



AMNIOTIC FLUID VOLUME

FLAME LECTURE: 59

STELLER 8.25.14

Learning Objectives

- ▶ To understand rationale behind using amniotic fluid volume for fetal assessment
- ▶ To describe approaches for assessment of fetal well being
- ▶ Prerequisites:
 - ▶ NONE
- ▶ See also – for closely related topics
 - ▶ FLAME LECTURE 54: Outpatient Antenatal Testing
 - ▶ FLAME LECTURE 54B: The Nonstress Test (NST) and Contraction Stress Test (CST)
 - ▶ FLAME LECTURE 56: The Biophysical profile
 - ▶ FLAME LECTURE 57: Assessment of Fetal Movements

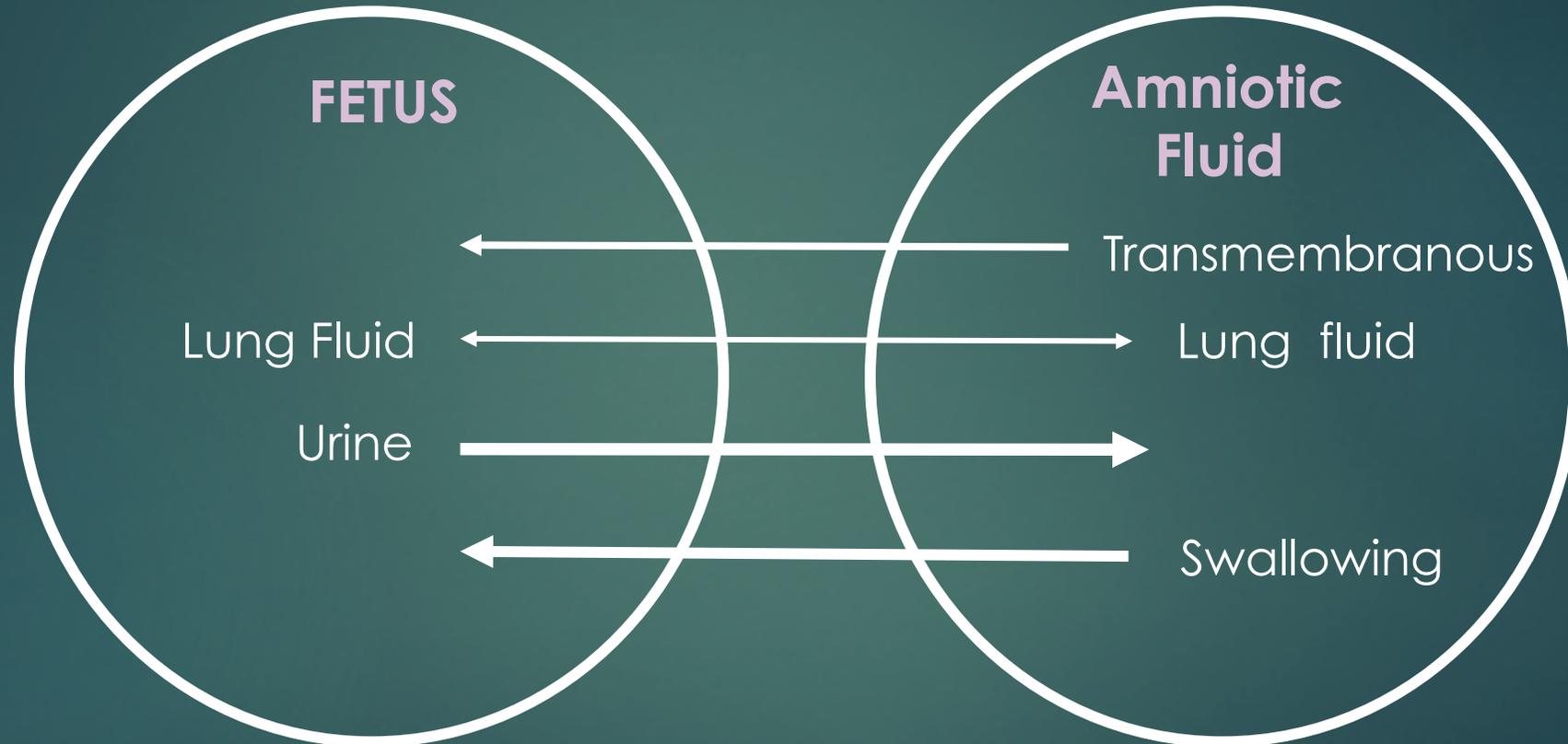
Rationale of Amniotic Fluid Volume for Fetal Assessment

- ▶ 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:
 - ▶ 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 → low amniotic fluid volume (oligohydramnios)

Amniotic Fluid Volume

- ▶ Is a **CHRONIC** indicator of uteroplacental insufficiency
 - ▶ It takes ~ 15 days for a fetus to progress from normal to reduced AFV and 23 to develop severe oligohydramnios¹
 - ▶ However, based on gestational age and severity of insulting disease process, this time interval can be dramatically less

AMNIOTIC FLUID VOLUME: Balance



Methods of Assessment

- ▶ ALL ultrasounds should include an assessment of AVF
 - ▶ Early pregnancy = subjective assessment → objective in late 2nd to early 3rd trimester
- ▶ Variety of measures used to objectively quantify AVF:
 - ▶ Single Deepest Vertical Pocket (DVP): calculated in centimeters
 - ▶ Amniotic Fluid Index (AFI): sum of the maximum vertical amniotic fluid pocket (in cm) in each quadrant (not containing cord or fetal extremities) via U/S

Rules for measuring by U/S

- ▶ “Pocket” of amniotic fluid must be at least 1 cm wide
- ▶ Exclude umbilical cord or fetal parts
- ▶ Hold ultrasound probe perpendicular to maternal spine (= floor when supine) → “Vertical” pocket
- ▶ Oligohydramnios: AFI < 5cm or DVP < 2cm
- ▶ Polyhydramnios: AFI > 24cm or DVP > 8cm

How to perform an AFI

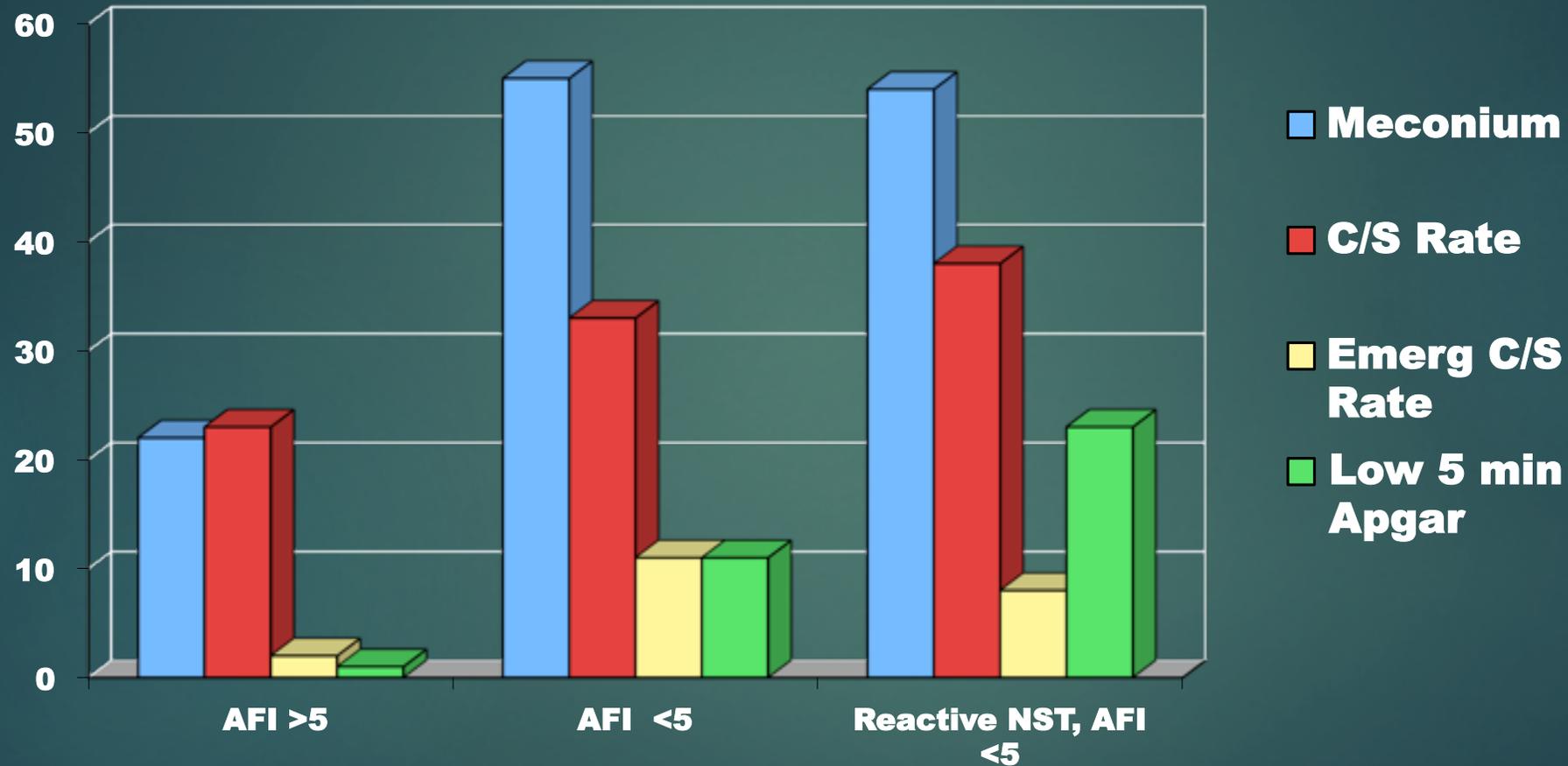
- ▶ Position patient supine as for ultrasound
- ▶ Linear, curvilinear or sector transducer
- ▶ Divide the uterus into 4 quadrants using the umbilicus as the center point
- ▶ Transducer must be kept parallel to the sagittal midline plane and perpendicular to the maternal coronal plane
- ▶ Measure the deepest, clear, unobstructed, cord-free pocket in the vertical plane for each of the four quadrants (can use color doppler if unsure if cord present in pocket)



Diagnosis of Oligohydramnios

- ▶ ACOG, SMFM recommend use of DVP, not AFI
 - ▶ Good evidence that using DVP reduces unnecessary interventions without increasing adverse perinatal outcomes
 - ▶ However, in practice, many providers still use AFI
- ▶ Both practices correlate poorly with amniotic fluid volume as measured with dye dilution techniques

AMNIOTIC FLUID INDEX



Even w/ a reactive NST, meconium staining, c-section rates, and low 5 minutes apgars are increased with oligohydramnios

Should oligohydramnios affect the decision for delivery?

- ▶ Determining when to intervene depends on: gestational age, maternal condition, and fetal clinical condition as determined by other indices of fetal well-being
- ▶ First, **rule out ruptured membranes**
- ▶ In setting of uncomplicated isolated and persistent oligohydramnios (DVP < 2), delivery at 36-37 weeks is recommended³
- ▶ In pregnancy less than 36 0/7 weeks, the decision expectant mgmt should be individualized, and f/u NSTs, AFIs, and growth assessments are indicated

IMPORTANT LINKS & REFERENCES

- ▶ [PRACTICE BULLETIN 145 – Antepartum Fetal Surveillance](#)
- ▶ [JOINT EXECUTIVE SUMMARY – Fetal Imaging](#)
- ▶ Magann EF. Obstet Gynecol. 2000
- ▶ Rutherford SE. Obstet gynecol. 1987
- ▶ Spong CY, Obstet Gynecol 2011