Obstetric Interventions

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Controversial areas

- Cervical cerclage
- Dilation of the cervix at caesarean section
- Elective induction
- Elective caesarean section

Cervical cerclage

...the orifice of the womb is so slack that it cannot rightly contract itself to keep in the seed; which is chiefly caused by abortion, or hard labor and childbirth, whereby fibers of the womb are broken into pieces one from another and they, and the inner orifice of the womb, overmuch slackened.

- Cole and Culpepper 1658

Indications

- History of cervical trauma or repeated dilation
- History of second trimester silent dilation
- History of recurrent preterm delivery
- Shirodker 1955
- McDonald 1957

There are pros and cons

- 60-80% of 'high risk' women with a history of cervical surgery or preterm birth will deliver at term
- History of 3 preterm births still have a 68% chance of delivering >33 weeks
- Risk of ruptured membranes, bleeding, infection, cervical damage

How do you assess the cervix?
Is ultrasound helpful?
What do you think?
Cervical changes in pregnancy

- Cervix mostly collagen & elastic fibres, only 10% muscle
- Isthmus = band of tissue forming slight constriction at junction of uterine body and cervix
  - 1 cm wide in non-gravid uterus and early pregnancy
  - Elongates in 3rd month and unfolds into the LUS, up to 7-10 cm wide near term.

The cervix in normal pregnancy

- **Shortens** (mean length) 41 mm @ 24 w 25 mm @ term
- **Widens** (mean width) 35 mm @ 24 w 48 mm @ term
- Often displays **dynamic changes** (opening / closing internal os)

Normal range of cervix measurement

![Graph showing normal range of cervix measurement](image)

Only 1% of pregnancies at 18 - 24 weeks will have a cervix ≤ 15 mm

Assessing cervical length TV

1. Empty bladder, probe in the anterior fornix of the vagina
2. Obtain a sagittal view of the cervix, with the long axis view of endocervical mucosa along the length of the canal
3. Withdraw the probe until the image is blurred and reapply just enough pressure to restore the image (avoid excessive pressure on the cervix, as that can elongate it)
4. Enlarge the image so that the cervix occupies at least 2/3 of the image, and both the external and internal os are well seen
5. Measure the cervical length from the internal to the external os along the hypoechoic endocervical canal

Standardized TV cervical assessment

The 4 quality standards for TV cervix measurement
1. The IO is flat or triangular
2. Observe the whole length of the cervical canal
3. Symmetric visualisation of the EO
4. Anterior and posterior widths are equal

Apply transludal pressure for 15 seconds, and record any changes in cervical length or funneling
Pitfalls in scanning the pregnant cervix

- Full bladder increases ability to see the cervix (at 23w: 42% if BV <50ml, up to 73% if BV >150ml) but overestimates cervix length by apposition of the ant/post uterine walls

- Empty bladder causes poor visualization (particularly in the third trimester & if the cervix is short)

- TV ultrasound is most accurate but transducer pressure can falsely elongate the cervix. Potential infective risk in PROM

- Curvature of cervix on TV causes undermeasurement of the cervix unless 2 separate measurements are made to incorporate the curve (BUT....a short cervix is always straight)

- Transabdominal ultrasound causes no distortion of the cervix and can be done with an empty bladder but the images are often poor and difficult to interpret. Longer training is required.

Prediction of preterm delivery

To [Lancet 2004] – multicentre study of 47,123 low risk patients

1% <= 15mm @ 22-24 weeks
22-26% delivered before 33 completed weeks

No difference in outcome between cerclage and control groups

Dilatation of the internal os (funneling)

18w twin pregnancy

Cervical funneling 24w

Cervical funnelling to predict preterm delivery

Berghella 1997 (USA) - 43 patients with cervical funneling (20-24w)

- 12/43 (28%) delivered before 34w
- Preterm delivery (< 37w) significantly associated with:
  - Funnel length >= 16 mm
  - Functional cervix length <= 20 mm
  - Funneling >= 40%
  - Funnel width >= 14 mm
Key points

- When a cervical length (CL) below 25 mm is found in low-risk women, 1 in 6 will deliver < 32w. In high-risk patients (eg history of PTB < 32 w), 1 in 2 will deliver before 32w.
- The most common gestational age at which a short cervix or funneling develops is 18 to 22 weeks – so that’s the best time to screen.
- Take great care with sonographic technique. TV if cervix poorly seen TA or is < 25mm (19w) or < 20mm (third trimester).
- Cervical length ≥ 35 mm between 18 – 24 w was correlated with preterm delivery risk of only 4% in both high-risk singletons and twins

Evidence-based?

- 1. An elective cerclage may prolong pregnancy in a woman who has had 3 or more unexplained second trimester losses or preterm deliveries, but it is unclear whether this will improve overall neonatal morbidity and survival.
- 2. If an elective cerclage is not placed in a woman with 3 or more unexplained second trimester losses or preterm deliveries, she still has a high chance of delivering at term (about 70% after 33 weeks and 50% after 37 weeks).

- 3. A therapeutic cerclage may prolong pregnancy in the high-risk patient with a short cervix noted on ultrasound, but it is unclear whether this will reduce neonatal morbidity or increase survival. A prospective trial evaluating such patients is ongoing.
- 4. A therapeutic cerclage will not prevent preterm birth in otherwise low-risk women with short cervixes, although there may be a subgroup of patients within this group who will benefit from cerclage. IL-8 may prove to be a useful marker to identify this subgroup.
- 5. There are no data supporting elective or therapeutic cerclage placement in twin pregnancies, and cerclage may be associated with more frequent preterm delivery.
- 6. There are limited observational data supporting an emergency cerclage in a patient with a dilated cervix and no signs of labor. The decision to place one should be individualized.
- Use of cerclage does not alter any perinatal outcome variables. Increased neonatal morbidity in these patients appears to be associated with subclinical infection, preterm labor, and abruption.

Cervical dilatation at caesarean section

- Do you do it?
- Why do you do it?
- Is it safe?
- What are the risks?

Routine Cervical Dilatation During Elective Cesarean Section and Its Influence on Maternal Morbidity: A Randomized Controlled Study

- Ahmed, Badredeen; Nahia, Fareed Abu; Abushama, Mandy
- 131 women had dilatation, 64 controls
- 3 women (2 treatment, 1 control) became febrile, two had breast engorgement, one had an UTI. No wound infections
- No difference in haemoglobin
- No evidence to support routine cervical dilatation
Elective induction of labour

Elective induction of labor

- Continuing the pregnancy is believed to be associated with greater maternal or fetal risk than intervention to deliver the pregnancy, and
- There is no contraindication to vaginal birth
- Labor also may be induced for logistic reasons, for example, risk of rapid labor, distance from hospital, or psychosocial indications (ACOG)

Indications for induction

- Abruptio placentae
- Chorioamnionitis
- Fetal demise
- Pregnancy-induced hypertension
- Premature rupture of membranes
- Postterm pregnancy
- Maternal medical conditions
- Fetal compromise (eg, severe fetal growth restriction, isoimmunization)
- Pre eclampsia, eclampsia

Contraindications

- Vasa previa or complete placenta previa
- Transverse fetal lie
- Umbilical cord prolapse
- Previous transfundal uterine surgery

Special attention

- Previous low-transverse caesarean deliveries
- Breech presentation
- Maternal heart disease
- Multiple pregnancy
- Polyhydramnios
- Presenting part above the pelvic inlet
- Severe hypertension
- Abnormal fetal heart rate patterns not necessitating emergent delivery

Elective induction?

- Maternal discomfort
- Maternal psychological welfare
- Scheduling (mother’s and doctor’s)
- Previous negative experience
- Desire for control

2886 low-risk obstetric patients induced without a medical or obstetric indication
9648 women with spontaneous labor.
Single fetus, vertex, 37 and 41 weeks
Similar groups; however, the induction group were more likely to have a gestational age of 41 weeks or more (30% vs 18%), to have an infant with a birth weight of 4000 g or more (21.7% vs 13.3%), and to have medical insurance.

RESULTS

• Among women meeting the study eligibility criteria, the proportion of births by induction nearly doubled during the study period (10.2% in 1989 to 19.7% in 1993).
• Nulliparous women who were induced were more likely to have a caesarean delivery than those women with spontaneous onset of labor (19.4% vs 9.9%; relative risk [RR, adjusted for birth weight]=1.77; 95% confidence interval [CI], 1.50-2.08; number needed to harm [NNH]=11).
• For multiparous women there was no difference in caesarean delivery rate (4% in each group).

• The risk of instrumental vaginal delivery was slightly increased for women with induced labor (18.6% vs 15.5%; RR=1.20; 95% CI, 1.09-1.36; NNH=32).
• There was also an increase in the incidence of shoulder dystocia in the induction group (3% vs 1.7%; RR=1.32; 95% CI, 1.02-1.69).
• The only other difference was a decreased risk of moderate to heavy meconium present at birth in the induction group (4.4% vs 5.7%; RR=0.78; 95% CI, 0.65-0.95). Not associated with a decreased risk of meconium aspiration.

• As these differences could potentially be confounded by a post-term gestation of 41 weeks or more, the authors repeated a data analysis including only women who delivered between 37 and 41 weeks. All outcomes were unchanged.


• Odds of a 1-minute Apgar score being ≤3 greater when labor was induced for elective reasons
• Vs medical reasons (OR 5.5, 95% CI 1.1-27.9)
• Vs spontaneous labor (OR 6.5, 95% CI 2.4-17.8) after controlling for mother's age, race and route of delivery.
• Elective induction not associated with fetal intolerance to labor, a low 5-minute Apgar or need for admission to a special care nursery.
• Elective induction is an independent risk factor for delivery of an infant requiring immediate attention.

- Low risk nulliparous women, electively induced compared with spontaneous labor.
- 37-40+6 weeks
- Elective induction with cervical ripening increased cesarean delivery during the first stage of labor RR3.5 (95% CI 2.7-4.5), compared with those admitted in spontaneous labor.
- Elective induction without cervical ripening, associated with a faster labor progression from 4 to 10 cm (266 compared with 358 minutes, P < .01), no increase in cesarean section rate.

In nulliparas, failure to follow the guidelines tripled the risk of cesarean (adjusted OR=3.2 [1.0-10.2]). On the other hand, elective induction of labor for women with a favourable cervix did not increase the risk of cesarean over the risk with spontaneous labor.

Conclusion. Elective induction does not appear to increase the cesarean rate when the guidelines are met. Electively inducing labor with a low Bishop score increased the risk of cesarean, especially in nulliparas.

The caesarean delivery rate

12.0% in women with a spontaneous onset of labor (n = 765)  
23.4% in women undergoing labor induction for medical reasons (n = 435) (unadjusted odds ratio [OR] 2.24; 95% confidence interval [CI] 1.64-3.06)  
23.8% in women whose labor was electively induced (n = 109) (unadjusted OR 2.29; 95% CI 1.53-3.41).

However, after adjusting for the Bishop score at admission, no significant differences in cesarean delivery rates were found among the 3 groups. A Bishop score of 5 or less was a predominant risk factor for a cesarean delivery in all 3 groups (adjusted OR 2.32; 95% CI 1.66-3.25).


Comparison of caesarean rates according to mode of onset of labor among 5,046 low-risk patients.

Violation of the (French) guidelines was defined as induction before 38 weeks or with a Bishop score <5

Women with electively induced (guidelines met) and spontaneous labor had identical caesarean rates (4.1%).

The guidelines were not followed in 23.2% of elective inductions. The risk of cesarean was higher after induction with a Bishop score <5, than after spontaneous labor (adjusted OR=4.1, 95% CI [1.3-12.9]).


A prospective cohort study was performed in nulliparous women at term with vertex singleton gestations who had labor induced at 2 obstetrical centers. Medical and elective indications and Bishop scores were recorded before labor induction.

1,389 women were included in the study.

Significantly increased risk for caesarean delivery
- maternal age of 30 years or older
- body mass index of 31 or higher
- use of epidural analgesia during the first stage of labor
- birth weight of 3,500 g or higher
- In both induction groups, more newborns required neonatal care, more mothers needed a blood transfusion, and the maternal hospital stay was longer

CONCLUSION: Compared with spontaneous onset of labor, medical and elective induction of labor in nulliparous women at term with a single fetus in cephalic presentation is associated with an increased risk of cesarean delivery, predominantly related to an unfavorable Bishop score at admission.
Elective caesarean section


A prospective cohort study 357 healthy primiparas from two different groups, “cesarean section on maternal request” (n=91) and “controls planning a vaginal delivery” (n=266) completed three self-assessment questionnaires in late pregnancy, two days after delivery and 3 months after birth. Symptom scores from the Edinburgh postnatal depression scale at three months after birth were also investigated.

Women requesting caesarean section

- experienced their health as less good (p<0.001)
- more often planning for one child only (p<0.001).
- more often reported anxiety for lack of support during labor (p<0.001), for loss of control (p<0.001), and concern for fetal injury/death (p<0.001).
- After planned caesarean section women in this group reported a better birth experience compared to women planning a vaginal birth (p<0.001).
- They were breastfeeding to a lesser extent three months after birth (p<0.001). There were no differences in signs of postpartum depression between the groups three months after birth (p=0.878).

Brachial plexus palsy

- vaginal delivery 0.047% to 0.6% (use 0.15%), therefore 4500 cases. If 15% permanent, 675 a year
- caesarean section 0.0042% to 0.095%. If the risk of permanent injury is 1 in 10,000 as reported by Chauhan, 300 cases a year
- The range then for permanent brachial plexus injury that could be avoided with caesarean section on request would appear to vary between 1 in 5000 and 1 in 10,000 vaginal births.

Hankins GD, Clark SM, Munn MB


PURPOSE: to determine the impact on specific forms of neonatal morbidity and mortality by allowing women to opt for delivery by elective cesarean section at 39 weeks of gestation

70% of 4 million deliveries per year >= 39 weeks in USA
3 million women choosing caesarean section.

Fetal trauma

The incidence of significant birth trauma especially related to instrumental delivery varies from 0.2 to 1 to 2 per 1000 births. Overall, the frequency of significant fetal injury is significantly greater with vaginal delivery, especially operative vaginal delivery, than with cesarean section for the nonlaboring woman at 39 weeks EGA or near term when early labor has been established.
Neonatal encephalopathy
Considering a prevalence of moderate or severe neonatal encephalopathy of 0.38%
In 4% to 10% of cases, the etiology appears to be pure intrapartum hypoxia. Intrapartum hypoxia superimposed on antepartum risk factors may account for up to 25% of the moderate to severe encephalopathies.
Infants born to nonlaboring women delivered by caesarean had an 83% reduction in the occurrence of moderate or severe encephalopathy.
11,400 cases of moderate to severe encephalopathy would occur. If delivered by caesarean 1938 cases. Net difference 9462 cases annually prevented by elective caesarean.

Intrauterine fetal demise
Fretts reported on fetal deaths per 1000 live births from 37 to 41 weeks of gestational age, showing that the rate progressively increased from 1.3 to 4.6 with each week of gestation.
It can be estimated that delivery at 39 weeks EGA would prevent 2 fetal deaths per 1000 living fetuses. This would translate into the prevention of as many as 6000 intrauterine fetal demises in the United States annually—an impact that far exceeds any other strategy implemented for stillbirth reduction thus far.

CONCLUSION: It is reasonable to inform the pregnant woman of the risk of each of the above categories, in addition to counseling her regarding the potential risks of a caesarean section for the current and any subsequent pregnancies. The clinician’s role should be to provide the best evidence-based counseling possible to the pregnant woman and to respect her autonomy and decision-making capabilities when considering route of delivery.

Maternal mortality and severe morbidity associated with low-risk planned cesarean delivery versus planned vaginal delivery at term. Liu et al

- Perception that caesarean section carries little or no risk.
- Planned breech caesarean group as surrogate elective matched with patients who delivered vaginally.

RESULTS: The planned cesarean group comprised 46,766 women v. 2,292,420 in the planned vaginal delivery group; overall rates of severe morbidity for the entire 14-year period were 27.3 and 9.0, respectively, per 1000 deliveries.

- Increased postpartum risks of cardiac arrest (OR 5.1, 95% CI 4.1-6.3), i.e 1.6 per 1000
- wound hematoma (OR 5.1, 95% CI 4.6-5.5)
- hysterectomy (OR 3.2, 95% CI 2.2-4.8)
- Major infection (OR 3.0, 95% CI 2.7-3.4)
- anaesthetic complications (OR 2.3, 95% CI 2.0-2.6)
- venous TED/OR (2.2, 95% CI 1.5-3.2)
- haemorrhage requiring hysterectomy (OR 2.1, 95% CI 1.2-3.8)
- lower risk of haemorrhage requiring blood transfusion (OR 0.4, 95% CI 0.2-0.8).
- Rate of in-hospital maternal death between the 2 groups nonsignificant (p = 0.87).

Planned elective cesarean section: A reasonable choice for some women? Mary E. Hannah

Term Breech Trial involving 2088 women with a singleton fetus in breech presentation at term, the risk of perinatal or neonatal death or of serious neonatal morbidity was significantly lower in the planned cesarean group, with no significant increase in the risk of maternal death or serious maternal morbidity.
Risks

- Longer recovery time
- Operative complications 6% for elective 15% for emergency
- Increased risk of major bleeding in a subsequent pregnancy (5.2 per 1000) and placental abruption (11.5 per 1000)
- Risk of neonate needing oxygen – prelabour c/s (35.5), labor c/s (12.2), vaginal (5.3) per 1000 live births
- Thromboembolic disease

Benefits

- Reduced urinary incontinence – overall 26% after 6 months: Elective caesarean 5% – Caesarean during labor 12% – Vaginal birth 22% – Forceps 33%
- May reduce faecal incontinence
- Avoidance of labor pain and alleviation of anxiety related to labor and vaginal delivery
- Control and convenience
- Reduced risk of intrapartum morbidities

Is caesarean section natural or normal?

Is modern vaginal birth natural or normal?

In the meantime, what should physicians do? Most women prefer to plan for a vaginal birth. However, if a woman without an accepted medical indication requests delivery by elective caesarean section and, after a thorough discussion about the risks and benefits, continues to perceive that the benefits to her and her child of a planned elective caesarean outweigh the risks, then most likely the overall health and welfare of the woman will be promoted by supporting her request.

What are the risks of cesarean delivery?

- Maternal mortality is higher than that associated with vaginal birth (5.9 for elective cesarean delivery v. 18.2 for emergency cesarean v. 2.1 for vaginal birth, per 100 000 completed pregnancies in the United Kingdom during 1994–1996).

If taken in a vacuum, the principle of patient autonomy would lend support to the permissibility of elective cesarean delivery in a normal pregnancy, after adequate informed consent. To ensure that the patient's consent is, in fact, informed, the physician should explore the patient's concerns. If the physician believes that cesarean delivery promotes the overall health and welfare of the woman and her fetus more than vaginal birth, he or she is ethically justified in performing a cesarean delivery. Similarly, if the physician believes that performing a cesarean delivery would be detrimental to the overall health and welfare of the woman and her fetus, he or she is ethically obliged to refrain from performing the surgery (ACOG).