

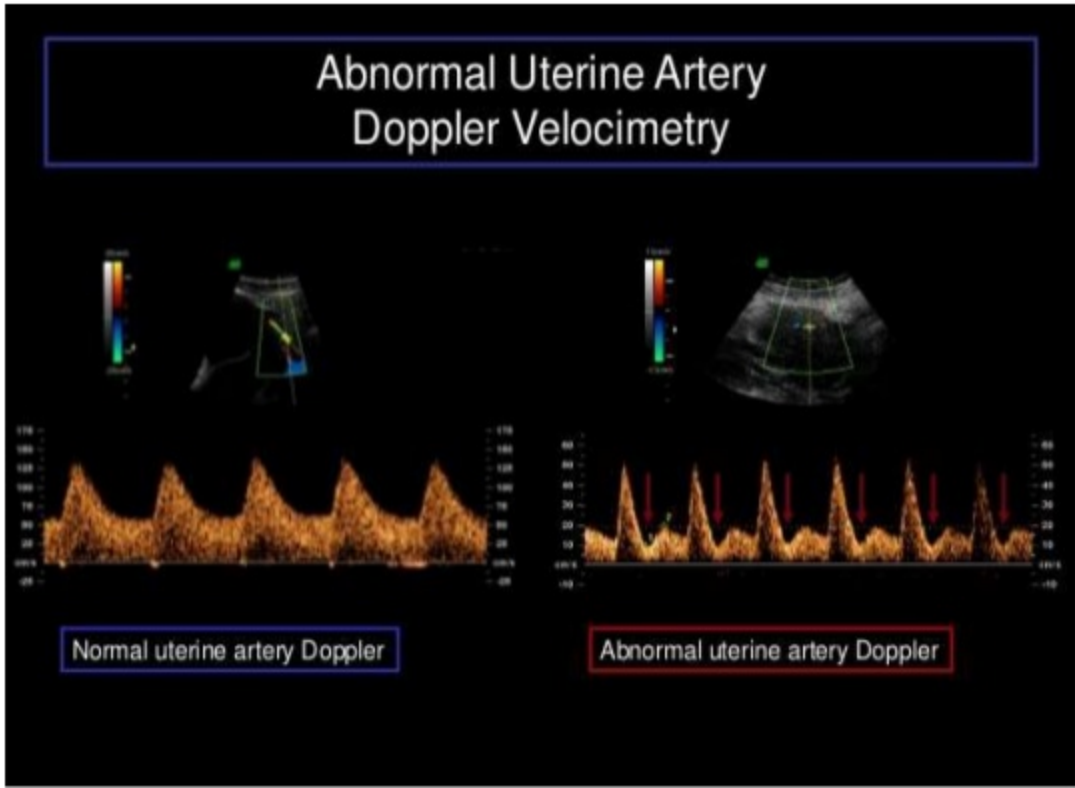
The modified BPP consists of a non-stress test and an AFI (> 5 cm is considered adequate)

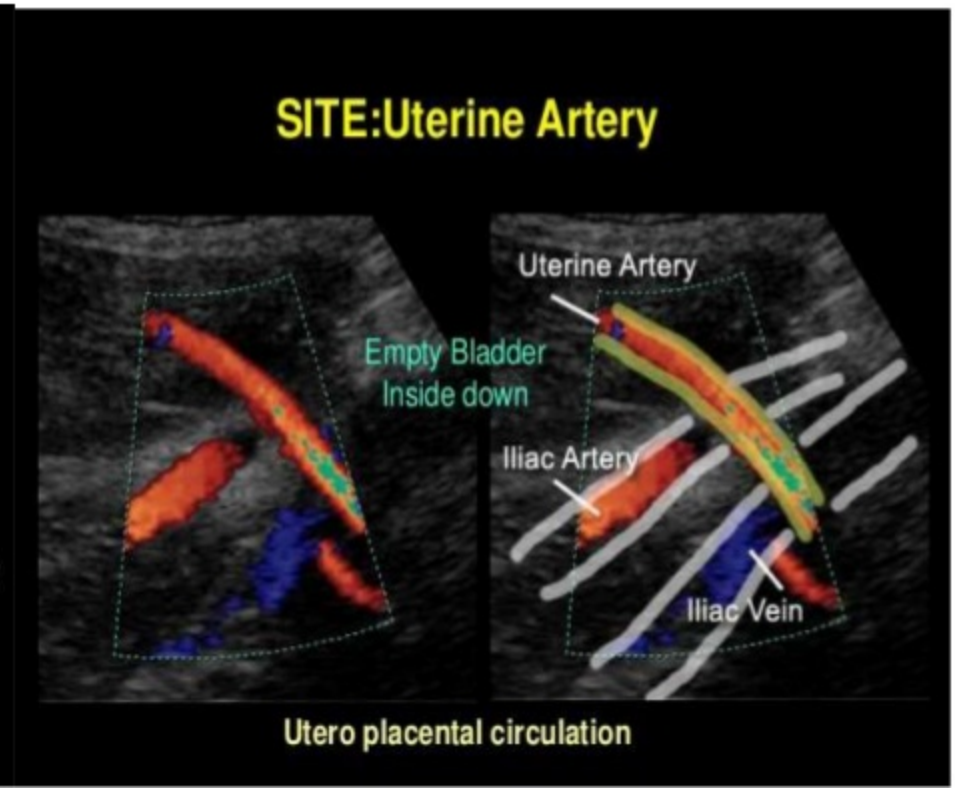
Recommendation 4: Biophysical Profile

1. In pregnancies at increased risk for adverse perinatal outcome and where facilities and expertise exist, **biophysical profile is recommended for evaluation of fetal well-being. (I-A)**
2. When an abnormal biophysical profile is obtained, the responsible physician or delegate should be informed immediately. Further management will be determined by the overall clinical situation. (III-B)

Table 8. Indications for uterine artery Doppler at 17 to 22 weeks

Previous obstetrical history	Previous early onset gestational hypertension
	Placental abruption
	Intrauterine growth restriction
	Stillbirth
Risk factors in current pregnancy	Pre-existing hypertension
	Gestational hypertension
	Pre-existing renal disease
	Longstanding Type I diabetes with vascular complications, nephropathy, retinopathy
	Abnormal maternal serum screening (hCG or AFP > 2.0 MOM)
	Low PAPP-A (consult provincial lab for norms)





Recommendation 5: Uterine Artery Doppler

1. Where facilities and expertise exist, uterine artery Doppler may be performed at the time of the 17 to 22 weeks' gestation during detailed anatomical ultrasound scan in women with the following factors for adverse perinatal outcome. (II-A)
2. Women with a positive uterine artery Doppler screen should have the following second uterine artery Doppler at 24 to 26 weeks.

Umbilical Artery Doppler

Cochrane meta-analysis of randomized trials108 on the use of umbilical artery Doppler in pregnancies with risk factors for adverse perinatal outcome demonstrates **a clear reduction in perinatal mortality in normally formed fetuses**

Neilson JP, Alfirevic Z. Doppler ultrasound for fetal assessment in high risk pregnancies [Cochrane review]. In: Cochrane Database of Systematic Reviews 1996 Issue 4. Chichester (UK): John Wiley & Sons, Ltd; 1996.DOI: 10.1002/14651858.CD000073.