Fetal Behavior
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OBJECTIVES

1) Review normal activity patterns
2) Recognize deviations
3) Understand the “Biophysical Profile”
4) Appreciate influences on patterns

Components

Heart rate:
- Reactive according to standard criteria
  - 2 in 20
- Non-reactive
  - 0 in 40
### Components

**Fetal movement:**
At least 3 body or limb movements in 30 minutes

**Fetal tone:**
At least one episode of extension with return to flexion in 30 minutes
Components

Fetal breathing:
At least 30 seconds of breathing in 30 minutes
Fetal behavior

Fetal breathing over 8 hours

Components

Amniotic fluid volume:
At least one pocket measuring 2 X 2 cm
Amniotic fluid volume

Volume varies across gestation
Normal @ 42 wks ≠ normal @ 32 wks
Use of AFI in future?

Amniotic fluid index

Fetal behavior

Fetal behavior
Fetal behavior

Scoring

• 2 for present, 0 for absent
• No allowance for intermediates (i.e. 1)
• Is a single number enough?

Fetal behavior

Factors influencing fetal breathing

Stimulated by
• Glucose
• Prostaglandin synthetase inhibitors
• Caffeine

Diminished by:
• Hypoxia
• General anesthesia
• Nicotine
• Diazepam
• Imminent labor
• Asphyxia
• Alcohol
• Barbiturates
• Prostaglandins
Components

Influences on episodic activities:
- Gestational age
- Intrinsic fetal activity patterns
- Circadian rhythm
- Labor
- Drugs

Breathing & glucose levels

Breathing & time of day
Fetal behavior

Time and cortisol & breathing

- High versus low consumption
- More time in state 4F (arousal)
- Less time in 2F (active sleep)

Effect of caffeine

Breathing & labor
Breathing & onset labor

Vibroacoustic Stimulation

How loud is it?
- Broad spectrum of frequencies
- Peak with VAS 98 - 111 dB
- Baseline in uterus 72 - 88 dB
- Prolonged exposure > 110 dB may be dangerous *

* Remember: dB are logarithmic, so 98 dB is 10 times as loud as 88 dB!
Fetal behavior

**VAS & fetal reactivity**

[Graph showing fetal reactivity over time, labeled with time points and data markers.]

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**VAS & breathing**

[Graph showing the incidence of fetal breathing over time, labeled with stimulus and percentage of counts.]

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**VAS & bladder size**

[Bar chart comparing bladder volume over different time periods, labeled with means and standard deviations.]
Fetal behavior

BPP score & perinatal mortality

Fetal behavior

BPP score & outcomes

Fetal behavior

Fetal Testing- How good & for how long

Answer depends on the question*
Why are we testing this fetus?
How likely is “fetal distress”?

*Gertrude Stein’s last words
Fetal Heart Rate Testing

NST versus BPP

NST
- Sensitive, non-specific
- Inexpensive, fast

BPP
- Sonographer, 1:1
- Adequate time allowance

Consider NST, fluid

Practical considerations

Allow sufficient time
Examiner’s skill:
- Fetal biometry
- Fetal anatomy

| NST & AFI | NST & AFI | AFI > 5 CM | Nonreactive or AFI ≤ 5 | Stop testing | Do full BPP | BPP 8-10 | BPP 6 | BPP 0-4 | Stop testing | Deliver or retest 24-48 | Deliver |
Fetal behavior

Alternatives

Kick counts- approaches:
- 10 in 30 min
- Time to 10
- 10 by 4

Kick counts I

- RCT 3,111 women > 32 weeks
- Randomized 1 hour counting 3X/week
- Call if change
- Counting group 3/1583 IUFD \( p < 0.05 \)
- Control group 12/1569 IUFD

Neldam Dan Med Bull 1983;30:274-8

Kick counts II

- RCT 68,0000 women 28-32 weeks
- Normal “10 movements in 10 hours”
- Study group to call if 2 days abnormal
- IUFD 2.9/1000 versus 2.7/1000 (NS)
- Only 46% in study group with decreased movement actually notified providers
- Compliance even lower with IUFD

Grant Lancet 1989;2:345-9
Fetal behavior

**Kick counts**

- Benefits in low risk pregnancies
- Probably helpful in higher risk pregnancies
- Must apply consistently (time of day, etc)

Fetal behavior

**Preterm ruptured membranes**

- Reduced AFV higher risk infection
- Breathing decreases with onset infection
- Can apply QD or QOD

Fetal behavior

**What does ACOG say?**

The following recommendations are based on limited or inconsistent scientific evidence (Level B)

ACOG Practice Bulletin #9, 10/99
What does ACOG say?

Women with high-risk factors for stillbirth should undergo antepartum fetal surveillance using the NST, CST, BPP, or modified BPP (NST + AFI >5).

ACOG Practice Bulletin #9, 10/99

What does ACOG say?

Initiating testing at 32-34 weeks of gestation is appropriate for most pregnancies at increased risk of stillbirth, although in pregnancies with multiple or particularly worrisome high-risk conditions, testing may be initiated as early as 26-28 weeks of gestation.

ACOG Practice Bulletin #9, 10/99

What does ACOG say?

When the clinical condition that has prompted testing persists, a reassuring test should be repeated periodically (either weekly or, depending on the test used and the presence of certain high-risk conditions, twice weekly) until delivery. Any significant deterioration in the maternal medical status or any acute diminution in fetal activity requires fetal reevaluation, regardless of the amount of time that has elapsed since the last test.

ACOG Practice Bulletin #9, 10/99
Fetal behavior

What does ACOG say?

An abnormal NST or modified BPP usually should be further evaluated by either a CST or a full BPP. Subsequent management should then be predicated on the results of the CST or BPP, the gestational age, the degree of oligohydramnios (if assessed), and the maternal condition.

ACOG Practice Bulletin #9, 10/99

Fetal behavior

What does ACOG say?

Oligohydramnios, defined as either no ultrasonographically measurable vertical pocket of amniotic fluid greater than 2 cm or an AFI of 5 cm or less, requires (depending on the degree of oligohydramnios, the gestational age, and the maternal clinical condition) either delivery or close maternal or fetal surveillance.

ACOG Practice Bulletin #9, 10/99

Fetal behavior

What does ACOG say?

In the absence of obstetric contraindications, delivery of the fetus with an abnormal test result often may be attempted by induction of labor with continuous monitoring of the fetal heart rate and contractions. If repetitive late decelerations are observed, cesarean delivery generally is indicated.

ACOG Practice Bulletin #9, 10/99
What does ACOG say?

Recent, normal antepartum fetal test results should not preclude the use of intrapartum fetal monitoring.

ACOG Practice Bulletin #9, 10/99

Basic Ultrasound
(AIUM, ACOG)

Fetal number
Presentation
Fetal life
Placental location
Amniotic fluid
Gestational age
Anatomic survey
Maternal pelvic anatomy

Conclusions

• A valuable approach to fetus
• Must understand influences to interpret
• Think about using every day
"Wow! The little bastard really was kicking, wasn’t he?"