Cervical Length Ultrasound Translating Knowledge Into Clinical Practice

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Goals

1. Review indications for cervical length measurement in the second and third trimester
2. Describe management of the short second trimester cervix based on fetal number and obstetrical history
3. Describe evaluation and management of third trimester threatened preterm labor using cervical length and fetal fibronectin testing

Issues with Cervical Ultrasound

- Past
  - despite association with spontaneous preterm birth, there were no effective interventions to reduce risk
- Present
  - no uniform technique or image quality criteria
    - inter and intraobserver variation
    - uncertain impact on appropriate clinical care

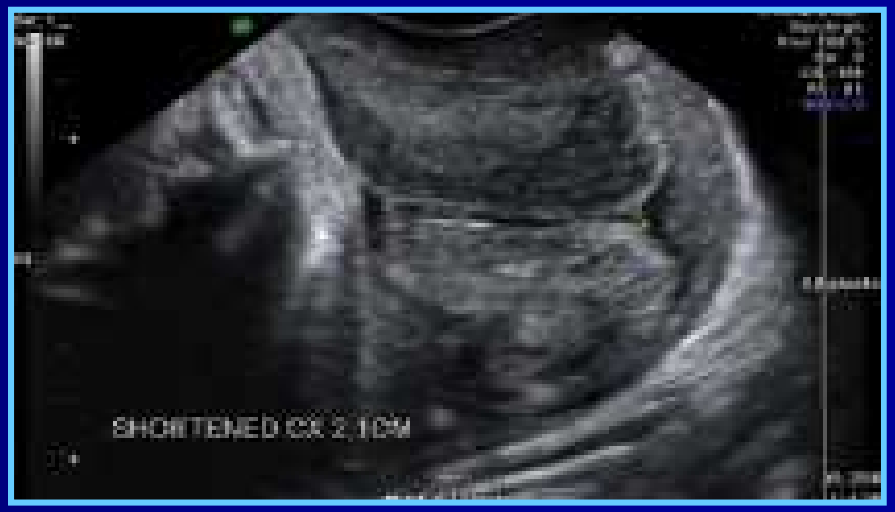
CLEAR

- Cervical Length Education And Review
  - standardizes imaging technique and quality
  - 3 on-line lectures (FREE!)
  - available
    - CME ($75)
    - image review ($75)
  - completely voluntary

www.perinatalquality.org

CLEAR Cervical Measurement Image Criteria

- Transvaginal image
- Maternal bladder empty
- Cervix occupies 75% of image
- Anterior width = posterior width
- Internal OS seen
- External OS seen
- Cervical canal visible throughout
- Caliper placement correct
- Cervical mobility considered



Indications for Cervical Length Measurement

- Second Trimester
  - assess SPTB risk in women with or without prior SPTB
  - guide preventative care of SPTB in women with short cervix
- Third Trimester
  - assess and guide care of women with threatened preterm labor

Second Trimester Cervical Length Measurement – Universal Screening?

"although this document does not mandate universal cervical length screening in women without a prior preterm birth, this screening strategy may be considered."

ACOG Practice Bulletin #130
October 2012

"CL screening in singleton gestations without prior PTB cannot yet universally be mandated." …"such a screening strategy can be viewed as reasonable…"

SMFM
AJOG May 2012

Scenario #1

- Singleton, no prior SPTB, short cervix (≤20mm) ≤24 weeks
- Is there an intervention to reduce prematurity risk?
  - VAGINAL PROGESTERONE daily from diagnosis to 36 weeks
  - 90 mg gel or 200 mg suppository

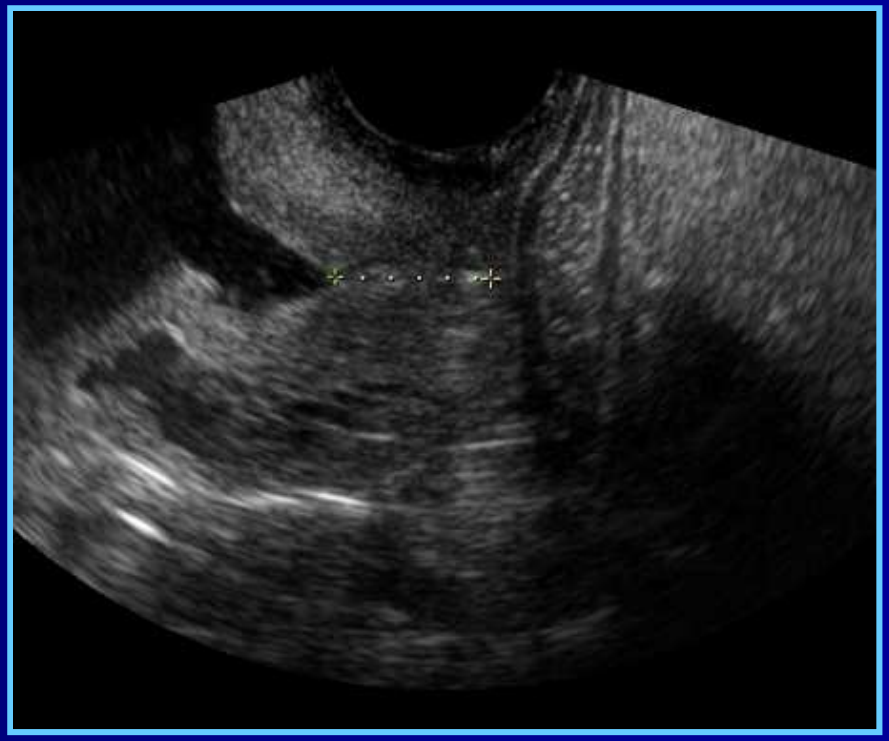
Benefits of Vaginal Progesterone

Outcome	RR (95% CI)
Preterm birth <33w	.56 (.40-.80)
Composite morbidity	.59 (.38-.91)

Romero R, et al AJOG 2012

Case #1

- 34 year old G_1P_0 at 22 2/7 weeks
- Suspected short cervix on TAUS



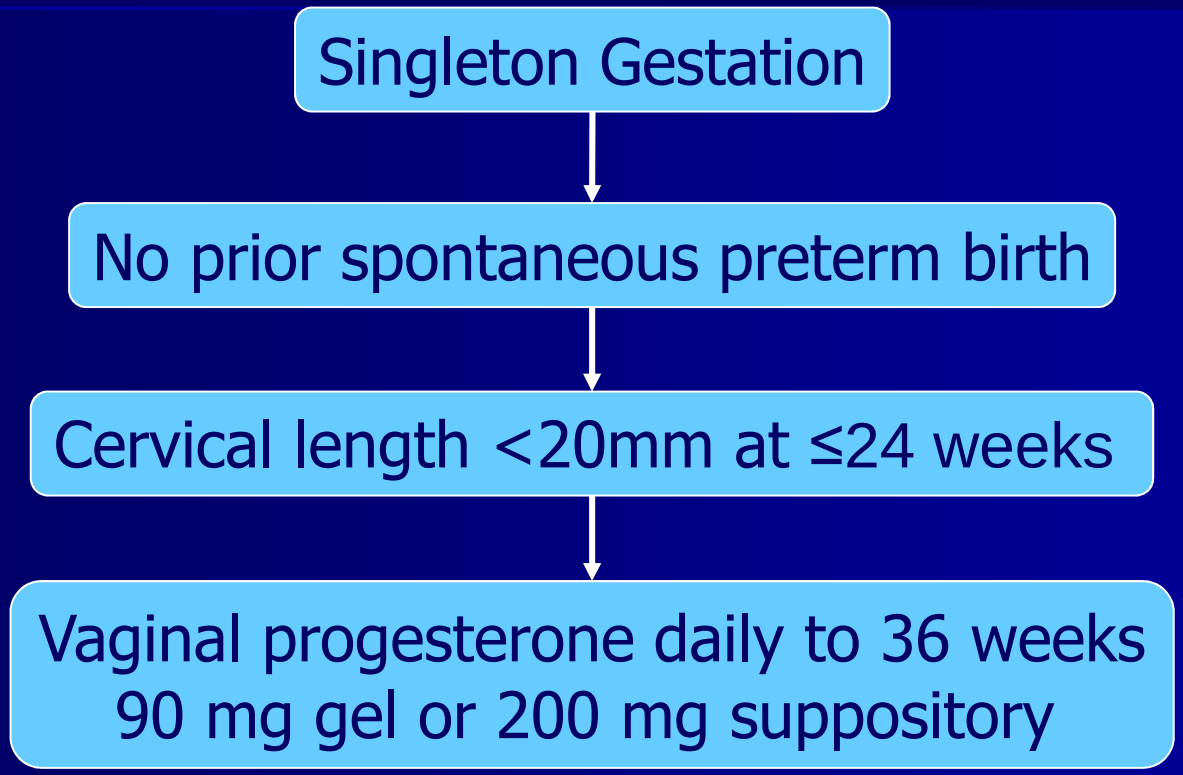
Cervical length 15mm

Case #1

- Negative urinalysis
- No contractions

VAGINAL PROGESTERONE CANDIDATE!

Algorithm



No benefit to cerclage or 17-hydroxyprogesterone caproate

SMFM AJOG May 2012
ACOG OG October 2012

Scenario #2

- Singleton, prior SPTB, unknown or normal (>25mm) cervix ≤24 weeks
- Is there an intervention to reduce prematurity risk?

  17-hydroxyprogesterone caproate (17P) weekly 16-36 weeks, 250 mg IM

Benefits of 17P

Delivery	%	RR (95% CI	NNT
<37w	36.3	0.66 (0.54-0.81)	5-6
<32w	11.4	0.58 (0.37-0.91)	12

Meis P, et al NEJM 2003

Scenario #2

- Is there a role for cervical length surveillance?

  YES!
  - meta-analysis, 4 randomized trials
  - prior SPTB <37w, cervix ≤25mm

Outcome	Cerclage	No Cerclage	RR (95% CI)	NNT
Delivery <35w	23.4%	39.0%	0.61 (0.40-0.92)	8

Berghella, et al OG 2005

Scenario #2

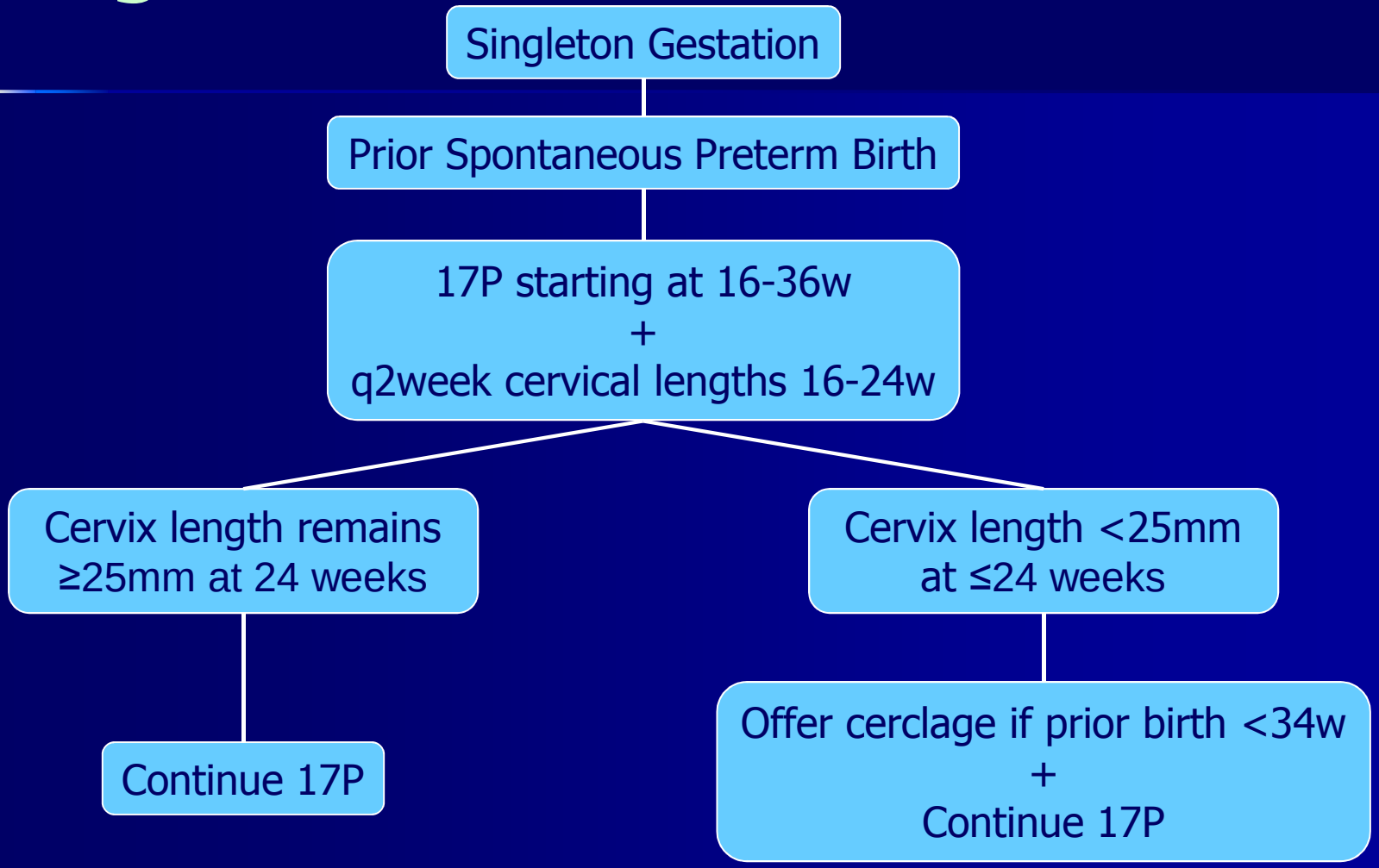
- Randomized trial cerclage vs. no cerclage
- Prior SPTB <34w, cervix ≤25mm at 16-22w

Outcome	Cerclage RR (95% CI)
<37w	0.75 (0.60-0.93)
<35w	0.78 (0.58-1.04) 0.23 (0.08-0.66)*
<24w	0.44 (0.21-0.92)
perinatal death	0.54 (0.29-0.99)

*<15mm

Owen, et al AJOG 2009

Algorithm



SMFM AJOG May 2012; ACOG OG October 2012

Scenario #2

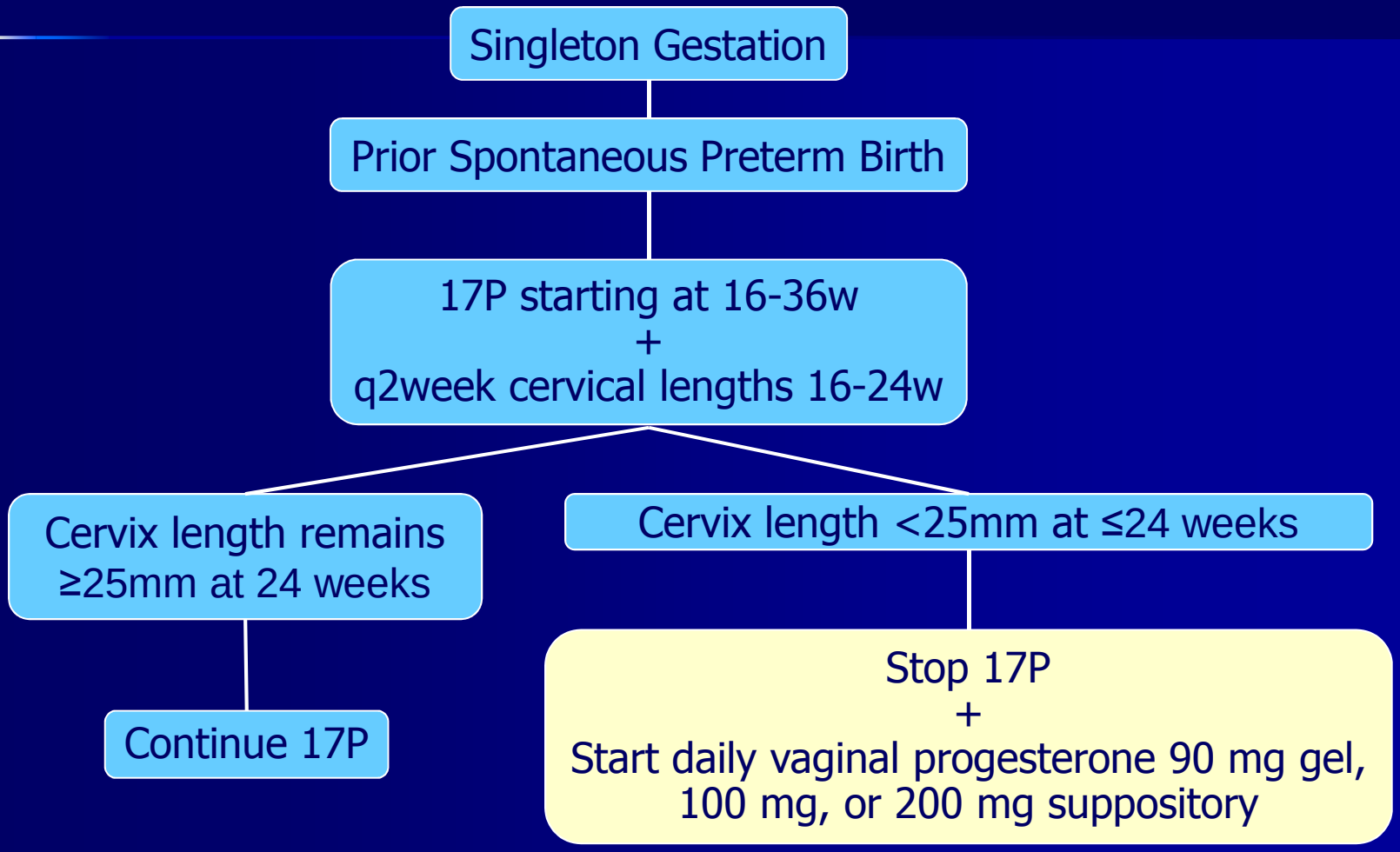
- Indirect comparison meta-analysis
- Vaginal progesterone vs. cerclage, cervix <25mm
- Both reduce
  - delivery <32w
  - composite perinatal morbidity and mortality

Vaginal Progesterone vs. Cerclage

Outcome	RR (95% CI)
Delivery <32w	0.71 (0.34-1.49)
Composite M&M	0.67 (0.29-1.57)

Conde-Agudelo, et al AJOG 2013

Scenario #2
Possible Alternate Algorithm



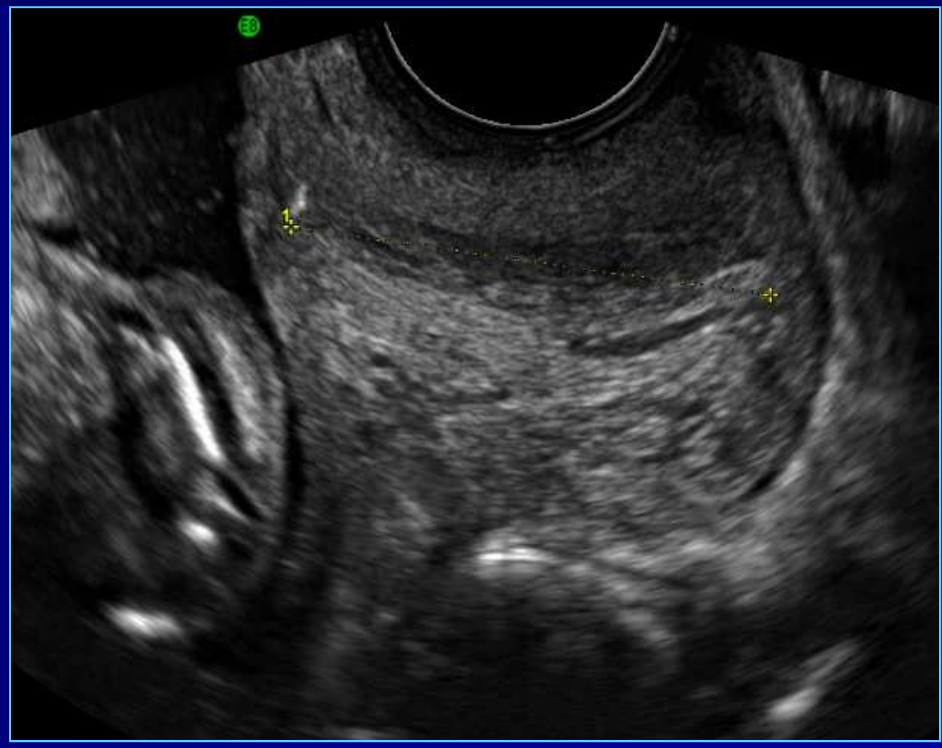
Conde-Agudelo, et al AJOG 2013

Case #2

- 26-year old G_3P_{1102} at 11 5/7 weeks
- Pregnancy #1
  - short cervix
  - preterm labor at 26 weeks
  - delivery at 28 weeks
- Pregnancy #2
  - 13 week cerclage
  - 40 week delivery

Case #2

- 17P 16-36 weeks
- Every 2 week cervix lengths 16-24 weeks



24 week cervix length = 37mm

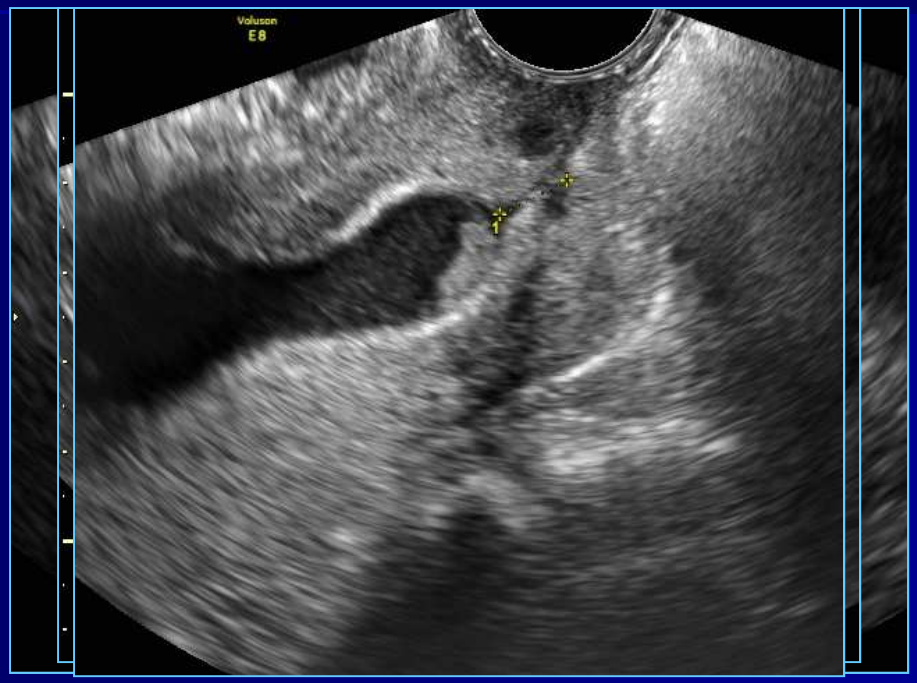
Case #2

- Spontaneous labor at 39 weeks
- Delivered 9lb 6oz infant, Apgars 9/9

Case #3

- 39-year old, G_4P_{0030}
- Two 2nd trimester losses (14w, 16w)
- 17P 16-36 weeks
- Every 2 week cervix lengths 16-24 weeks

Case #3



23 week cervix = 32mm

Cerclage

or

Vaginal Progesterone?

Case #3

- Continue 17P
- Emergency cesarean at 34 weeks – abruption

How well do 17P, cerclage, or both perform in patients with a singleton and prior SPTB?

Delivery	No Rx	17P	Cerclage	17P + Cerclage
<24w	20	2	7	4
<28w	25	15	17	9
<32w	34	21	25	17

Berghella, et al AJOG 2010

Scenario #3

- Twins, normal cervix regardless of prior SPTB

No value to 17P or vaginal progesterone

Scenario #4

- Twins, no prior SPTB, short cervix
- Vaginal progesterone *may* reduce neonatal composite morbidity, but small numbers

  RR 0.52 (0.29-0.93) Romero, et al AJOG 2012

"insufficient evidence to assess effect of progesterone" SMFM

"available data regarding the efficacy of cerclage placement, progesterone supplementation, or both…do not support their use." ACOG

Scenario #4

- 17P not efficacious
- Avoid cerclage
  - meta analysis suggests *increased* adverse outcomes

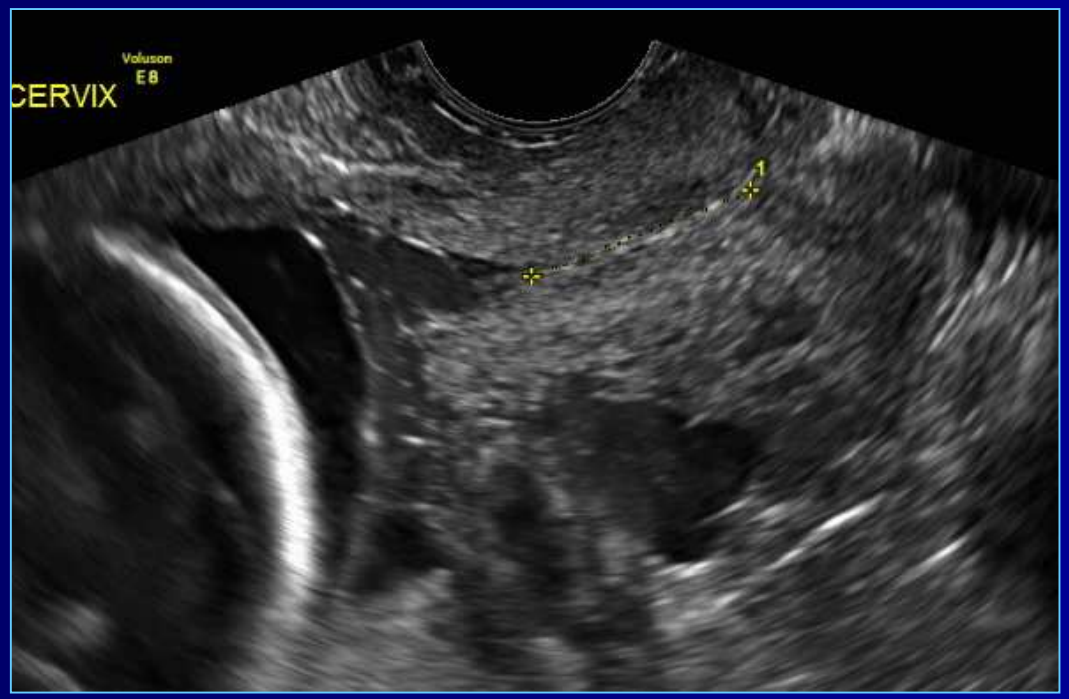
Outcome	RR (95% CI)
Delivery <35w	2.15 (1.15-4.01)
Perinatal mortality	2.66 (0.83-8.54)

Berghella, et al OG 2005

Case #4

- 45-year old, G_7P_{1051}
  - five 1st trimester miscarriages
  - term cesarean
- IVF dichorionic twins

Case #4

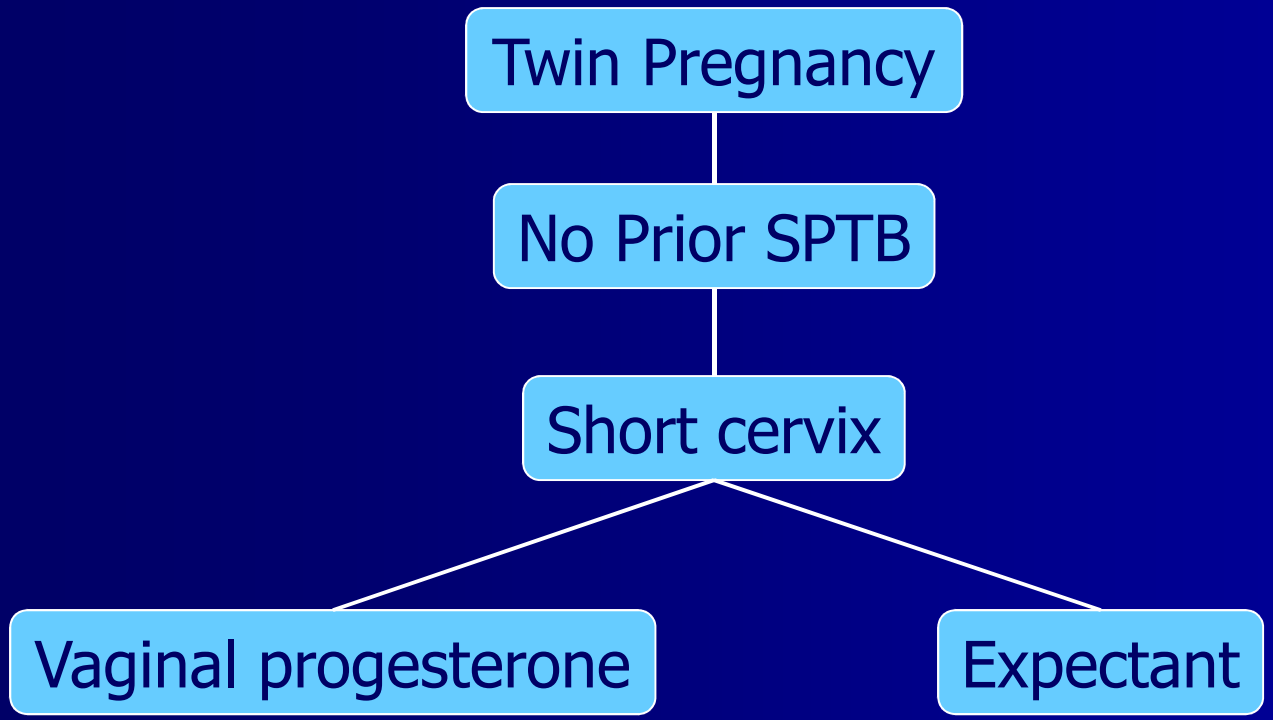


20 week cervix length 21mm

Case #4

- No contractions
- Negative urinalysis
- Options?
  - vaginal progesterone
  - expectant care
- Outcome
  - spontaneous labor at 36 weeks

Algorithm


Twin Pregnancy
No Prior SPTB
Short cervix
Vaginal progesterone
Expectant

Preterm Labor: (≥24 weeks) Importance of Early Diagnosis

- Transfer to facility with NICU
- Glucocorticoid administration
- Group B streptococcal (GBS) prophylaxis
- Tocolytic therapy

Clinical Indicators of Preterm Delivery (24h-7d)

- Cervix
  - dilation ≥3cm
  - effacement ≥80%
- Vaginal bleeding
- Ruptured membranes

Often occur too late to intervene

Evaluation of the Symptomatic Patient

- Two Goals:
  1. Identify patient not likely to deliver preterm and avoid unnecessary intervention
  2. Identify patient likely to deliver preterm, allowing time for effective interventions

Assessment of Symptomatic Patient-Speculum Exam

- Obtain vaginal swab for fetal fibronectin (FFN)
- Evaluate for presence of amniotic fluid
- Obtain culture for GBS

Fetal Fibronectin (FFN)

- Glycoprotein acts as a "glue" for membrane adherence
- Presence in cervicovaginal fluid 20-36 weeks associated with increased risk of SPTB
- Absence of FFN associated with reduced risk of SPTB in next 7-14d

	SPTB Detection (%)	PPV (%)	NPV (%)
Singletons			
Symptomatic	76.1	25.9	97.6
Asymptomatic	17-19	13-24	97
Twins	71		97

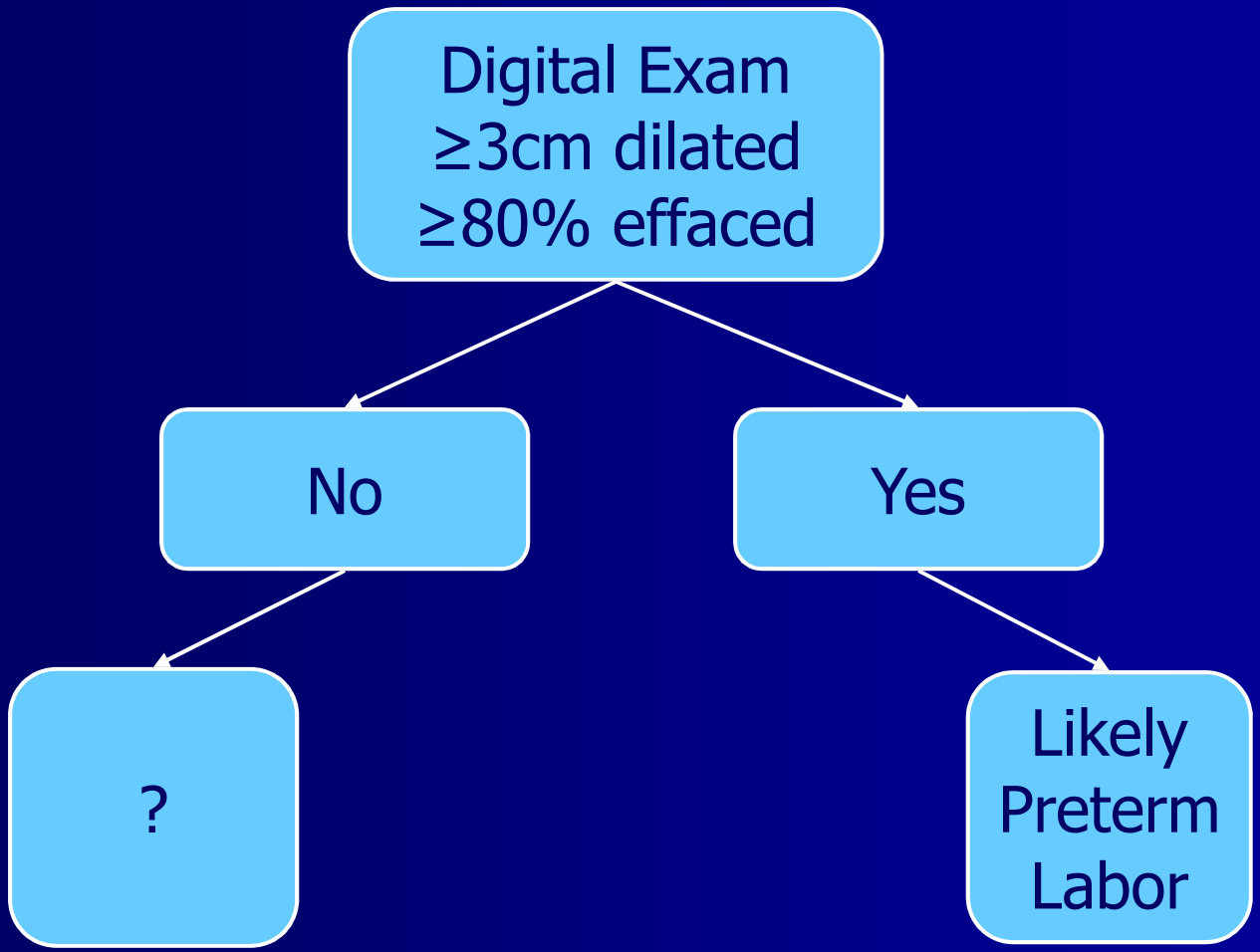
Sanchez-Ramos L, et al OG 2009; Singer E, et al OG 2007

Assessment of Symptomatic Patient

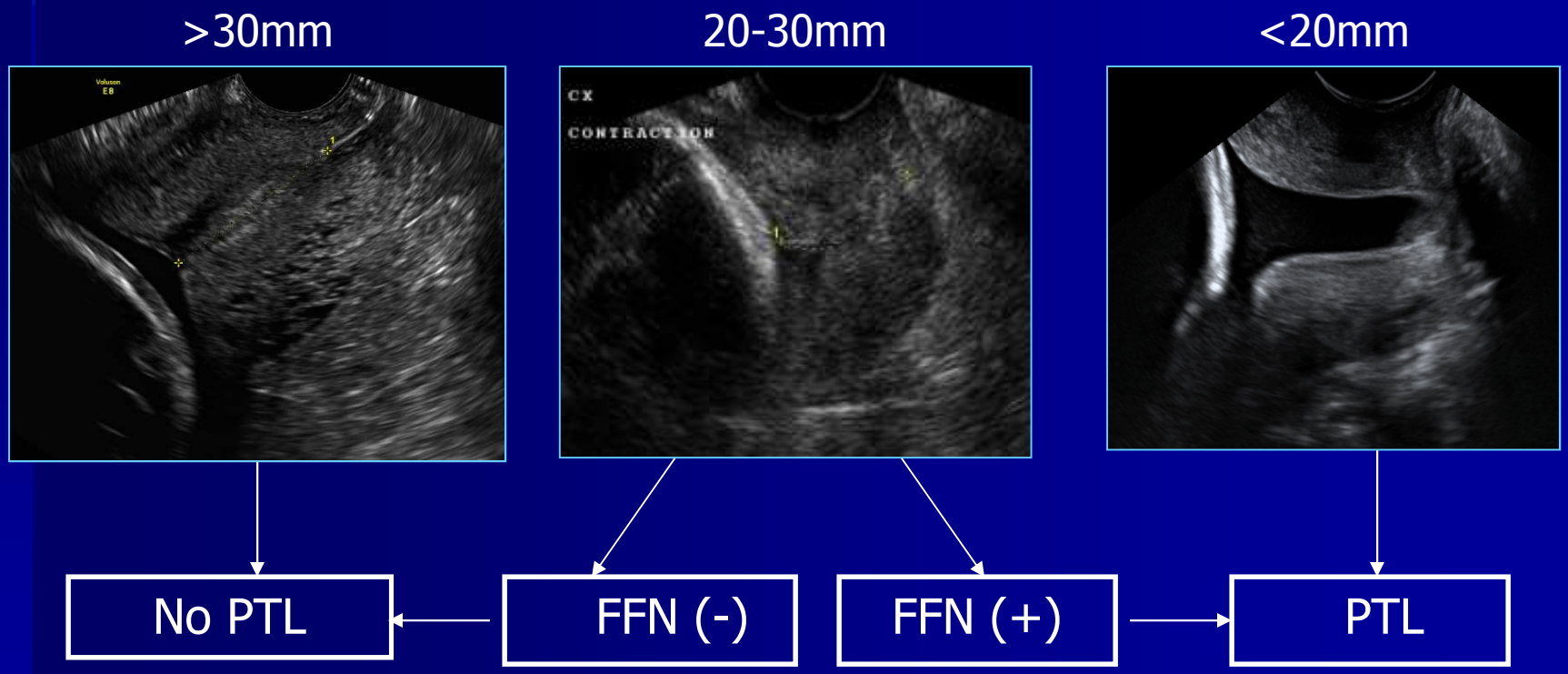
- Evaluate for and treat:
  - cystitis
  - bacterial vaginosis (if prior preterm delivery)
- To significantly reduce prematurity:
  - RR 0.56 (95% CI 0.43-0.73)
  - OR 0.42 (95% CI 0.27-0.67)

Romero R, et al Obstet Gynecol 1989
Leitich H, et al AJOG 2003

Assessment of the Symptomatic Patient – The Cervix



Trust **Y**our **V**aginal **U**ltrasound! (and your FFN, too)



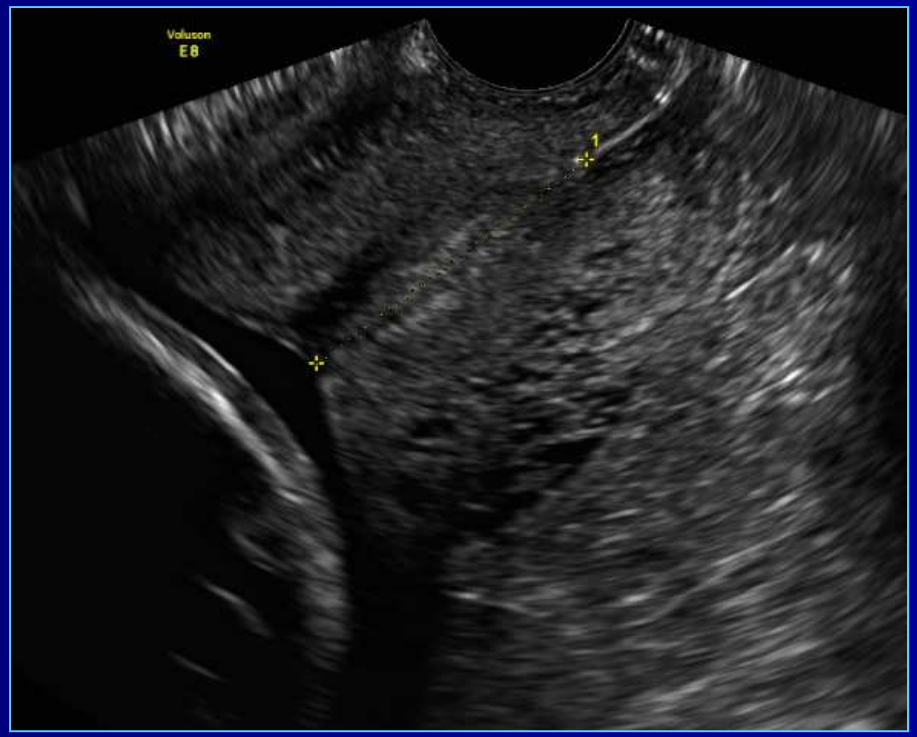
Iams, JD. Obstet Gynecol 2003

Case #1

- 31-year old, G_3P_{2002}, singleton
- cc: contractions at 25 6/7 weeks
- monitor: no contractions
- urinalysis: negative

Case #1

- Cervical length = 35mm
- Diagnosis?
- Plan?
- Outcome:
  emergent c/s at 34 weeks (abruption)

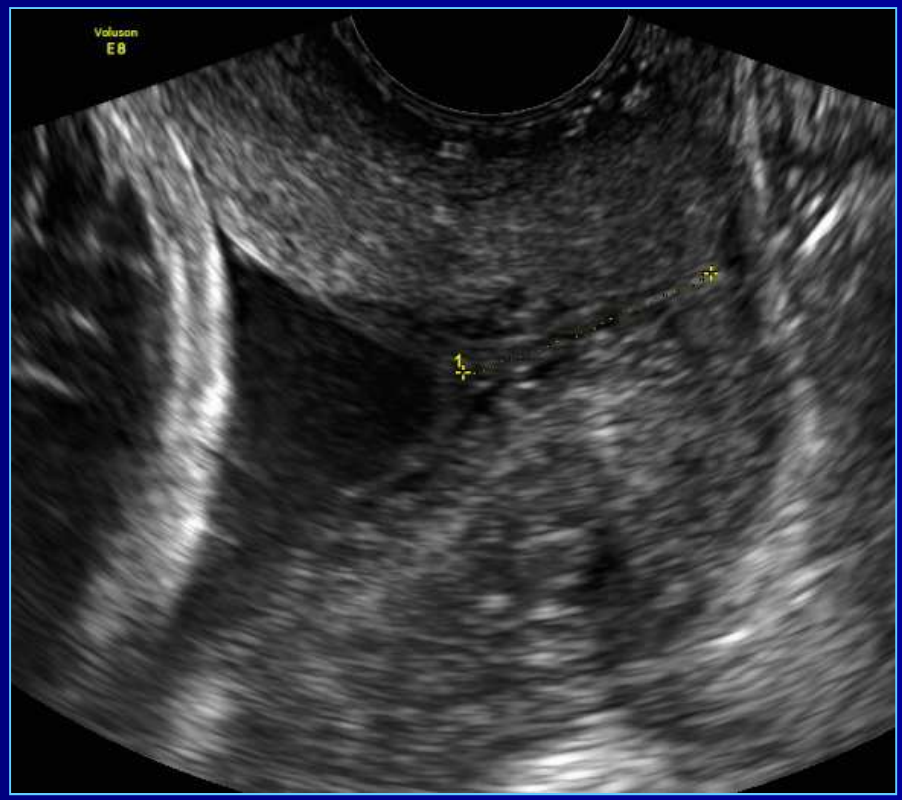


Case #2

- 33-year old, G_4P_{2012}, singleton
- cc: contractions at 28 3/7 weeks
- monitor: contractions every 1-3”
- urinalysis: negative

Case #2

- Cervical length = 20mm
- Diagnosis?
- Plan?



Case #2

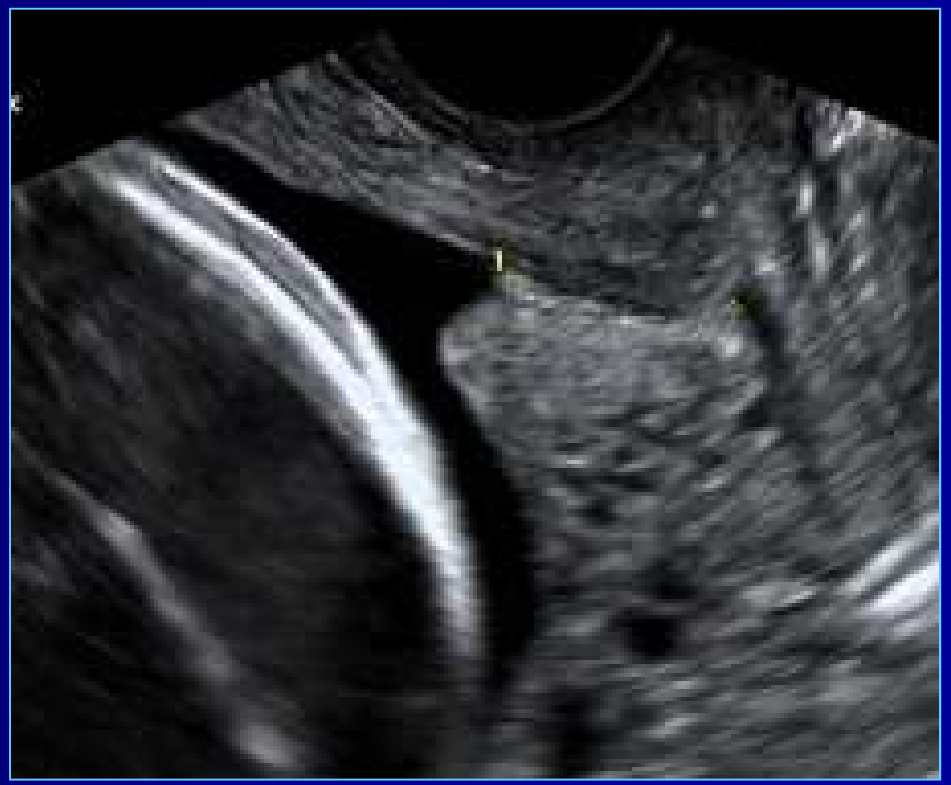
- FFN = negative
- D/C on nifedipine
- Outcome: repeat c/s in labor at 37 weeks

Case #3

- 27-year old G_1P_0, singleton
- cc: contractions at 30 6/7 weeks
- monitor: q3” contractions
- urinalysis: negative
- cervix: 1cm/70% effaced

Case #3

- Cervical length = 17mm
- Diagnosis?
- Plan?



Case #3

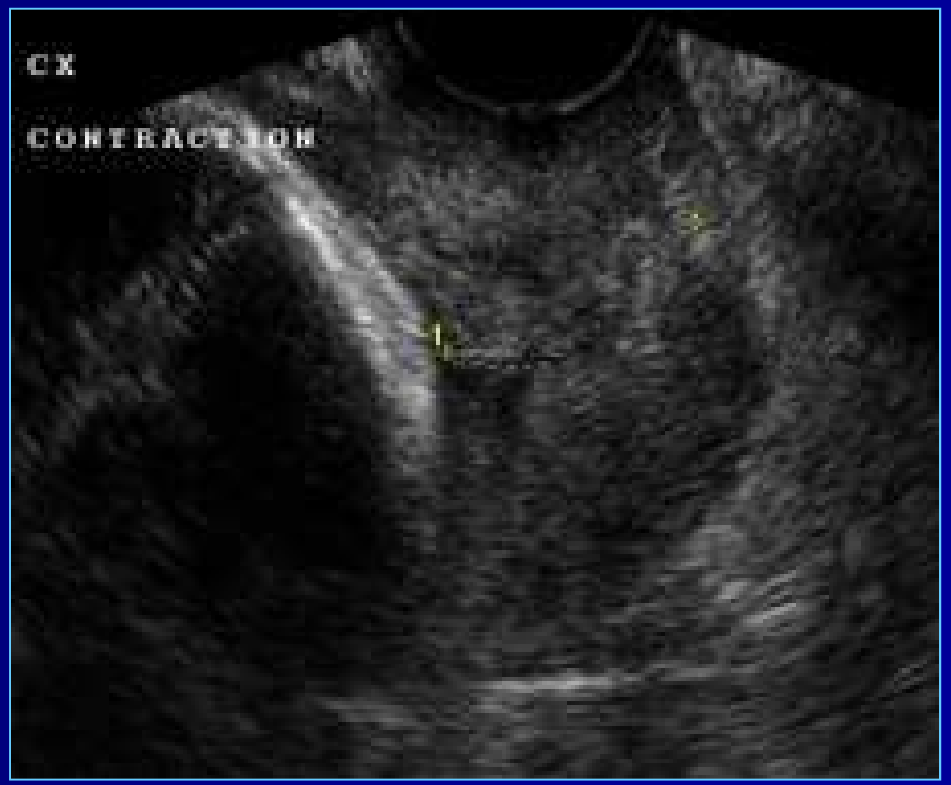
- Treatment
  - steroids
  - tocolytic
  - antibiotic
- Outcome
  - recurrent PTL
  - delivery at 31 2/7 weeks

Case #4

- 31-year old G_1P_0, dichorionic twins
- cc: contractions q3”
- monitor: q3” contractions
- urinalysis: negative
- cervix: 1-2cm/50% effaced

Case #4

- Cervical length = 27mm
- Diagnosis?
- Plan?



Case #4

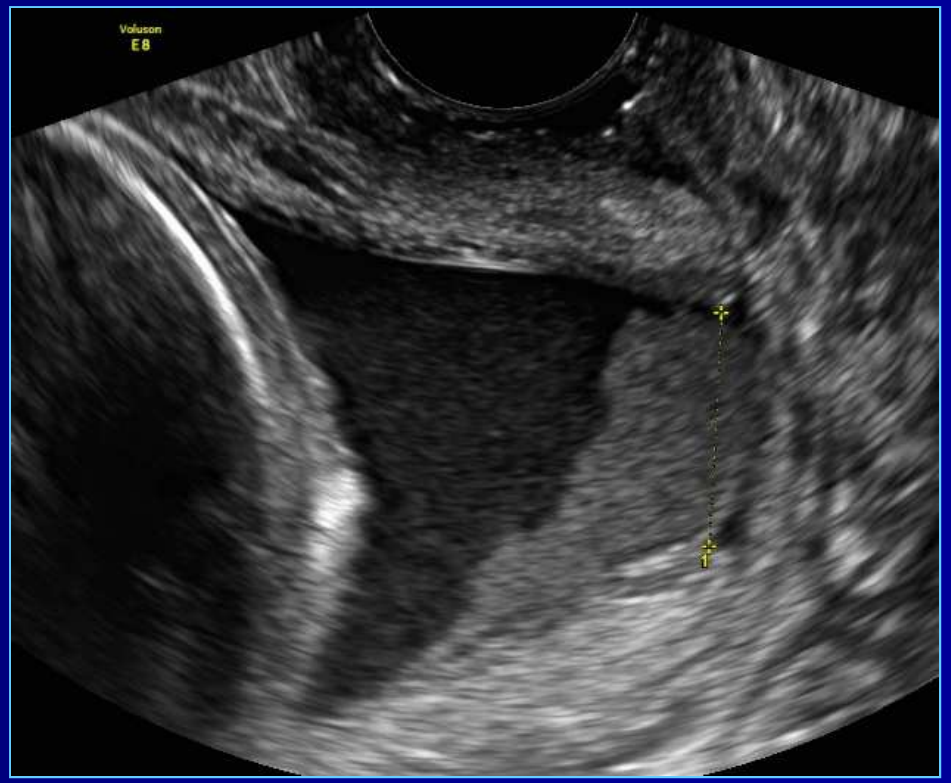
- FFN negative
- Every 2 week cervix length (stable) and FFN (-) to 34 weeks
- Spontaneous labor at 36 weeks

Case #5

- 26-year old G_2P_{0010}, dichorionic twins
- cc: q4” contractions
- monitor: q4” contractions
- urinalysis: negative
- cervix: 2cm/80% effaced

Case #5

- Cervix length = no measurable cervix, sludge present
- Diagnosis?
- Plan?



Case #5

- Tocolysis
- Steroids
- Antibiotics
- Progressive labor
- Cesarean delivery

Summary – Singletons

- No prior SPTB
  - cervical length screening not recommended, but acceptable
  - treat short cervix with vaginal progesterone

Summary – Singletons

- Prior SPTB
  - treat with 17P 16-36 weeks
  - serial cervix lengths 16-24 weeks
  - for short cervix
    - offer cerclage, continue 17P
    - vaginal progesterone without cerclage or 17P

Summary – Twins

- No current role for 17P or cerclage
- No prior SPTB, short cervix
  - expectant care vs. vaginal progesterone

Summary – Threatened PTL

- Cervical length with FFN effectively triages women with threatened PTL and an equivocal digital exam