Ultrasound of cervical length: why, when and how

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Leeds

- Population 750,000
- Previously heavily industrialised
- 10,000 deliveries/yr
- Two maternity units
  - Leeds General Infirmary
  - St James’s University Hospital
- Higher than average deprivation
Leeds

• history
  • preterm birth rate 11% in 1999
  • prevention strategy
  • clinic started following year

• progress
  • 2 clinics/week, 2 consultants
  • 500 referrals/yr (20% regional)
  • >100 individual clinic episodes/month
European neonatal mortality rates 2013

Wang et al Lancet (2014)
European neonatal mortality rates 2013

Babies less than 2500g account for 75% of deaths

Wang et al Lancet (2014)
RCPCH report (2014)
Gestational age at delivery (UK, 2008-9)

2.3% <32 weeks (n=10,657) - £25k/baby
7.9% <37 weeks (n=36,283)

http://www.hesonline.nhs.uk
Trends in preterm birth

- **England & Wales**
- **Australia**
- **Scotland**
- **Denmark**

References:

intelligence scale vs. gestational age / weeks
History

• general associations
% risk of PTD

previous delivery history

very/very
mod/very
very/mod
mod/mod
term/very
term/mod
very/term
mod/term
term/term

The diagram illustrates the percentage risk of Preterm Delivery (PTD) associated with different gestational ages (GA) at birth.

- **22-27 weeks**: The highest risk of PTD, with the percentage exceeding 14%.
- **28-32 weeks**: A lower risk compared to the earliest stage, with the percentage around 9%.
- **33-36 weeks**: Further decrease in risk, approximately 8%.
- **Term**: The lowest risk, indicated by a smaller bar, around 6%.

The data is referenced to Swamy et al. (2008) in *JAMA* 299:1429-36.
Causes

- general associations
- specific causes
Preterm birth - causes

- uterine infection
- systemic infection
- local infection
- placental infection
- cervical infection
cervical
Cervical

- length: prevent ascending infection
- strength: retain conceptus
The role of the cervix

• shortening of cervix
  • caused by
    • cone biopsy, LLETZ
    • obstetric trauma (full dilatation CS/forceps)
LLETZ and risk of preterm birth

Depth of LLETZ

Noehr B et al
*Obstet Gynecol*
114:1232-8 (2009)
LSCS and risk of preterm birth

sPTB risk per cm of dilation at time of cesarean

Cervical compromise

• consequences
  • ↓ barrier for ascending infection
  • ascending colonisation
  • spectrum of presentation
    • hourglass membranes
    • PTL
    • PPROM
Cervical assessment

- digital examination

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- ● Routinely done.
- ○ Not routinely done.

Cervical assessment

- digital examination

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No reduction in preterm birth...

...but increased likelihood of admission
Cervical assessment

• digital examination
• transvaginal ultrasound
  • 7.5 MHz
    – microcurved array probe
Measurement of Cervical Length in Pregnancy: Comparison Between Vaginal Ultrasonography and Digital Examination

JIRI D. SONEK, MD, J. D. IAMS, MD, M. BLUMENFELD, MD, F. JOHNSON, RN, M. LANDON, MD, AND S. GABBE, MD
THE LENGTH OF THE CERVIX AND THE RISK OF SPONTANEOUS PREMATURE DELIVERY

JAY D. IAMS, M.D., ROBERT L. GOLDENBERG, M.D., PAUL J. MEIS, M.D., BRIAN M. MERCER, M.D., ATEF MOAWAD, M.D., ANITA DAS, M.S., ELIZABETH THOM, PH.D., DONALD MCNEILLIS, M.D., RACHEL L. COPPER, M.S.N., C.R.N.P., FRANCEE JOHNSON, R.N., B.S.N., JAMES M. ROBERTS, M.D., AND THE NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT MATERNAL FETAL MEDICINE UNIT NETWORK*

Cervical length

- technique

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<tr>
<th>Study</th>
<th>‘failed’ images</th>
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<tr>
<td>Preterm Prediction Study (MFMU Network)</td>
<td>20%</td>
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<td>SCAN Trial (MFMU Network)</td>
<td>15%</td>
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<td>NuMOM2b Network</td>
<td>30%</td>
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<td>CerviLenz Study</td>
<td>11.5%</td>
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<tr>
<td>PREGNANT Trial</td>
<td>10%</td>
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Cervical length

• technique
  • cervix occupies 75% of the image
  • anterior width = posterior width
  • maternal bladder empty
  • internal os seen
  • external os seen
  • cervical canal visible throughout
  • caliper placement correct
Cervical length

• indications
  • asymptomatic: to assess need for preventive strategies (progesterone, cerclage, pessary)
  • symptomatic: guide intervention (tocolysis, steroids, magnesium sulphate)
Cervical assessment

• implications of short cervix
Cervical assessment

• implications of short cervix
Cervical assessment

• implications of short cervix
• determine causation:
  • normal length for that woman?
  • previous excisional procedure?
  • structural weakness of internal os?
  • early parturition?
  • combination of any of these?
Cervical assessment

• **sequential scans/critical length?**
  • low risk population, serial scans, change 24-28wks
  • ‘among women with a short cervix [<25mm], for every 1 mm of cervical shortening between ultrasounds, there was a 3% increase in the odds of SPTB…. [with] stable or increased CL, rate of SPTB was lower than for women with decreased CL between visits… no association for women with a CL >25 mm’

Cervical assessment

- sequential scans/LLETZ?

Kindinger et al. *PLOS One* 2016
Cervical assessment

- start at 16 weeks for baseline measurement
- repeat scans according to POH
- assess internal os
- earlier collapse probably implies structural weakness
Cerclage

• types
  • McDonald
  • Shirodkar
  • transabdominal

• timing
  • elective
  • ultrasound-indicated
  • rescue
Cerclage

- Cerclage reduces sPTB by 30% in women with a history of sPTB and a cervix <25mm before 24 weeks gestation

Pessaries

• Arabin
  • silicone
  • easier insertion
  • ongoing trials v cerclage and progesterone
Cervical length

• indications
  • asymptomatic: to assess need for preventive strategies (progesterone, cerclage, pessary)
  • symptomatic: guide intervention (tocolysis, steroids, magnesium sulphate)
Cervical length

• ‘If the clinical assessment suggests that the woman is in suspected preterm labour and she is 30+0 weeks pregnant or more, consider transvaginal ultrasound measurement of cervical length as a diagnostic test to determine likelihood of birth within 48 hours’

www.nice.org.uk/guidance/ng25
Woman presents with symptoms of PTL with intact membranes

**Suspected PTL**
- **<30^{+0} weeks**
- **≥30^{+0} weeks**

**Clinical assessment**

**Established PTL**

**Care for established PTL** (sections 10-12)

- Transvaginal ultrasound of cervical length
  - >15 mm
  - ≤15 mm
    - Negative (≤50ng/ml)
    - Positive (>50ng/ml)

**If not available or acceptable**

**Fetal Fibronectin**

**Care for diagnosed PTL**

Unlikely to be in PTL/alternative diagnoses
Summary

• TVS assessment of cervix is here to stay
• use in symptomatic and high-risk asymptomatic women
• current challenges
  • adjunctive tests
  • management strategies
  • training