Cervical Ultrasound: The Transvaginal Probe, At Your Cervix

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Objectives

• Discuss concepts behind screening testing
• Review rationale for evaluation of cervical length and implications for patient care
• Review evaluation of cervical length and anatomy by ultrasound
• Wrap it up!
Maternal-Fetal Medicine

- Obstetrics subspecialty
- Complications seen in mother
- Complications seen in babies
- Complications in the process of gestation
- Consult for and advise general obstetricians, midwives, and family practice
- Overlap with ultrasound in radiology
Case

- 41 y/o Latina woman Gravida 3 Para 2002 at 27 weeks
- Patient presented for ultrasound for fetal growth
- No complaints of cramping, back pain, bleeding, leakage of fluid, or change in discharge
- Normal structural survey and normal cervical length at 20 weeks in our office
Case: 41 y/o multiparous woman
Follow up growth scan 28 wks
Suspicious ultrasound images

- Transabdominal images suggested foot prolapsing into cervical canal or into vagina
- Deferred transvaginal ultrasound until patient examined with speculum and pelvic exam performed
- Obstetrical urgency
  - High risk of cord prolapse
  - Prematurity
  - Outside hospital with no neonatologist around, no OB in house, no privileges for the OR for me!
Why do we do what we do?
Statistics Don’t Have To Be Boring

...they just usually are

Statistics shows that teenage pregnancy drops dramatically after 20
Screening versus Diagnostic Testing

• Screening
  • Purpose is to identify unrecognized disease or defect in asymptomatic individuals

• Criteria
  • The condition must pose a significant health concern
  • Must be effective treatment for the condition if “screen positive”
  • Test must be valid (accurate) and reliable (reproducible)
  • Test must be inexpensive* and easy to perform
    • Must be cost-effective
  • Test must be safe and acceptable to patients

*Creasy and Resnick’s Maternal Fetal Medicine
Examples - Screening

- Pap smear
- Successful screening!
Examples - Screening

• Pap smear
  • Meets above criteria
  • Ongoing reassessment of how to manage results

• Cytomegalovirus (CMV)
  • Significant burden of disease? Yes
  • Effective treatment? No
    • Some centers experimenting with CMV Ig
Examples - Screening

- Fetal fibronectin
  - Protein from matrix between amnion and chorion
  - Most centers assess qualitatively - positive or negative
  - Must be obtained from posterior fornix with Dacron swab PRIOR to transvaginal ultrasound or digital exam, or no sooner than 24 hours after last exam or intercourse
  - Useful adjunct in assessing risk of preterm labor in patients from 24 weeks on
  - Significant burden of disease
  - Effectiveness of intervention limited

Andrews WW Obstet Gynecol 2003
Receiver Operating Characteristic Curves (ROCs)

- Expresses a continuum instead of categorical response
  - Spectrum of normal to abnormal instead of negative or positive

- Most medical tests require clinicians to accept trade-offs between ability to detect a problem and ability to rule out an abnormal finding

- How do you determine the threshold?
  - ROC
Receiver Operating Characteristic Curves (ROCs)

- Three main uses
  - Select a cut point for an individual test
  - Assess overall accuracy of an individual test
  - Compare accuracy of two tests for the same condition
The shortest observed cervical length is better than initial cervical length at predicting risk of preterm birth.

Neither measurement is ideal.

The optimal “cut point” for the shortest cervical length is 2.5 cm (25 mm):
- Sensitivity only about 70%
- False positive rate of 20%
Why do we care about cervical length?

- Preterm birth is a common problem

![Graph showing percentages of preterm and low birthweight from 1990 to 2011. The graph is sourced from CDC/NCHS, National Vital Statistics System.]
Preterm Birth
Preterm Deliveries

- Cervical insufficiency (aka cervical incompetence)
- Preterm labor
- Preterm rupture of membranes
- Indicated preterm birth

Cervical length assessment focuses on the first three
Cervical Insufficiency

- Often painless dilatation
- Recurrent second trimester births in the absence of other causes
- Suggestive of intrinsic structural cervical weakness
  - Connective tissue weakness from genetic disorder
  - Iatrogenic following conization
Cervical Insufficiency

- Most effective treatment is cerclage
- Performed transvaginally or transabdominally
Cervical Shortening

- More likely early step in labor process than marker of cervical insufficiency
- May be iatrogenic
  - LEEP, cold knife cone biopsy
  - Surgical dilatation
  - Cervical laceration from prior delivery
    - Vaginal or cesarean
- May be congenital
  - DES exposure
  - Mullerian anomaly
Cervical Shortening

- Cervical remodeling
  - Softening
  - Effacement = decrease in length
  - Dilation without contractions
  - Dilation with contractions
Cervical Shortening

- Prevented or stabilized with progesterone
- If previous preterm birth, give 17 OH progesterone weekly beginning at 16 weeks to reduce risk of subsequent preterm birth
- If no prior preterm birth, but findings of cervical shortening, give progesterone vaginally
- Preterm labor changes not prevented with cerclage
Cervical Shortening

- Interpretation depends upon gestational age

- < 23-24 weeks
  - Measurements < 2.5 cm likely treated with vaginal progesterone
  - Measurements < 1.5 cm at highest risk of preterm birth

- > 23-24 weeks
  - Measurements < 2.0 cm usually lead to discussion of steroids for fetal maturity
  - Consider monitoring for contraction activity
Normal Cervix - Transabdominal
Normal Cervix, Transvaginal
Normal Cervix - Transvaginal, s/p LEEP x 4???
Suspicious Cervix - Transabdominal
Suspicious Cervix
Abnormal Cervix

Amnion

Chorion

Cervical length (15 mm)
Continuing our Case

- Patient was seen in labor and delivery
- Speculum exam demonstrated normal external os
- Digital exam suggested effacement but no dilatation, no prolapsed foot
- No contractions on monitor
- Opted for close outpatient follow up
Case Images - Subsequent Visit
Case Images - Subsequent Visit
Summary

- Evaluation of the cervix should occur at all midtrimester scans, regardless of symptoms - SCREENING! 😊
- Transabdominal images are sometimes adequate but can be misleading
- In patients with risk factors for cervical abnormality, low threshold for transvaginal imaging
- Measurement less than 2.5 cm should prompt notification of physician as intervention available
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