Induction of Labour

Learning objectives

- To know IOL and augmentation
- describe indications and contraindications for induction of labour
- describe methods of induction of labour
- describe complications of induction of labour
- counsel women about induction of labour.

Lecture outline

- Induction of labour
- Indications
- Contra indications
- Membrane sweep and pre induction procedure
- Methods of induction
- Complications of IOL

What is labour induction and augmentation.

- Initiation of labour before its natural onset.
- Augmentation is the process of further stimulating the already started labour.

IOL .Does it increase instrumental and Caesarean deliveries ?

- No change in assisted vaginal delivery rates

- No increase in caesarean section rate.

IOL in Genaral

- 20% require IOL and majority for prolonged pregnancy.
- 50% delivered by 40 weeks, 74% by 41 weeks,82% by 42wks.

- Dating pregnancy is a must to avoid inducing women unnecessarily

Determine gestational age using:

- CRL from 10+0 weeks to 13+6 days
- HC if CRL is above 84 mm.

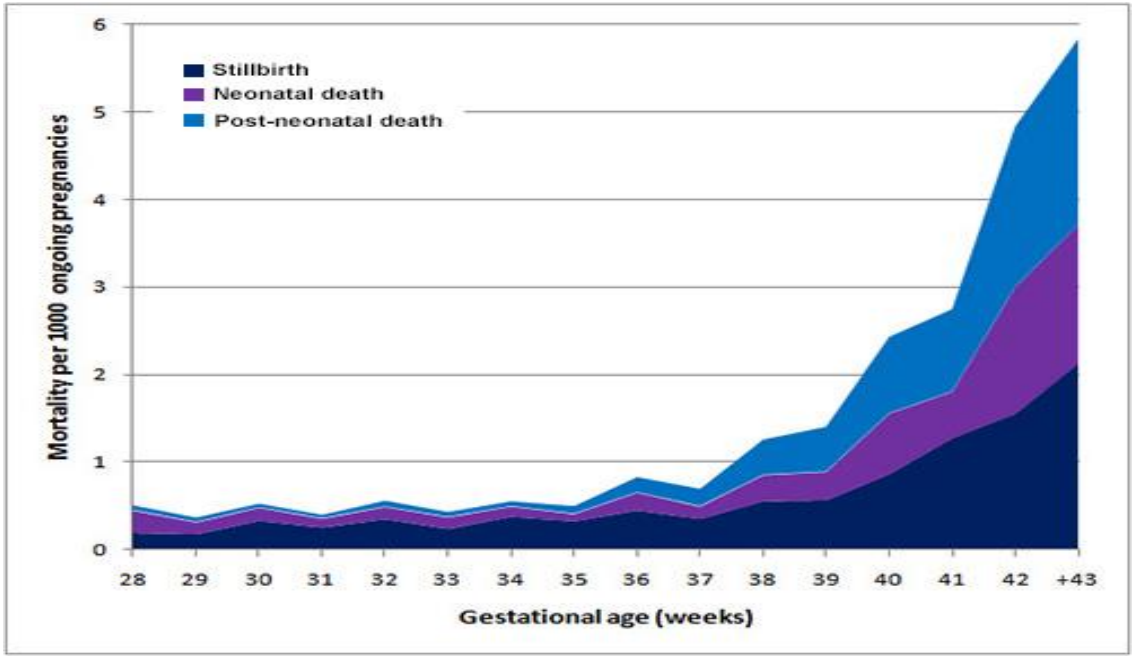
Indications for induction of labour

1. Prolonged pregnancy
2. Maternal diabetes
3. Twin pregnancy
4. Prom
5. FGR
6. HT in pregnancy and other maternal medical conditions
7. Maternal request
8. History of precipitate labour
9. History of reduced fetal movements at term
10. Suspected fetal macrosomia.

Prolonged pregnancy

Definition

5–10% of women, their pregnancies continue beyond 42 completed weeks and described as being 'post-term' or 'postdate'



Prolonged pregnancy- benefits of IOL.

- Increased risk of perinatal death with expectant management. therefore IOL can reduce them.

- Lower risk of meconium aspiration syndrome (after 41 weeks of gestation)

2. Maternal diabetes –benefits

- Overall DM 2.5% of pregnancies, 87% GDM and remainder type 1 and 2 (NICE 2015).

- E.IOL before term reduce birth trauma (e.g. SD, bone fractures and B.plexus injury) associated with fetal macrosomia.

- DM/GDM has higher unexplained IUD than others, particularly around term. So IOL at 38–39 weeks without increasing the risk of CS.

3. Twin pregnancy -benefits

- Stillbirth rate higher than for singletons at each week of gestational age.

- Singleton stillbirth rise from 41–42 weeks compared with twins (36–38 weeks).

- IOL in singletons > 41 weeks has reduced PNM. Same true for twins at > 37 to reduce PNM and morbidity.

4.PPROM benefits of IOL.

- Reduced risk of chorioamnionitis
- Caesarean section rates not increased
- Neonatal outcomes (Apgar score at 5 minutes, neonatal intensive care unit admission, sepsis and total hospital stay) not increased
- Reduced incidence of fetal heart abnormalities.

PROM benefits of IOL.

- Reduced risk of chorioamnionitis and endometritis
- Fewer neonatal unit admissions
- No increase risk in CS or operative VD.
- Increased maternal satisfaction
- Increased risk of lower birthweight.

5.Fetal growth restriction – FGR benefits

- PNM and morbidity is markedly increased in FGR.so delivery is indicated

- Caesarean section rates were higher due to intrapartum events

6. PIH in pregnancy

Maternal risks include:

- Death, eclampsia, stroke ,multiorgan failure, renal failure, liver failure , HELLP syndrome, pulmonary oedema, cardiac arrest.

Neonatal risks include:

- Stillbirth, placental abruption, impaired uteroplacental circulation potentially leading to FGR and hypoxaemia.

Therefore IOL is beneficial in PIH.

7. Maternal request

- Consider elective IOL for pragmatic, social and emotional reasons.
-
- Eg .relevant to women whose partners are about to be posted abroad.

8. Maternal age

- Advanced maternal age associated with an increase in antenatal and intrapartum stillbirth and neonatal mortality.

- So offer IOL at 39–40 weeks of gestation to women ≥40 years of age.

9. Suspected fetal macrosomia

- IOL in fetal macrosomia > 4000 g is to reduce CS birth and of difficult operative birth, which are associated with maternal and perinatal morbidity.

Contraindications to induction of labour

Absolute contraindications for IOL.

- placenta praevia/vasa praevia , transverse lie ,prolapsed umbilical cord, active genital herpes, previous classical CS

Relative contraindications for IOL.

- triplet or higher order multiple pregnancy
- breech presentation
- two or more previous CS.

Approach to induction of labour

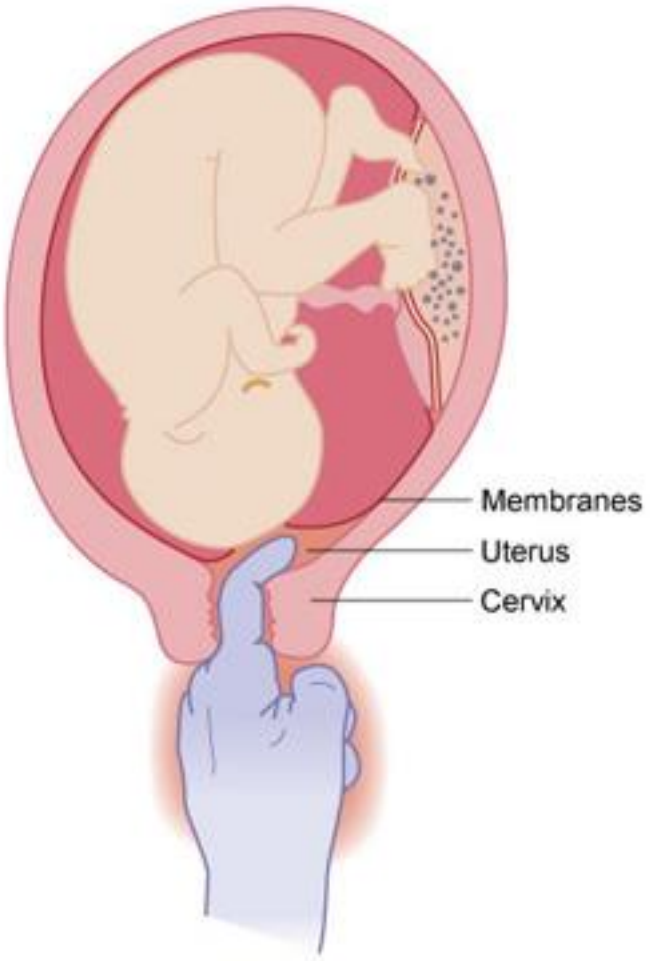
Membrane sweep

Can be offered all women who are waiting for labor induction.

- Membrane sweep, simple technique usually performed without admission to hospital.

- This increase the local PGs and reduce pregnancy duration or support formal IOL with either oxytocin, prostaglandins or amniotomy.

Membrane sweep



A finger is inserted through the cervix making a firm, circular, sweeping movement. The membranes are peeled off the lower segment, stimulating the prostaglandin release.

Benefits and risk

- No increased risk of caesarean section
- Membrane sweep reduce pregnancy duration
- No increase of maternal or neonatal infection

- Discomfort during VE and other adverse effects (bleeding, irregular contractions) are more frequently reported

Pre-induction assessment

- Women are admitted to the maternity unit for IOL.
- Next a CTG taken to ensure the fetus' wellbeing
- followed by a VE to determine the modified Bishop score and act as a baseline against which to compare subsequent examinations.

Methods of induction of labour

Methods of induction include:

- Prostaglandin
- Oxytocin
- Amniotomy

- Misoprostol
- ISMN
- Mechanical methods
- Other methods.

Prostaglandin

Mode of action of prostaglandins

- prostaglandin E2 act by causing uterine contraction and softening of the cervix.

- IOLwith PGE2 associated with increased VD, reduced CS rates, reduced rates of epidural analgesia and increased maternal satisfaction.

Treatment types

- tablets, gel and slow release pessary.

Tablet

- 3 mg PG tablet is inserted into the posterior vaginal fornix followed by a second dose 6–8 hours later.
- On rare occasions, and only after discussion with the woman and her consultant, a third dose of prostaglandin may be given if it is not possible to perform amniotomy after two doses of prostaglandin.
- The maximum dosage is 6 mg in 24 hours.

Prostaglandin gel

Prostaglandin slow release formula

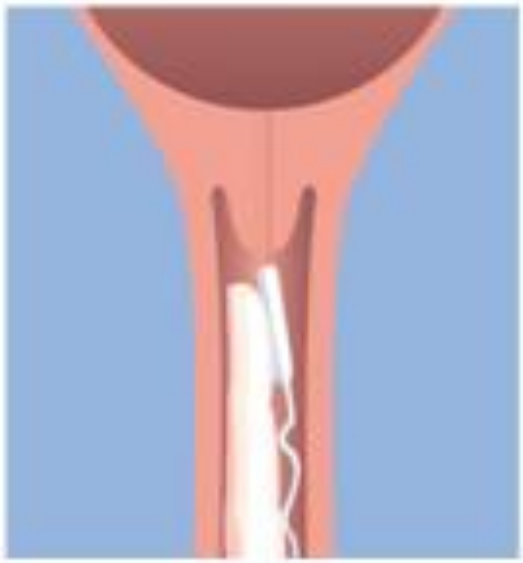


Figure a.

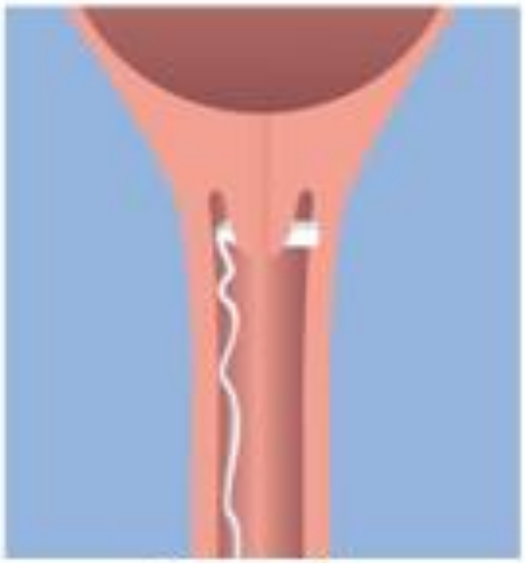


Figure b.

Figure c.

2. Oxytocin

- Oxytocin -most common induction agent used worldwide.

- Used alone.
- Used in combination with amniotomy
- Used following cervical ripening

(pharmacological/non-pharmacological)

Mode of action

- Oxytocin-nonapetpide from HT and stored in the posterior pituitary gland.

- It acts on oxytocin receptors of uterus to cause uterine contractions.

Practical aspects of using oxytocin

- BNF- starting rate of 1–2 mU /per minute and increased every 30 minutes.
- Most units dilute this using 10 IU of oxytocin in 500 ml or 30 IU of oxytocin in 500 ml.
- The maximum licensed rate is 20 mU per minute, though many units go up to 32 mU per minute.

- Oxytocin is increased until 3-4 contractions PER 10 minute
- Oxytocin given by infusion pump or syringe driver.
- Cervical ripening is necessary before starting oxytocin. It can be done with PG, or spontaneous
- Folly catheters are commonly used in SL though it is excluded in Nice guidelines .

Syntocinon dose and regimes

Suggested standardised dilutions and dose regimen:

10 iu in 500 ml of Sodium Chloride 0.9%; hence 3ml/hr = 1milliunits per minute.

Time after starting (minutes)	**Oxytocin dose** (milliunits per minute)	**Volume infused (ml/hr)** **Dilution 10iu** Oxytocin **in 500 ml Sodium Chloride 0.9%**
0	1	**3**
30	2	**6**
60	4	**12**
90	8	**24**
120	12	**36**
150	16	**48**
180	20	**60**
210	24	**72**
240	28	**84**
270	32	**96**

Syntocinon dose and regimes

30 IU in 500 ml as below should be considered in women on fluid restriction to reduce the risk of fluid overload.

30 IU in 500 ml of Sodium Chloride 0.9%; hence 1ml/hr = 1milliunits per minute.

Time after starting (minutes)	**Oxytocin dose** (milliunits per minute)	**Volume infused (ml/hr)** **Dilution 30iu** Oxytocin **in 500 mls Sodium Chloride 0.9%**
0	1	1
30	2	2
60	4	4
90	8	8
120	12	12
150	16	16
180	20	20
210	24	24
240	28	28
270	32	32

3.Misoprostol

synthetic prostaglandin E1 analogue.

- cheap and stable at room temperature unlike dinoprostone.
- oral, vaginal or sublingual available.
- low price and easy storage good for resource-poor settings.
- Not in routine use for labour induction. can use for research setting.

4. Isosorbide mononitrate ISMN

Can be used for cervical ripening.

No more effective than PGE2 in inducing a change in the modified Bishop score.

Use of IMN in the outpatient setting does not shorten the admission to delivery interval.

5. Mechanical methods

- Catheters or laminaria tents, were the first methods used in an attempt to ripen the cervix or induce labour.

- Introduced into the cervical canal or extra-amniotic space.

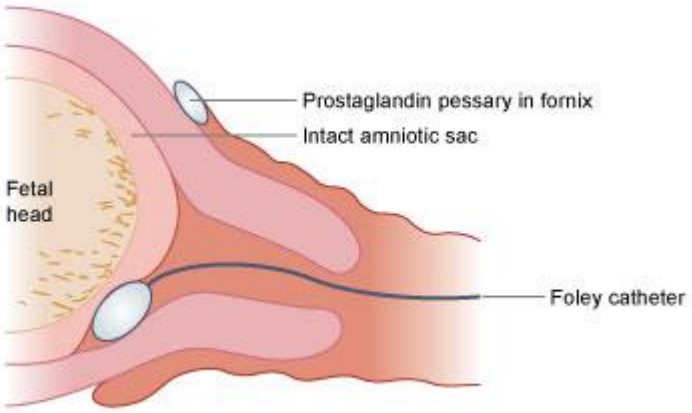
- Act by direct dilatation of canal or, indirectly, by increasing prostaglandin and/or oxytocin secretion.

Advantages

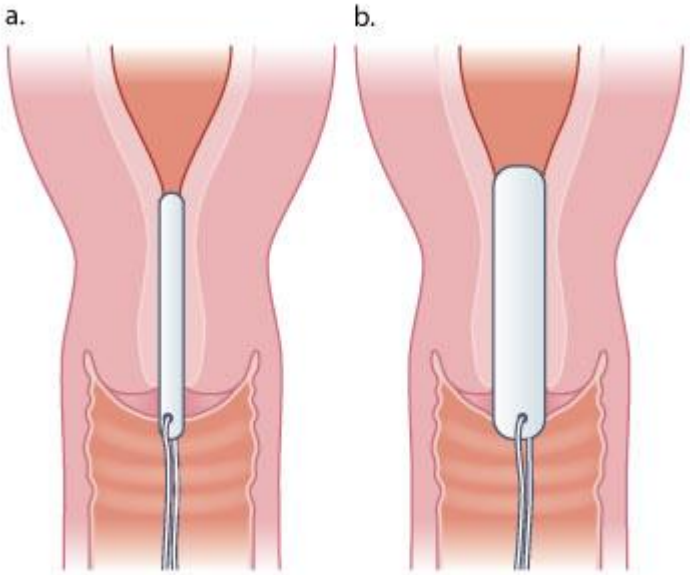
- Simplicity
- Lower cost
- No risk of hyperstimulation.

Disadvantages

- Difficulty to insert
- Discomfort for the woman
- Risk of infection

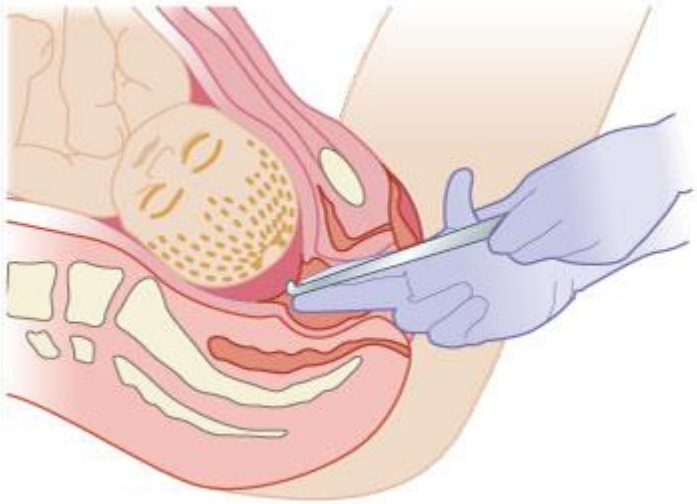


A Foley catheter is inserted behind the cervical wall and inflated. This applies pressure to the cervix causing it to dilate. The catheter is adjusted over time to maintain pressure on the cervix. Once the cervix is adequately dilated the catheter simply drops out.



(a) The laminaria should be placed just beyond the cervical os. (b) The laminaria then expands, causing cervical dilation.

6. Amniotomy



Definition

Deliberate artificial rupture of the membranes used for IOL.
Only possible if the membranes are physically accessible.

This can be done to
initiate labour,
during labour to try to accelerate the process,
to allow a fetal scalp electrode.
An amnihook may be used to rupture the membranes;

Complications of induction of labour

- hyperstimulation
- fetal distress
- failed induction
- caesarean section
- ruptured uterus
- adverse effects of drugs used for induction

1.Hyperstimulation

Definition

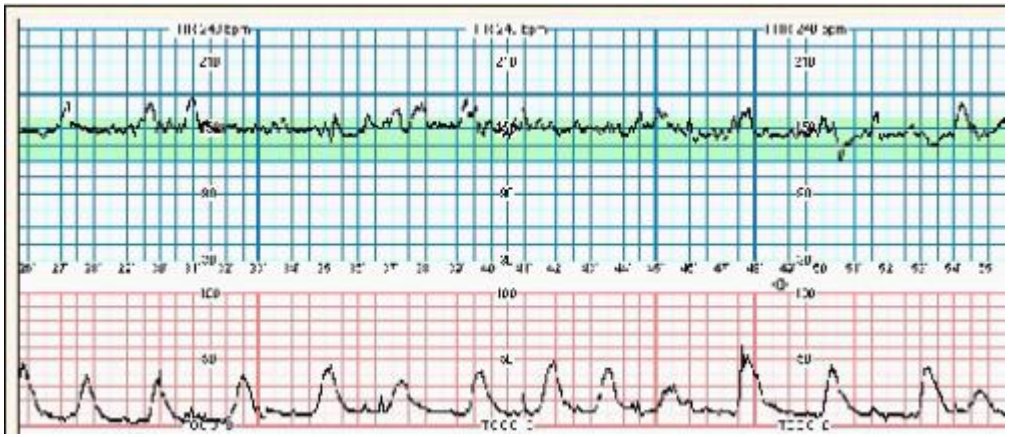
Tachysystole, that is, more than five contractions in 10 minutes over a period of at least 20 minutes,

or

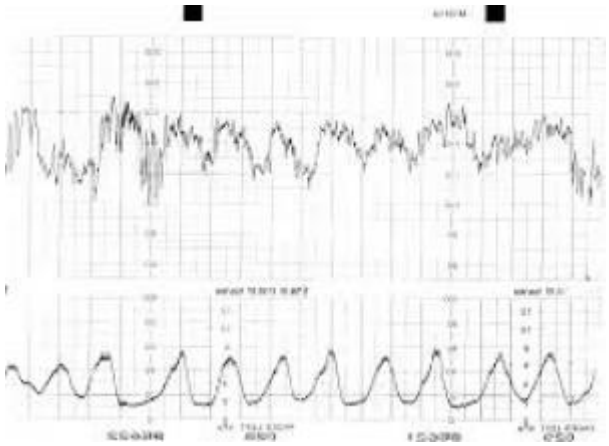
hypertonus, that is, a contraction lasting for more than 2 minutes

in association with changes in the fetal heart trace.

- –5% of PG -induced labour
- more common with the use of misoprostol.
- also occur in response to oxytocin but less problem becausecan be reduced simply by turning the oxytocin infusion off.



The above CTG shows uterine tachysystole (7 contraction in 10 minutes) without any signs of fetal distress.



The above CTG now shows hyperstimulation with 6–7 contractions in 10 minutes and signs of fetal distress

Management

Stop or reduce the rate of the oxytocin infusion or removing PG Consider the use of a tocolytic.

If fail to resolve FHR abnormality - immediate delivery

2.Fetal distress

- The fetal distress occurs due to decrease in uterine blood flow (and hence placental oxygenation) by uterine contractions.

- In suspected fetal, fetus is less able to withstand poor leading to fetal distress.

- Fetal distress should manage according to the cause for it .

3.Failed induction

If labour cannot be initiated despite use of induction agents, IOL is said to have failed.

There is no accepted definition of this.

Eg. 3 doses of vaginal prostaglandins have not ripened the cervix sufficiently for membrane rupture to be performed, then further doses are unlikely to be helpful.

Next options

- allowing the woman to go home and repeat later
- waiting for labour to start spontaneously
- scheduling delivery by CS
- considering alternative cervical ripening method such as an intracervical Foley catheter.

4. Adverse effects of drugs used for induction

The most common adverse effect of oxytocin is excessive uterine contractions, but the following have also been reported:

- water intoxication and hyponatraemia
- nausea and vomiting
- arrhythmias
- anaphylactoid reactions and rashes
- placental abruption
- amniotic fluid embolism (with overdose).
- nausea, vomiting, diarrhoea
- pulmonary or amniotic fluid embolism

4. Adverse effects of drugs used for induction

- abruption
- fetal distress
- maternal hypertension
- bronchospasm
- fever
- backache
- cardiac arrest
- stillbirth or neonatal death
- vaginal discomfort.