

Antepartum Fetal Surveillance

Topic- based Uworld Questions

Block 1, 2, 7, 8



The following vignette applies to the next 2 items. The items in the set must be answered in sequential order. Once you click **Proceed to Next Item**, you will not be able to add or change an answer.

A 40-year-old woman, gravida 5 para 0 aborta 4, at 35 weeks gestation comes to labor and delivery triage because she has not felt her baby move for the past 24 hours. The patient has not eaten much all day and skipped dinner due to nausea. She has a 25-pack-year history of cigarette use but has cut down on her smoking during her pregnancy. Her last ultrasound at 32 weeks gestation showed a fetus in breech position measuring at the 15th percentile and placenta previa. A nonstress test shows a baseline fetal heart rate in the 130s with moderate variability and no decelerations. There are no accelerations after an hour of monitoring despite vibroacoustic stimulation. Tocometry shows no contractions.

Item 1 of 2

Which of the following is the most appropriate next step in management of this patient?

- A. Biophysical profile
- B. Cesarean delivery
- C. Continuation of nonstress test
- D. Contraction stress test
- E. Umbilical artery flow velocimetry

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A 40-year-old woman, gravida 5 para 0 aborta 4, at 35 weeks gestation comes to labor and delivery triage because she has not felt her baby move for the past 24 hours. The patient has not eaten much all day and skipped dinner due to nausea. She has a 25-pack-year history of cigarette use but has cut down on her smoking during her pregnancy. Her last ultrasound at 32 weeks gestation showed a fetus in breech position measuring at the 15th percentile and placenta previa. A nonstress test shows a baseline fetal heart rate in the 130s with moderate variability and no decelerations. There are no accelerations after an hour of monitoring despite vibroacoustic stimulation. Tocometry shows no contractions.

Item 1 of 2

Which of the following is the most appropriate next step in management of this patient?

- A. Biophysical profile (62%)
- B. Cesarean delivery (11%)
- C. Continuation of nonstress test (3%)
- D. Contraction stress test (16%)
- E. Umbilical artery flow velocimetry (6%)

Omitted

Correct answer

A



62%

Answered correctly



03 secs

Time Spent



02/04/2020

Last Updated

Antepartum fetal surveillance

Test	Description	Normal result	Abnormal result
Nonstress test	External fetal heart rate monitoring for 20-40 minutes	Reactive: ≥ 2 accelerations	<ul style="list-style-type: none"> • Nonreactive: < 2 accelerations • Recurrent variable or late decelerations
Biophysical profile	Nonstress test plus ultrasound assessment of the following: <ul style="list-style-type: none"> • Amniotic fluid volume • Fetal breathing movement • Fetal movement • Fetal tone 2 points per category if normal & 0 points if abnormal (maximum 10/10)	8 or 10 points	<ul style="list-style-type: none"> • Equivocal: 6 points • Abnormal: 0, 2, or 4 points • Oligohydramnios
Contraction	External fetal heart rate monitoring during spontaneous or	No late or recurrent variable decelerations	Late decelerations with $> 50\%$ of contractions

			decelerations
Biophysical profile	<p>Nonstress test plus ultrasound assessment of the following:</p> <ul style="list-style-type: none"> • Amniotic fluid volume • Fetal breathing movement • Fetal movement • Fetal tone <p>2 points per category if normal & 0 points if abnormal (maximum 10/10)</p>	8 or 10 points	<ul style="list-style-type: none"> • Equivocal: 6 points • Abnormal: 0, 2, or 4 points • Oligohydramnios
Contraction stress test	External fetal heart rate monitoring during spontaneous or induced (eg, oxytocin, nipple stimulation) uterine contractions	No late or recurrent variable decelerations	Late decelerations with >50% of contractions
Doppler sonography of the umbilical artery	Evaluation of umbilical artery flow in fetal intrauterine growth restriction only	High-velocity diastolic flow in umbilical artery	Decreased, absent, or reversed end-diastolic flow

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This patient presents with **decreased fetal movement**, a subjective and nonspecific symptom that may be benign (eg, normal fetal sleep cycle) or ominous (eg, central nervous system hypoxia). A nonstress test (NST) is performed to assess fetal status and identify fetuses at risk of adverse outcomes. During an NST, the heart rate of a well-oxygenated fetus rises with fetal movement (accelerations). A **reactive NST** (≥ 2 accelerations) has a high negative predictive value to rule out fetal acidemia. A nonreactive NST has a high false-positive rate and low positive predictive value and cannot rule in fetal acidemia.

A **nonreactive NST** requires further evaluation with a **biophysical profile** (BPP) or contraction stress test (CST). These tests are equivalent in assessing fetal status and are selected based on available resources and relevant contraindications. A BPP includes an NST plus an ultrasound evaluation of the amniotic fluid index as well as fetal movement, tone, and breathing. A CST (**Choice D**) is performed by administering oxytocin or using nipple stimulation until 3 contractions occur every 10 minutes. Contraindications to CST include contraindications to labor (eg, **placenta previa**, prior myomectomy). Therefore, a BPP is more appropriate for this patient.

(Choice B) Although this patient's nonreactive NST is concerning, the NST has a high false-positive rate. Should a BPP also be abnormal, cesarean delivery may be warranted for this patient due to placenta previa.

(Choice C) Because fetal sleep is a common cause of a nonreactive NST, monitoring should occur for ≥ 40 minutes to account for a fetal sleep cycle. Continuing this patient's NST would not be helpful as it has been performed long enough to account for a fetal sleep cycle and vibroacoustic stimulation did not produce a fetal heart rate response. Further workup is needed to determine if the decreased fetal movement and nonreactive NST reflect underlying pathology.

(Choice E) Umbilical artery flow velocimetry is beneficial in monitoring growth-restricted fetuses (estimated fetal weight < 10 th percentile). This fetus has normal growth.

Educational objective:

Patients with decreased fetal movement should undergo antenatal fetal testing with a nonstress test (NST) followed by a biophysical profile or a contraction stress test if the NST is nonreactive. A biophysical profile should be performed if labor is contraindicated.

References

ACOG practice bulletin no. 145: Antenatal fetal surveillance.

A nonreactive NST requires further evaluation with a biophysical profile (BPP) or contraction stress test (CST). These tests are equivalent in

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Placenta previa



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Item 2 of 2

An ultrasound confirms an anterior placenta covering the cervical os and an amniotic fluid index of 1.5 with a single fluid pocket measuring 1.5 x 1 cm. Over a period of 45 minutes, there are 4 episodes of fetal movement, 3 flexion/extension events, and no fetal breathing movements. The fetus is breech. Which of the following is the most likely cause of the patient's biophysical ultrasound findings?

- A. Fetal malpresentation
- B. Maternal hypoglycemia
- C. Placental dysfunction
- D. Placental location
- E. Prematurity

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Item 2 of 2

An ultrasound confirms an anterior placenta covering the cervical os and an amniotic fluid index of 1.5 with a single fluid pocket measuring 1.5 x 1 cm. Over a period of 45 minutes, there are 4 episodes of fetal movement, 3 flexion/extension events, and no fetal breathing movements. The fetus is breech. Which of the following is the most likely cause of the patient's biophysical ultrasound findings?

- A. Fetal malpresentation (10%)
- B. Maternal hypoglycemia (6%)
- C. Placental dysfunction (54%)
- D. Placental location (19%)
- E. Prematurity (9%)

Omitted

Correct answer

C



54%

Answered correctly



02 secs

Time Spent



02/04/2020

Last Updated

Explanation

Biophysical profile*	
Component	Normal finding
Nonstress test	Reactive fetal heart rate monitoring

Biophysical profile*	
Component	Normal finding
Nonstress test	Reactive fetal heart rate monitoring
Amniotic fluid volume	Single fluid pocket $\geq 2 \times 1$ cm or amniotic fluid index > 5
Fetal movements	≥ 3 General body movements
Fetal tone	≥ 1 Episodes of flexion/extension of fetal limbs or spine
Fetal breathing movements	≥ 1 Breathing episode for ≥ 30 seconds
Maximum score = 10; 0 = abnormal, 2 = normal for each component. *Performed continuous observation for ≥ 30 minutes.	

The **biophysical profile** (BPP) is performed to assess fetal oxygenation through ultrasound observation and the nonstress test. The components of the ultrasound assessment include measurement of amniotic fluid volume and observation of fetal tone, breathing movement, and gross body movement. Each component of the BPP is scored 0 or 2 and summed to give a score of 0 to 10. A normal BPP (8/10 or 10/10) suggests that the fetus is well-oxygenated.

This patient has **oligohydramnios** (a single deepest pocket < 2 cm or an amniotic fluid index ≤ 5) and an abnormal BPP score of 4/10. A score of 0/10 to 4/10 indicates **fetal hypoxia** due to **placental dysfunction** (placental insufficiency). Risk factors for placental insufficiency include advanced maternal age, **tobacco use**, **hypertension**, and **diabetes**. The patient requires prompt delivery due to the high likelihood of fetal demise.

(Choice A) Malpresentation is associated with fetal growth restriction and may be a result of chronic fetal hypoxia, but it does not cause oligohydramnios or an abnormal BPP.

(Choice B) Decreased fetal movement is often caused by maternal hypoglycemia. However, maternal hypoglycemia is not associated with a low amniotic fluid volume.

The **biophysical profile** (BPP) is performed to assess fetal oxygenation through ultrasound observation and the nonstress test. The components of the ultrasound assessment include measurement of amniotic fluid volume and observation of fetal tone, breathing movement, and gross body movement. Each component of the BPP is scored 0 or 2 and summed to give a score of 0 to 10. A normal BPP (8/10 or 10/10) suggests that the fetus is well-oxygenated.

This patient has **oligohydramnios** (a single deepest pocket <2 cm or an amniotic fluid index ≤ 5) and an abnormal BPP score of 4/10. A score of 0/10 to 4/10 indicates **fetal hypoxia** due to **placental dysfunction** (placental insufficiency). Risk factors for placental insufficiency include advanced maternal age, **tobacco use**, **hypertension**, and **diabetes**. The patient requires prompt delivery due to the high likelihood of fetal demise.

(Choice A) Malpresentation is associated with fetal growth restriction and may be a result of chronic fetal hypoxia, but it does not cause oligohydramnios or an abnormal BPP.

(Choice B) Decreased fetal movement is often caused by maternal hypoglycemia. However, maternal hypoglycemia is not associated with a low amniotic fluid volume.

(Choice D) Patients with an anterior placenta more frequently report a decrease in fetal movement as this placental position may make perception of movement more difficult. However, there is no association between placental location and an abnormal BPP.

(Choice E) Although a BPP performed on an extremely premature infant is difficult to interpret due to the immaturity of the preterm fetal nervous system, a 35-week fetus would be expected to have a well-developed central nervous system and a normal BPP.

Educational objective:

An abnormal biophysical profile score (eg, 4/10) is consistent with fetal hypoxia. Prompt delivery is indicated due to the high probability of fetal demise.

References

- [ACOG practice bulletin no. 145: antepartum fetal surveillance.](#)
- [Fetal biophysical profile.](#)
- [Antenatal fetal surveillance.](#)

A 39-year-old woman, gravida 1 para 0, at 32 weeks gestation comes to the office for routine prenatal care. She has had fetal movement but no contractions, abdominal pain, headaches, or changes in vision. The patient has hypertension diagnosed at 26 weeks gestation that is being managed with labetalol and weekly biophysical profiles. An evaluation for preeclampsia was negative at the time her hypertension was diagnosed. Her current blood pressure is 135/85 mm Hg and pulse is 72/min. A urinalysis shows trace protein. The nonstress test results are shown in the [exhibit](#). Ultrasound results are shown below:

Amniotic fluid volume

Quadrant 1	3.7 cm
Quadrant 2	4.3 cm
Quadrant 3	2.1 cm
Quadrant 4	4.4 cm
Total	14.5 cm

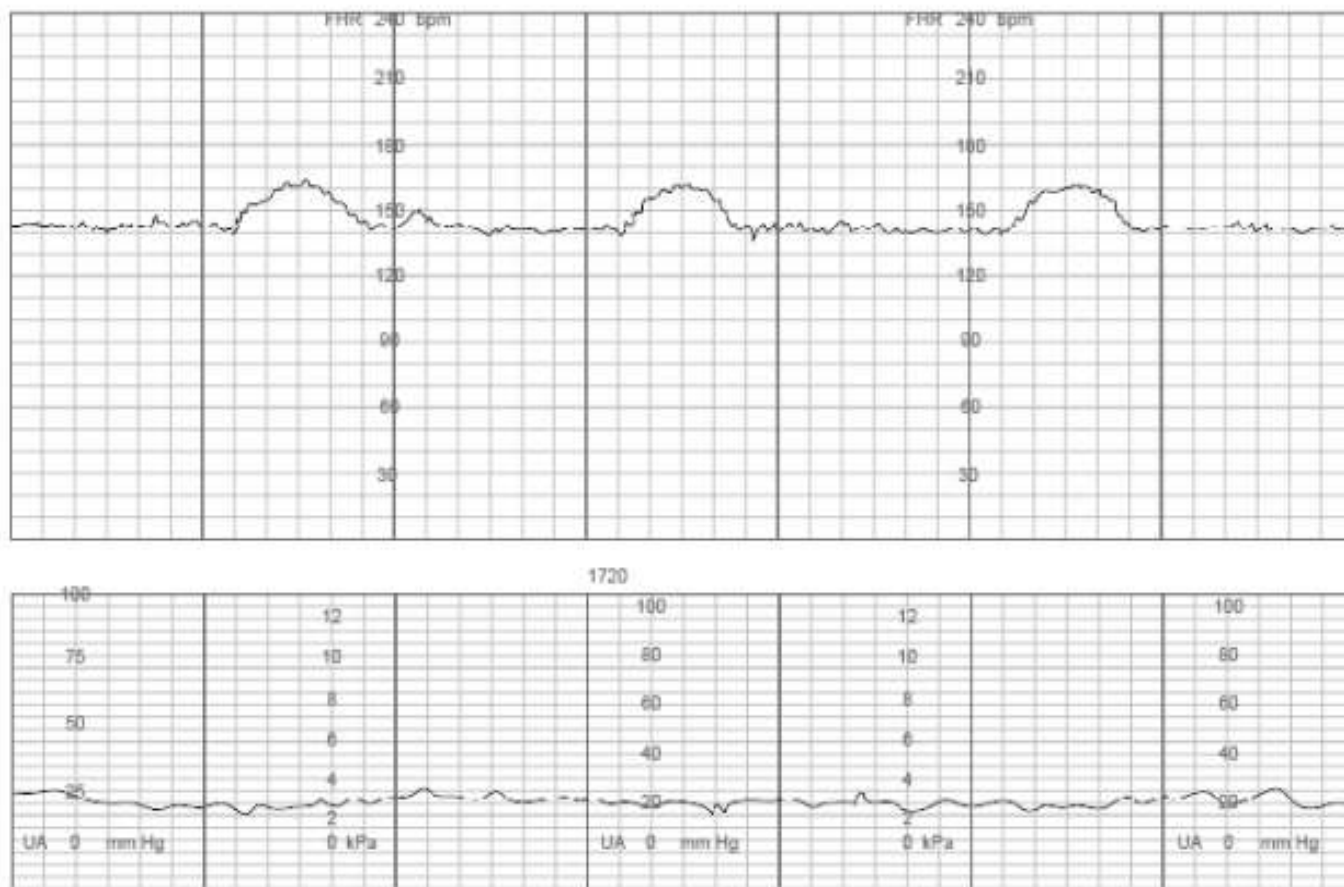
Biophysical profile

Breathing	2
Movement	2
Tone	2
Amniotic fluid volume	2

Estimated fetal weight 1678 g (3.7 lb) - 15th percentile

Which of the following is the most appropriate next step in management of this patient?

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Which of the following is the most appropriate next step in management of this patient?

Total 14.5 cm

Biophysical profile

Breathing 2

Movement 2

Tone 2

Amniotic fluid volume 2

Estimated fetal weight 1678 g (3.7 lb) - 15th percentile

Which of the following is the most appropriate next step in management of this patient?

- A. Administer magnesium sulfate
- B. Perform contraction stress test
- C. Perform Doppler sonography of the umbilical artery
- D. Perform vibroacoustic stimulation
- E. Repeat testing in 1 week
- F. Repeat testing in 24 hours

Submit

Total 14.5 cm

Biophysical profile

Breathing 2

Movement 2

Tone 2

Amniotic fluid volume 2

Estimated fetal weight 1678 g (3.7 lb) - 15th percentile

Which of the following is the most appropriate next step in management of this patient?

- A. Administer magnesium sulfate (2%)
- B. Perform contraction stress test (4%)
- C. Perform Doppler sonography of the umbilical artery (11%)
- D. Perform vibroacoustic stimulation (4%)
- E. Repeat testing in 1 week (74%)
- F. Repeat testing in 24 hours (1%)

Antepartum fetal surveillance			
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Antepartum fetal surveillance evaluates for fetal hypoxia. It is performed in pregnancies with a **high risk of fetal demise** due to maternal (eg, hypertension, diabetes mellitus) or fetal (eg, post-term pregnancy, growth restriction) conditions. The most common surveillance modality is the **biophysical profile (BPP)**, which includes a nonstress test (NST) and an ultrasound evaluation of amniotic fluid, fetal tone, movement, and breathing movement. Each parameter is assigned a score of 0 or 2 and summed for a total of 0-10.

A **normal (reactive) NST** should demonstrate **≥ 2 heart rate accelerations** that are ≥ 15 beats/min above baseline and ≥ 15 seconds long **within a 20-minute period**; however, the test can last up to 40 minutes to account for a 20-minute fetal sleep cycle. A BPP of 0-4/10 indicates fetal hypoxia and necessitates urgent delivery. A BPP of 6/10 is equivocal and should be repeated in 24 hours (**Choice F**). A normal BPP score is 8-10/10 and rules out fetal hypoxia.

This patient has gestational hypertension and needs weekly BPPs starting at 32 weeks gestation. Her NST is reactive, showing a baseline of 140 beats/min and 3 accelerations. The remainder of the BPP is also normal for a score of 10/10; the patient can resume weekly testing.

(Choice A) Magnesium sulfate is administered for seizure prophylaxis in patients with preeclampsia with severe features. This patient has a normal blood pressure and trace protein (normal in pregnancy), and preeclampsia can be ruled out. Magnesium sulfate is administered for fetal neuroprotection at 24-32 weeks gestation when preterm birth is anticipated within the next 24 hours. Delivery is not indicated in this patient with a normal BPP.

(Choice B) A BPP and a contraction stress test are equivalent tests. If a BPP has been performed, a CST is not needed.

(Choice C) Doppler sonography of the umbilical artery evaluates for fetoplacental vascular pathology in growth-restricted fetuses (<10th percentile weight for gestational age). This fetus has normal growth.

(Choice D) Vibroacoustic stimulation is used during NST to stimulate a fetus to determine if lack of fetal heart rate accelerations is from fetal sleep. This patient's NST had 3 accelerations.

Educational objective:

Maternal comorbidities (eg, gestational hypertension) require antepartum fetal surveillance to screen for fetal compromise. A normal (reactive) nonstress test contains ≥ 2 heart rate accelerations. A normal biophysical profile score (8-10/10) rules out fetal hypoxia.

References