OUTPATIENT ANTENATAL TESTING

FLAME LECTURE: 54

STELLER 12.30.23

LEARNING OBJECTIVES

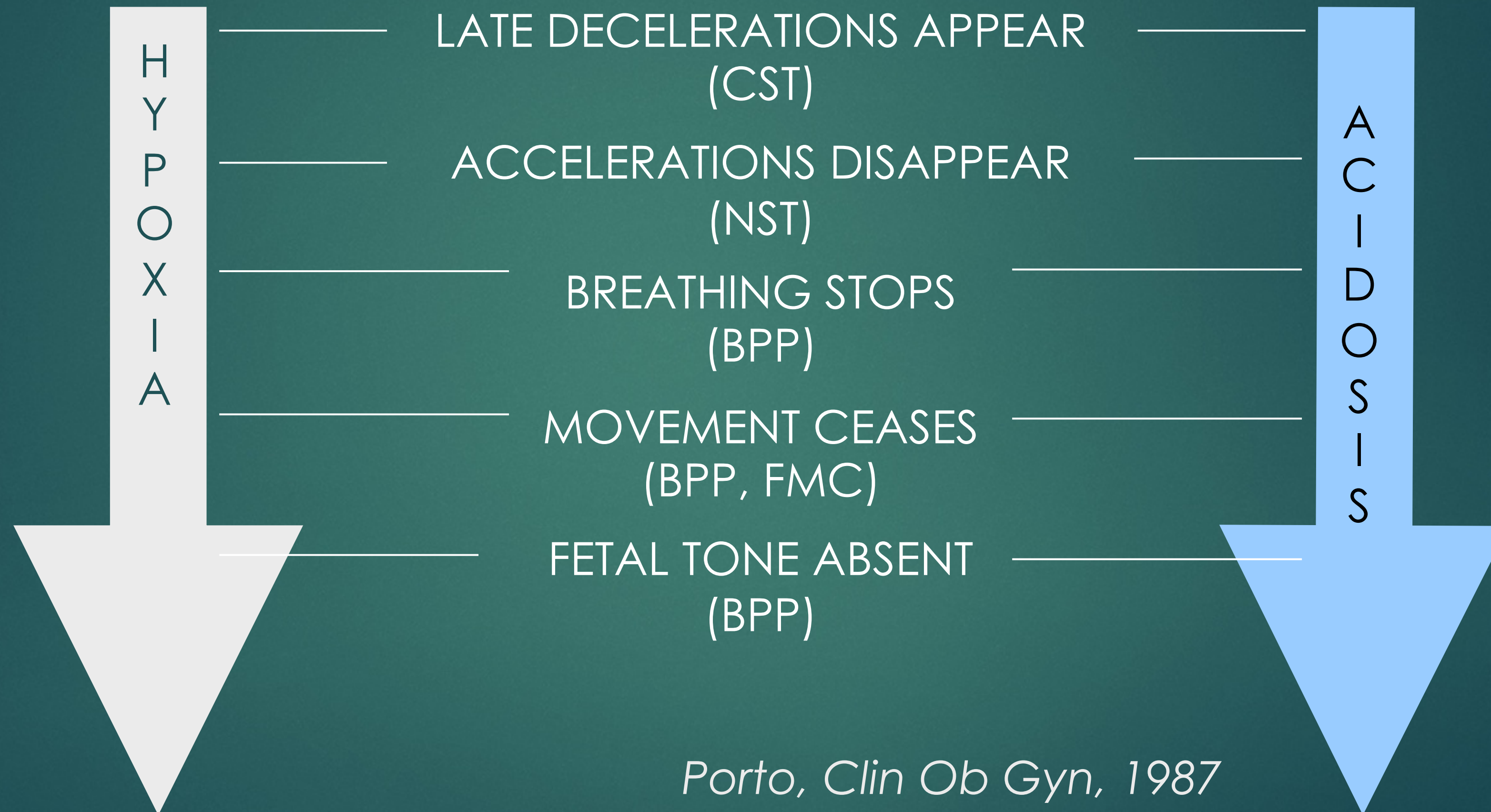
- Understand the rationale for prenatal outpatient fetal assessment
- Describe approaches for assessment of fetal well being
- Prerequisites:
  - FLAME LECTURE 53: Overview of Interpreting Fetal Heart Rate Tracings
- See also – for closely related topics
  - FLAME LECTURE 54B: The Nonstress Test (NST) and Contraction Stress Test (CST)
  - FLAME LECTURE 56: The Biophysical profile
  - FLAME LECTURE 57: Assessment of fetal movement
  - FLAME LECTURE 59: Assessment of amniotic fluid volume

RATIONALE OF PRENATAL OUTPATIENT FETAL ASSESSMENT

- Goals
  - Detect uteroplacental insufficiency
  - Prevent stillbirth
  - Avoid unnecessary iatrogenic preterm delivery
- Physiologic basis: The fetal brain is incredibly sensitive to changes in O_2 and pH, and under stress:
  - Chemoreceptor response to acidemia → vagally-mediated deceleration of the fetal heart rate
  - Fetal movements decrease as the fetus attempts to conserve energy[1-2]
  - Blood flow is directed to the brain, heart and adrenals and away from the kidneys → a decrease in renal perfusion → a decrease in fetal urine production → oligohydramnios

1. Olesen AG. Acta Obstet Gynecol Scand. 2004.
2. Manning FA. AJOG 1993

Antepartum Fetal Distress Cascade



Porto, Clin Ob Gyn, 1987

ANTENATAL ASSESSMENT MODALITIES

- Fetal movement (kick) counting
- Non-stress test (NST)
- Contraction stress test (CST)
- Biophysical profile (BPP)
  - Assessing fetal breathing, fetal body movements, fetal tone, amniotic fluid volume by US
  - Modified BPP (mBPP) = NST + AFI
- Umbilical Artery Doppler velocimetry (for FGR fetuses only)

TIMING OF ANTEPARTUM SURVEILLANCE

- WHEN TO START?
- WHY TO START?
- HOW OFTEN TO PERFORM?
- No large clinical trials to guide recommendations of initiation and frequency of testing thus we rely on guidelines from our governing body
  - *ACOG Committee Opinion 828*

INDICATIONS FOR ANTENATAL TESTING
FETAL

FACTOR	TIMING	FREQUENCY
FGR w/ NL or elevated UAD	At diagnosis	1-2x/weekly
FGR w/ AEDF or Oligo	At diagnosis	2x/weekly OR Admission
FGR w/ REDF	At diagnosis	Admission
Di-Di Twins (Uncomplicated)	36 0/7	1x/weekly
Di-Di Twins (w/ FGR)	At diagnosis	Individualized
Mo-Di Twins (Uncomplicated)	32 0/7	Individualized
Mo-Di Twins (Complicated)	Individualized	Individualized
Mo-Mo Twins	Individualized	Individualized
Higher Order Multiples	Individualized	Individualized
Decreased Fetal Movement	At diagnosis	Once
Fetal Anomalies/Aneuploidy	Individualized	Individualized

INDICATIONS FOR ANTENATAL TESTING

MATERNAL

FACTOR	TIMING	FREQUENCY
cHTN (good control on meds)	32 0/7	1x/weekly
cHTN (poor control)	At diagnosis	Individualized
gHTN/PreE w/o SF	At diagnosis	2x/weekly
gHTN/PreE w/ SF	At diagnosis	1x/weekly
GDM (good control on meds)	32 0/7	1-2x/weekly
GDM (poor control)	32 0/7	2x/weekly
DM	32 0/7	2x/weekly
SLE (uncomplicated)	32 0/7	1x/weekly
SLE (complicated)	At diagnosis	Individualized
APAS	32 0/7	2x/weekly

INDICATIONS FOR ANTENATAL TESTING
MATERNAL

FACTOR	TIMING	FREQUENCY
SSD (uncomplicated)	32 0/7	1-2x/weekly
SSD (complicated)	At diagnosed	Individualized
Hemoglobinopathy other than SSD	Individualized	Individualized
Renal Disease (Cr > 1.4)	32 0/7	1-2x/weekly
Thyroid Disorders (poor control)	Individualized	Individualized
Alcohol use (5+ drinks/week)	36 0/7	1x/weekly
Polysubstance Use	Individualized	Individualized
IVF Pregnancy	36 0/7	1x/weekly
AMA	Individualized	Individualized
Obesity (BMI 35-40)	37 0/7	1x/weekly
Obesity (BMI 40+)	34 0/7	1x/weekly

INDICATIONS FOR ANTENATAL TESTING

OBSTETRIC

FACTOR	TIMING	FREQUENCY
Previous stillbirth ≥32 0/7	32 0/7	1-2x/weekly
Previous stillbirth < 32 0/7	Individualized	Individualized
Previous PTD 2/2 FGR	32 0/7	1x/weekly
Previous PTD 2/2 PreE	32 0/7	1x/weekly
IHCP	At diagnosis	1-2x/weekly
Late term (>41 0/7)	41 0/7	1-2x/weekly
Abnormal PAPP-A	36 0/7	1x/weekly
Abnormal Inhibin A	36 0/7	1x/weekly

INDICATIONS FOR ANTENATAL TESTING
PLACENTAL

FACTOR	TIMING	FREQUENCY
Chronic Placental Abruption	At diagnosis	1-2x/weekly
Vasa Previa	Individualized	Individualized
Velamentous Cord Insertion	36 0/7	1x/weekly
Single Umbilical Artery	36 0/7	1x/weekly
Oligohydramnios	Individualized	1-2x/weekly
Polyhydramnios	32 0/7-34 0/7	1-2x/weekly

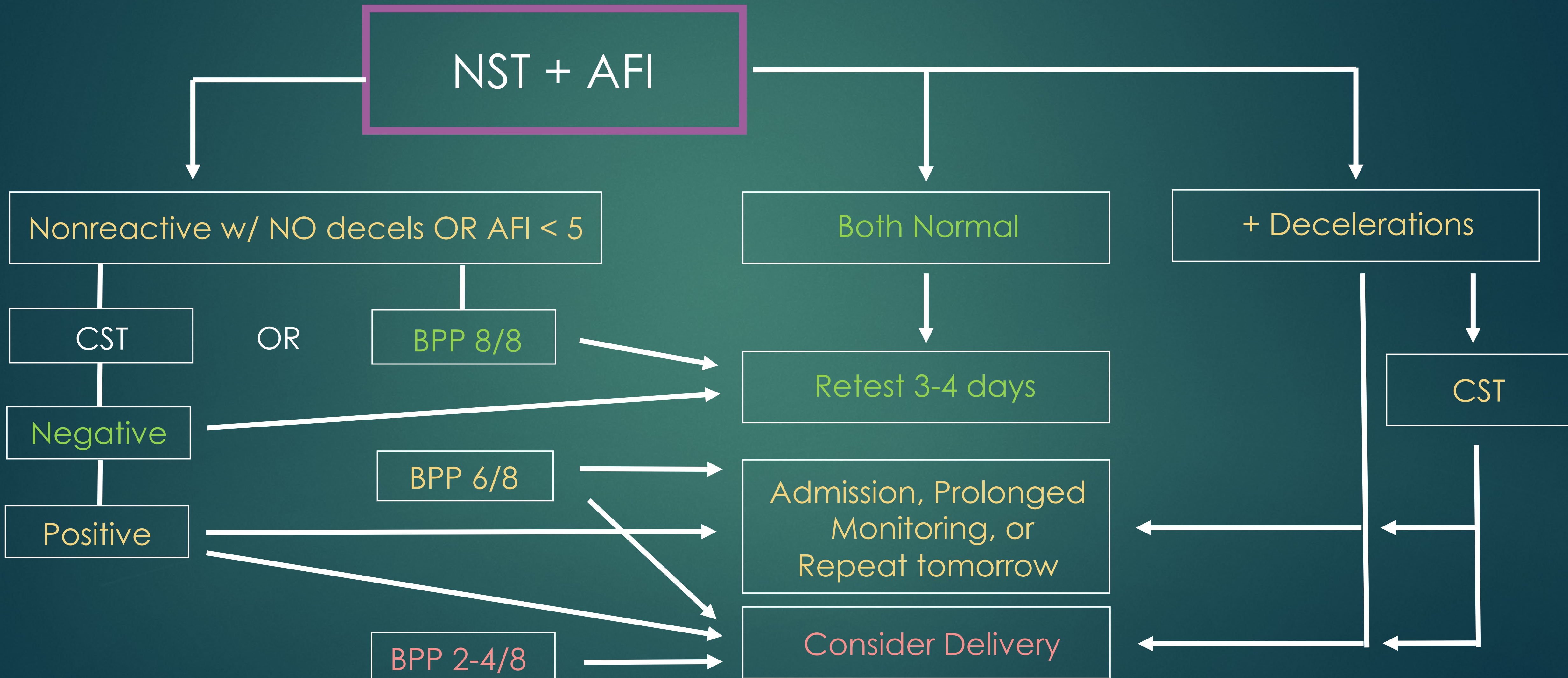
REASSURANCE?

- Incidence of stillbirth within 1 week after a normal fetal assessment[3-5]
  - 1.9/1000 NSTs - NPR of 99.8%
  - 0.3/1000 CSTs – NPR of 99.9%
  - 0.8/1000 BPPs – NPR of 99.9%
  - 0.8/1000 mBPPs – NPR of 99.9%
  - 0/214 Dopplers in FGR fetuses – NPR of 100%[6]
- Antenatal testing does NOT predict stillbirths related to acute changes in maternal-fetal status (i.e., Abruptio placentae, Umbilical cord accident)
- Achilles heel is high false positive rate (approx 35% CST, 55% NST)
- Thus, we use the NPR to reassure ourselves by ruling out acidemia, rather than ruling it in.

ABNORMAL TESTING… NOW WHAT?

- Fix the offending disease process if possible (i.e., DKA, PNA)
- Consider a ‘back-up’ test (CST, BPP) or prolonged monitoring)
- Consider admission for observation with continuous fetal monitoring (CFM) vs. repeat testing in short intervals[7]
- Consider expediting delivery after weighing the risks and benefits of fetal prematurity (depending upon gestational age) and the condition/disease state

ONE PRACTICAL APPROACH



IMPORTANT LINKS & REFERENCES

- PRACTICE BULLETIN 145 - Antepartum Fetal Surveillance
- Committee Opinion 828 – Indications for Outpatient Antenatal Fetal Surveillance. 2021.
- Olesen AG. Acta Obstet Gynecol Scand. 2004.
- Manning FA. AJOG 1993
- Freeman RK. AJOG 1982
- Miller DA. AJOG 1996.
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- Almstrom H. Lancet. 1992
- Manning FA. AJOG. 1990.