Cervical Screening for the Prevention of Preterm Birth

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Did you know?
• Preterm birth (PTB) is the leading cause of infant morbidity and mortality in the industrialized world
  • Disorders related to prematurity and low birth weight make up 23% of United States neonatal deaths
• PTB is a major cause of long-term health problems in neonates, including respiratory distress syndrome, chronic lung disease (bronchopulmonary dysplasia), infection, intraventricular hemorrhage, and severe neurologic deficit.
Goals: At the end of this talk...

- You will be able to recognize transvaginal ultrasound landmarks used to achieve an accurate cervix length measurement.
- You will be able to identify cervical incompetence through the use of ultrasound, history, and clinical judgement.
- You will have basic knowledge of appropriate management options for cervical incompetence.

Risk factors for Preterm Birth

- History of preterm birth is the strongest risk factor for spontaneous preterm birth
  - Women with a history of PTB account for 10% of all births <34 weeks gestation
- Maternal history of preterm birth increases risk for recurrent preterm birth 1.5-2x above baseline risk in a subsequent pregnancy.
- The risk of PTB is highest when the previous PTB was in the pregnancy prior to the current pregnancy (ie, no intervening term pregnancies).
- Recurrence ranges from 5-70% depending on the etiology, whether the previous PTB was spontaneous or iatrogenic, whether it was associated with a single or with multiple risk factors, and the gestational age at the time of the delivery (<30 weeks’ recurs 40% of the time; 30-34 weeks’ 25%, and 34-37 weeks’ 5-10%).

Additional Risk Factors

- No partner
- Low socioeconomic level
- Anxiety/stress
- Depression, use of SSRIs
- Life-events (divorce, separation, death)
- Diet and nutrition in pregnancy
- Maternal illness (xerostomia, organ-specific)
- Hypertension
- Pre-eclampsia
- Polyhydramnios
- Urinary anomaly
- PFDM
- History of second trimester abortion
- History of cervical surgery
- Premature cervical dilatation of effacement
- Premature rupture of membranes
- Infections (gonorrhea, chlamydia, pyelonephritis, pelvic inflammatory disease)
- Environmental factors (heat, air pollution)
- Fetal demise
- Positive HIV test result in vaginal secretions
- Bacteriuria
- Pelvic inflammatory disease
- Placenta previa
- Placenta abruption
- Violent bleeding (especially in more than one pregnancy)
- Previous preterm delivery
- Induction of labor
- Smoking
- Maternal age (<18 or >40)
- African-American race
- Poor nutrition and low body mass index
- Inadequate prenatal care
- Anemia (Hgb <10g/dL)
- Excessive uterine contractility
- Low level education
- Maternal first degree history of spontaneous preterm birth
- Fetal anomaly
- Fetal growth restriction

(Risk factors, 2018)
How to predict who will deliver preterm?

- History, Physical
- Few tests available
- FFN
  - Fetal glycoprotein found at the interface between the maternal decidua and fetal amniochorion
  - Should be absent from cervicovaginal secretions between 22 and 37 weeks
  - At least 99% of symptomatic patients with a negative fFN will not deliver within 7 days.
- Cervix length measurement
  - Objective, reproducible, accepted by most patients
  - Can appreciate funneling
    - The process of cervical shortening begins with dilatation of the internal os leading to funneling and progressive shortening of the CL
  - Allows for intervention, if indicated
    - Help to prevent, delay, and prepare for preterm birth

The finding of short cervix length, irrespective of prior pregnancy history, has been consistently and reproducibly associated with an elevated risk of spontaneous preterm birth across different gestational age cutoffs and multiple patient populations.

- Even in women with symptoms of preterm labor, PTB is highly unlikely if the CL is longer than 30 mm or if the fFN is negative.

What is a normal cervix length?

- In a low risk pregnancy 20-30 weeks:
  - 90th percentile 45mm
  - 10th percentile 25mm
- In low-risk pregnancies, women with a cervix that is shorter than 25 mm (10th percentile) at 24 weeks have a 6-fold increase in the risk of spontaneous PTB before 35 weeks of gestation compared with women with values above 40 mm (75th percentile).
- At 28 weeks, women who deliver at term may show some degree of cervical shortening.
When are serial cervix length measurements indicated per SMFM and ACOG Guidelines?

- History of preterm delivery
  - We recommend routine transvaginal CL screening for women with singleton pregnancy and a history of prior PTB (Grade 1A)
- Patient without a history of preterm delivery
  - Practitioners who decide to implement universal CL screening should follow strict guidelines (Grade 2B)
- In general, universal cervical screening is not currently recommended
  - Many women with a short cervix will go on to have a term delivery
- When is serial cervix length measurement NOT indicated?
  - We recommend routine transvaginal CL screening NOT be performed for women with cervical cerclage, multiple gestation, PPROM, or placenta previa (Grade 2B)

* There are other indications for transvaginal ultrasound

What are the criteria for an optimal cervix length measurement?

- Transvaginal ultrasound
  - More sensitive than transabdominal ultrasound
  - When performed by trained operators, the results are reproducible
- C.L.E.A.R. Criteria (sponsored by SMFM and its Perinatal Quality Foundation)
  - Cervical Length Education and Review program
  - Fetal Medicine Foundation Certificate of Competence in Cervical Assessment

C.L.E.A.R. Steps for Proper Cervical Length Measurement

- Ensure patient has emptied her bladder
- Prepare the cleaned probe and use a probe cover
- After vaginal insertion, guide the probe to the anterior fornix
- Obtain a sagittal, long axis image of the entire cervix
- To ensure excessive pressure isn’t being used: Remove the probe just until the image blurs and then re-insert gently until the image clears
- Enlarge the image so that the cervix occupies two-thirds of the screen
- Ensure both the internal and external os are seen clearly
- Measure the cervix length along the endocervical canal between the internal and external os
- Repeat this process two more times to obtain a total of 3 sets of images/measurements (take each cervical measurement with and without calipers)
- Use the shortest best measurement
- Repeat every 1-2 weeks or as clinically indicated from 16-24 weeks gestation
Why do we only screen 16-24 weeks gestation?

- Prior to 16 weeks gestation, the lower uterine segment is underdeveloped, making it difficult to distinguish from the endocervical canal.
  - Studies evaluating first trimester and early second trimester cervix lengths have not consistently shown adequate predictive value of cervix length measurement for preterm birth.
- After 24 weeks gestation in an asymptomatic woman, the fetus is considered viable and there are no interventions that are recommended past that gestational age. Therefore, cervix length screening after 24 weeks gestation in asymptomatic women provides little clinical value.
- (There are still circumstances in which a Perinatologist/ObGYN may consider CL measurement prior to 16 weeks and after 24 weeks gestation.)
Normal Cervix

Short Cervix with Funnel

Normal Cervix with Lower Uterine Segment Contraction

Follow-up
Bulging Bag (Transabdominal)

Dynamic Cervix

You found a shortened cervix, now what?
- The majority of women with an incidental finding of short cervix and no risk factors for preterm birth, will deliver at term.
- Management options available:
  - Expectant management & cervical length screening
  - Progesterone suppository (200mg nightly) & cervical length screening
  - Cerclage
What are the criteria for a diagnosis of cervical insufficiency and cerclage placement?

- **Ultrasound-based cervical insufficiency**
  - **Criteria**
    - One prior second-trimester loss/extremely preterm birth (<28 weeks)
    - AND
    - Cervical length ≤ 25mm before 24 weeks
  - **Management**
    - Cerclage up to 24 weeks gestation
    - +/- vaginal progesterone

- **Physical examination-based cervical insufficiency**
  - **Criteria**
    - Women 14-27 weeks gestation
    - Dilated and effaced cervix on physical examination
    - Effacement and dilation are usually not detected until the transvaginal cervical length is ≤ 10 mm
    - No contractions or inadequate weak/irregular contractions that don’t explain the dilation/effacement
    - Membranes may be prolapsed or ruptured
  - **Of note:**
    - Cerclage will only be placed up to 24 weeks gestation
    - Cerclage is not placed in patients who are contracting or with ruptured membranes
    - +/- vaginal progesterone

- **History-based cervical insufficiency**
  - **Criteria**
    - ≥ 2 consecutive prior second-trimester pregnancy losses/extremely preterm births (<28 weeks) associated with no or minimal/mild symptoms
    - ≥ 3 preterm births in which other causes of preterm birth (infection, placental bleeding, multiple gestation, preterm labor) have been excluded
    - Risk factors for structural cervical weakness (in the history) should support the diagnosis
  - **Management**
    - Prophylactic cerclage placement at 12-14 weeks gestation may be offered
    - +/- 17-OHP 24-36 weeks gestation
    - Alternatives
      - 17-OHP in women with previous PTD ≥ 20 weeks gestation
      - Serial cervical length screening and initiation of vaginal progesterone if cervix length falls to ≤ 25mm
      - Rescue cerclage can be considered with ultrasound/physical examination cervical insufficiency, however this may pose higher risk than prophylactic cerclage
Contraindications to Cerclage

• The major contraindications are clinical scenarios where the procedure is unlikely to reduce the risk of preterm birth or improve fetal outcome: fetal anomaly incompatible with life, intrauterine infection, active uterine bleeding, active preterm labor, preterm premature rupture of membranes, and fetal demise.

• The presence of fetal membranes prolapsing through the external cervical os is a relative contraindication because the risk of iatrogenic rupture of the membranes in this setting may exceed 50 percent.

• Placenta previa on ultrasound examination is not an absolute contraindication to cerclage placement; whether it decreases the risk of bleeding is controversial

Types of Cerclages

• McDonald
• Shirodkar
• Transvaginal cervicoisthmic cerclage (TVCIC) – rare
• Transabdominal cerclage (TAC)
  ▫ Above cardinal ligament (level of internal os)
  ▫ Placed in open or laparoscopic procedure
  ▫ Delivery 37-39 weeks or immediately at the onset of regular uterine contractions
  ▫ Must deliver by cesarean section
  ▫ May be left in for future pregnancies, or may be removed at the time of CS if no future pregnancies are planned
  ▫ Criteria (must meet at least one)
    • Failed to deliver a healthy newborn after at least one previous elective transvaginal cerclage (does not include rescue cerclage)
    • Unable to undergo a transvaginal procedure because an extremely short or absent cervix, amputated cervix, marked cervical scarring, or cervical defect make it technically impossible to perform
Complications associated with Cerclage placement

- Suture migration
- Rupture of membranes
- Chorioamnionitis
- Cervical lacerations
- Damage to adjacent anatomy
- Bleeding
Short Cervix Management Options in Women without Diagnosis of Cervical Insufficiency?

- Singleton gestations with no prior spontaneous preterm birth and with a short cervix (≤25mm) are treated with vaginal progesterone
  - Vaginal progesterone has shown a 45 percent reduction in preterm births in women who are carrying a singleton.

- Of note:
  - Cervical cerclage does not appear to be effective for women with a short cervix who have not had a prior preterm birth. In a meta-analysis of four randomized trials in which singleton pregnancies were screened with cervical ultrasonography and randomly assigned to cerclage or no cerclage if the cervix was short, cerclage placement in women with no prior preterm birth did not result in significant reduction in birth <35 weeks.
  - Women with no prior second-trimester pregnancy loss/extremely preterm birth, but risk factors for cervical insufficiency
    - Single transvaginal cervical length measurement at 18 to 24 weeks of gestation (usually at about 20 weeks, with the anatomic survey ultrasound) in women with singleton gestations and with no prior preterm birth
      - If short cervix (≤25 mm) identified, these patients are treated with vaginal progesterone.

What about tocolysis and bedrest for the prevention of preterm birth?

- Bedrest
  - No consistent evidence that it is able to delay preterm delivery
  - Increases risk for the development of blood clots

- Tocolysis
  - There isn’t consistent data to suggest that any tocolytic agent can delay delivery for longer than 24 to 48 hours.
  - Used during delivery of first course of antenatal steroids or for transfer to a tertiary care facility.

Special considerations?

- LEEP (Loop electrical excision procedure) or Cold Knife Conization
  - Increased risk of spontaneous birth appears to be related to the history of cervical dysplasia, not the procedure itself.
  - In one retrospective study of 108 women with prior conization, the rate of preterm delivery was similar to those without cervical dysplasia.
  - At this time, if the patient is otherwise low-risk without a history of prior PTL, no additional evaluation is recommended.
  - Vaginal progesterone may be reasonable in women who have had a very deep LEEP excision (≥1 to 2 cm) or two or more LEEP procedures.

- Multiple gestations
  - Routine CL screening in multiple gestations is not generally recommended by SMFM.
  - Cerclage has not been shown to be effective in multiple gestations, and therefore is not recommended.
  - In the presence of cervical shortness, if at least one twin is already small for dates and ongoing gestational age-related growth restriction, then cerclage is reasonable in women who have had previous PTLs and have a history of being delivered preterm. However, cerclage in singleton pregnancy with a history of two or more prior PTLs has not been shown to be effective.
  - Prophylactic cerclage in women with a history of PTLs is reasonable, especially if they have had a prior cerclage placement and a subsequent PTL.
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- Screening after cerclage placement?
  - There is insufficient data to suggest a clinical benefit of routine post-cerclage measurement or surveillance.
  - Routine screening post-cerclage is not recommended.

- Uterine anomaly?
  - Routine cerclage is not recommended in all women with uterine anomalies; standard indications for cerclage placement are followed.
  - The value of prophylactic cerclage in women with a uterine anomaly, factor history, of second trimester fetal demise is controversial. Prophylactic cerclage in women with no history of cervical insufficiency is not advised.
## References


- **Clinical manifestations and diagnosis of congenital anomalies of the uterus.** (2017). Up To Date. Retrieved from https://www.uptodate.com/contents/clinical-manifestations-and-diagnosis-of-congenital-anomalies-of-the-uterus?search=Clinical%20manifestations%20and%20diagnosis%20of%20congenital%20anomalies%20of%20the%20uterus&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1


