

**Texas Tech University Health Sciences Center El Paso
Department of Obstetrics and Gynecology**

Protocol #3

The Biophysical Profile

Background

The biophysical profile (BPP) is based on the concept that fetal breathing, movement and tone are mediated by neurological pathways and therefore reflect the fetal CNS status at the time of the examination. Amniotic fluid level is a measure of chronic asphyxia or placental function. The addition of the evaluation of the fetal heart rate variability (NST) to the BPP increases the sensitivity for acute status changes. The BPP represents the in-utero APGAR score and has been shown to correlate well with the acid-base status of babies delivered by cesarean section prior to the onset of labor. The earliest signs of fetal acidosis are a nonreactive NST and loss of fetal breathing. A significant inverse correlation between the BPP score and perinatal morbidity and mortality has been documented.

BPP \geq 8/10 accurately predicts normal tissue oxygenation with false negative rate <1%
BPP \leq 6/10 is a relatively accurate predictor of acidemia
BPP = 0/10 has near 100% sensitivity for acidemia

Administration of antenatal corticosteroids can decrease the BPP score. This effect usually resolves within 48 hours.

A. Indications

1. Patients with a nonreactive NST
2. Any patient where further confirmation of fetal well-being is desired
3. The BPP should not be performed before 24 weeks

B. Technique

1. The patient is placed into a supine position.
2. The fetus is observed, by ultrasound, for up to 30 minutes. During the 30 minutes, the components of the BPP are sought.

C. Scoring of the biophysical profile

1. Each component receives a score of 0 (not present) or 2 (present)
2. A score of 8/8 or 8/10 if the NST is performed is considered normal

Biophysical Variable	Normal (Score=2)	Abnormal (Score=0)
Fetal breathing movements (FBM)	≥ one episode of at least 30 sec. duration in 30 min.	Absent or no episode >30 sec. duration in 30 min.
Gross body movement	≥ three discrete body/limb movements in 30 min. (episodes of active continuous movement considered a single movement)	≤ two episodes of body/limb movements in 30 min.
Fetal tone	≤ one episode of active extension with return to flexion of fetal limb(s) or trunk: opening and closing of hand considered normal tone	Slow extension with return to partial flexion OR movement of limb already fully extended OR no movement
Reactive fetal heart rate (NST)	≥ two episodes of acceleration of ≥15 bpm and at least 15 sec. duration in 20 min.	≤ one acceleration or acceleration <15 bpm in 20 min.
Quantitative AFV	≥ one pocket of fluid measuring at least 2 cm in two perpendicular planes	Either no amniotic fluid pockets or a pocket <2 cm in two perpendicular planes

Interpretation of NST for gestations 32 weeks or less is ≥ two episodes of accelerations ≥10 bpm lasting at least 10 seconds.

D. Management.

Score	Interpretation	Management
10	Normal infant; low risk of chronic asphyxiation	Repeat testing at weekly intervals; repeat 2X weekly in diabetics and patients >40 weeks gestation.
8	Normal infant; low risk of chronic asphyxiation	Repeat testing at weekly intervals if primary method of following patient; repeat testing 2X weekly in diabetics, patients with non-reactive NST, patient >40 weeks gestation and patient with vascular disease.
6	Suspect chronic asphyxia	≥36 weeks or oligohydramnios consider delivery <36 weeks, initiate continuous fetal monitoring, repeat BPP in 4 hours
4	Suspect chronic asphyxia	If ≥36 weeks and conditions favorable, deliver; if <36 weeks initiate continuous fetal monitoring, repeat BPP in 4 hours, if repeat ≤4, deliver. Discuss with MFM faculty.
0-2	Strongly suspect chronic asphyxia	Consider delivery, regardless of gestational age. Discuss with MFM faculty.

Note: Must observe fetus for a total of 30 minutes before assigning a 0 score for any of the BPP variables.

Staging:

Normal BPP 8/8 or ≥ 8/10 with NST

Equivocal BPP 6/8 or 6/10 with NST

Abnormal BPP <6/8 or <6/10 with NST

Alternative:

Modified Biophysical Profile (MBPP)

- Consists of NST and ultrasound assessment of amniotic fluid.
- This is a shortened method of the BPP.
- It is accepted as a first-line screening test and should be followed by the complete BPP as a backup test when indicated.
- The amniotic fluid can be assessed using one of two techniques: 1) measurement of the single deepest pocket (SDP) or 2) measurement of the amniotic fluid index (AFI).

References:

1. Lalor JG et al: Biophysical profile for fetal assessment in high risk pregnancies (Review). The Cochrane Library. Issue 3, 2009
2. Magann EF et al: Biophysical profile with amniotic fluid volume assessments. *Obstet Gynecol.* 104(1):5-10, 2004
3. Odibo AO et al: What antepartum fetal test should guide the timing of delivery of the preterm growth-restricted fetus? A decision-analysis. *Am J Obstet Gynecol.* 191(4):1477-82, 2004
4. Manning FA: Fetal biophysical profile: a critical appraisal. *Clin Obstet Gynecol.* 45(4):975-85, 2002
5. ACOG Practice bulletin #145 July 2014