Preterm labour

Preterm birth is defined as delivery of a baby before 37completed weeks of pregnancy.(delivery between 24 and 37wks).

A ccounts for 5–10% of births but >50% of perinatal deaths.

Approximately 25% of PTDs are for maternal or fetal indications, 50% follow spontaneous PTL and 25% follow PPROM.

Iatrogenic or medically-indicated deliveries are typically for diagnoses such as pre-eclampsia, fetal growth restriction (FGR) and maternal cardiac or renal conditions.

Aetiology

Labour at term and prior to it share a common pathway involving:

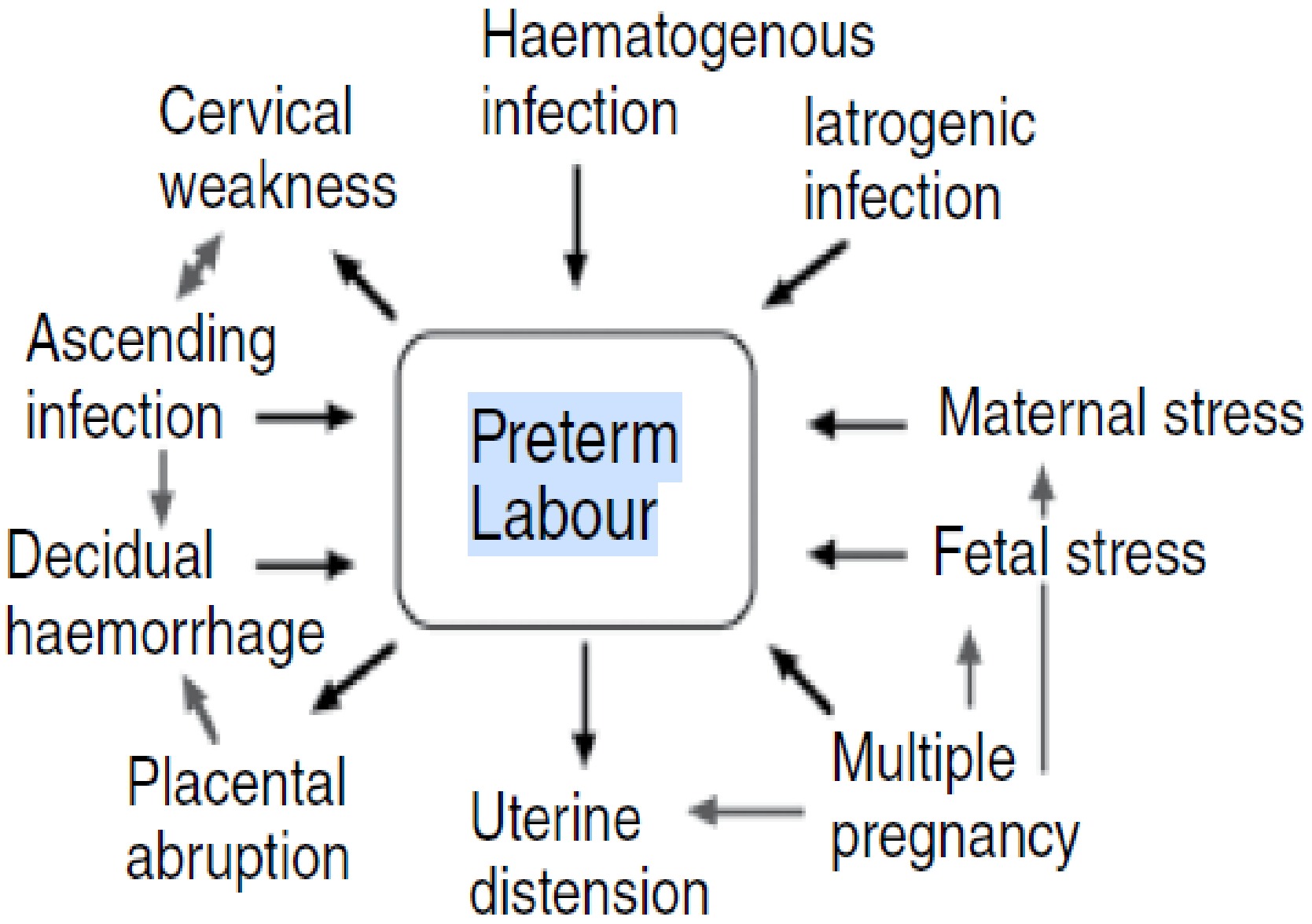
- **uterine contractility**
- **cervical effacement and dilatation**
- **membrane rupture**.

At term, the activation of this pathway is physiological.

However, a variety of pathologies underlie labour

remote from term

so it is a multifactorial condition involving the following causes


Haematogenous infection
Cervical weakness
Iatrogenic infection
Ascending infection
Preterm Labour
Maternal stress
Decidual haemorrhage
Fetal stress
Placental abruption
Uterine distension
Multiple pregnancy

Cervical weakness

Cervical weakness is classically associated with painless premature cervical dilatation and is suggested by a history of painless second trimester pregnancy loss. There is almost certainly an overlap between cervical weakness and other

factors such as ascending infection, as during pregnancy, the cervix not only acts as a physical obstacle, keeping the pregnancy in the uterus, but also as a barrier to ascending infection through the synthesis of a thick mucus plug in the cervical canal that has bactericidal properties.

there strong relationship between cervical length and the risk for PTD.

Infection

Infection of the fetal membranes, chorioamnionitis, is a major cause of preterm birth particularly in deliveries before <32 weeks' gestation. It is associated with a threefold increased risk of PTD with intact membranes, and a fourfold increased risk with ruptured membranes. In most cases, infection ascends from the vagina, although the route of infection may be transplacental or introduced during invasive procedures

Uterine over-distension

Multiple pregnancy and polyhydramnios are the most common causes of uterine distension. Myometrial stretch has been shown to result in up-regulation of oxytocin receptors and prostaglandin production. Stretch of the fetal membranes may also result in the formation of prostaglandins and other cytokines that are key to the initiation of labour.

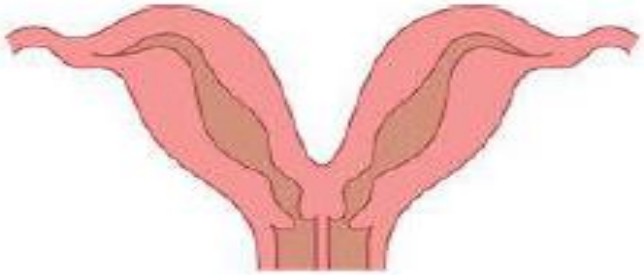
Intercurrent illness

Serious infective illnesses such as pyelonephritis, appendicitis and pneumonia are associated with preterm labour. This association is presumed to be due either to direct blood-borne spread of infection to the uterine cavity or indirectly due to chemical triggers, such as endotoxins or cytokines. Many other medical complications, such as cholestasis of pregnancy and any surgical procedures, are associated with preterm labour, although the mechanisms remain obscure. Intercurrent illness may also result in iatrogenic indicated preterm birth for maternal or fetal reasons

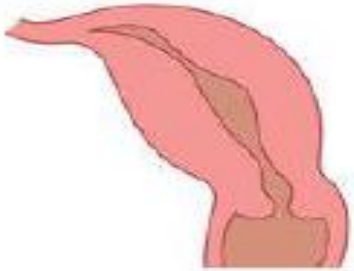
Uterine müllerian anomalies

Congenital müllerian anomalies are often unrecognized but are estimated to occur in up to 4% of women of reproductive age. They occur as a consequence of abnormal embryologic fusion and canalization of the müllerian ducts .

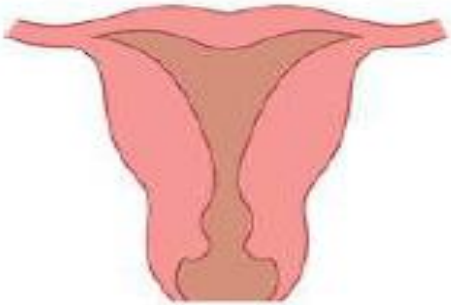
They are associated with adverse pregnancy outcome in up to 25% of women, including first and second trimester miscarriage, PPROM, preterm birth, FGR, breech presentation and caesarean section.



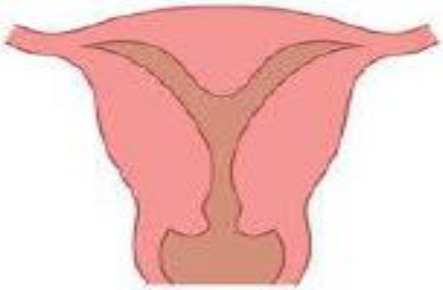
Didelphic



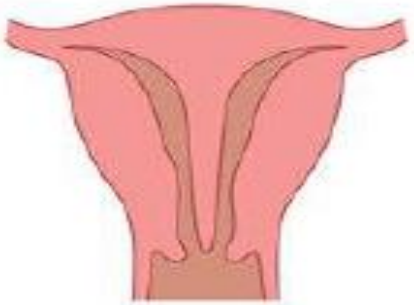
Unicornuate



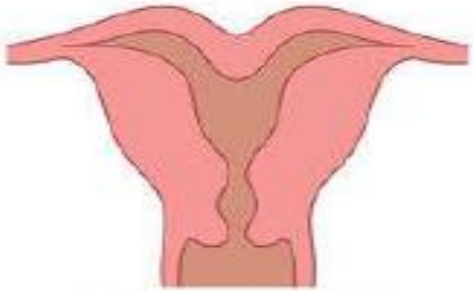
Arcuate



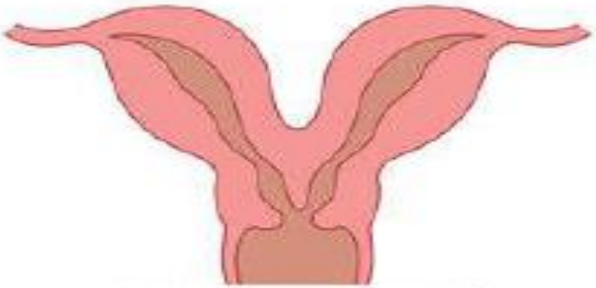
Septate (partial)



Septate (complete)



Bicornuate (partial)



Bicornuate (complete)

Haemorrhage

Antepartum haemorrhage and placental abruption may lead to spontaneous PTL.

The presence of a subchorionic haematoma in early pregnancy increases the risk of later PPROM, either through an effect of thrombin on membrane strength or through the occurrence of infection in the haematoma.

Acute bleeding leads to the release thrombin that directly stimulates myometrial contractions.

Stress

Major life events have an association with prematurity, as does the fetal stress of FGR.

A link between maternal stress and PTL is suggested by its increased prevalence among unmarried and poor mothers, as well as in stressful Socio-demographic conditions (such as loss of employment, housing or partner).

Prematurity is also more common among women reporting increased stress or anxiety.

The biochemical pathway through which maternal and fetal stress promotes PTL is uncertain, but may involve a premature increase in circulating corticotrophin-releasing hormone (CRH).

Epidemiological and personal factors

. Some minor risk factors carry importance because they are potentially modifiable. These include:

- smoking;
- low BMI;
- interpregnancy interval of less than one year.

Other minor risk factors that are not amenable to influence include:

- maternal age (teenage multiparae);
- parity (nulliparous or grandmultiparous);
- ethnicity (black women);
- socio-economic deprivation;
- unemployment;
- low levels of education.

Main problems of preterm babies

Respiratory distress syndrome
Chronic lung disease
Intraventricular haemorrhage, parenchymal cerebral haemorrhage
Periventricular leukomalacia
Infection
Hypoglycaemia
Necrotizing enterocolitis
Patent ductus arteriosus
Jaundice

Assessment of patient with PL

History

check the dating of the pregnancy

Ask about pain/contractions—onset, frequency, duration, severity.

Vaginal loss: SROM or PV bleeding.

Obstetric history (check hand-held notes).

Examination

Maternal pulse, temperature, respiratory rate.

Uterine tenderness (suggests infection/abruption).

Fetal presentation.

Speculum: look for blood, discharge, liquor. Takes swabs.

Management of preterm labour outside pregnancy

- The importance of smoking cessation should be stressed
- the potential benefit of leaving 12 months between pregnancies should be discussed.
- Dietician referral may be appropriate for women with a low BMI.
- Optimazation of general health of the mother including cardiac or renal disease

Management of preterm labour

Establish whether threatened or 'real' preterm labour Up to 70% of women who present with threatened PTL to the labour ward will not deliver during the current admission, and up to 50% will not deliver until term. :

- transvaginal cervical length scan (>15mm unlikely to labour)
- fibronectin assay: if –ve, unlikely to labour.
- **Admit** if risk high.
- **Inform neonatal unit**.
- **Arrange *in utero transfer if no suitable beds available*.**
- **Check fetal presentation with USS.**

• **Steroids** (12mg betametasone IM—two doses 24h apart). Antenatal steroids reduce rates of respiratory distress, intraventricular haemorrhage, and neonatal death).

• **Consider tocolysis.**

Tocolytics are used to delay delivery long enough for corticosteroid administration to improve neonatal lung function and, if necessary, for *in utero* transfer to a NICU.

•• Give IV antibiotics but only if labour confirmed.

Magnesium sulphate

ACOG supports the use of magnesium sulphate for neuroprotection stating that "magnesium sulphate reduces the risk of cerebral palsy in surviving infants.

fetal fibronectin (fFN), a glycoprotein found in cervicovaginal fluid, amniotic fluid, placental tissue and in the interface between the chorion and decidua. It acts like ‘glue’ at the maternal–fetal interface and its presence in cervicovaginal fluid between 22 and 36 weeks’ gestation has been shown to be a predictor of PTD. Negative fFN testing has a very high negative predictive value, enabling most women with threatened PTL and a negative fFN test to be sent home.

TOCOLYSIS

A wide variety of agents have been advocated as suppressing uterine contractions include:

1. beta-agonists,
2. calcium channel blockers,
3. oxytocin receptor antagonists, atosiban.
4. prostaglandin synthetase inhibitors,
5. nitric oxide donors
6. magnesium sulphate.

Tocolysis has been advocated for the management of:

- preterm labour. Tocolytic drug is associated with a prolongation of pregnancy for up to 7 days but no significant effect on preterm birth and no clear effect on perinatal or neonatal morbidity and mortality
- intrapartum fetal distress
- to facilitate external cephalic version at term.
- Restoration of uterine inversion

Tocolysis should not be used where there is a contraindication to prolonging pregnancy.

Absolute contraindication:

1. lethal congenital or chromosomal malformation,
2. intrauterine infection,
3. severe pre-eclampsia,
4. placental abruption,
5. advanced cervical dilatation
6. evidence of fetal compromise or placental insufficiency.

Beta-sympathomimetics

Beta-agonists (ritodrine, salbutamol and terbutaline) mediate myometrial relaxation by stimulating cyclic adenyl monophospate (AMP) production.

The most serious side-effect is pulmonary oedema. Maternal deaths from acute cardiopulmonary compromise are described, with greater risks if beta-agonists are given in large fluid volumes, in multiple pregnancies and in women with cardiac disease.They may impair glycemic control in diabetic patient.

Oxytocin receptor antagonists

Administration of atosiban results in a dose-dependent inhibition of uterine contractility and oxytocin-mediated PG release.

In pregnant women, atosiban is 46–48% plasma protein bound and only a small amount appears to cross the placenta into the fetal circulation. It has a similar efficacy as beta sympathomimetics, but is much better tolerated.

Non-steroidal anti-inflammatory drugs

The first NSAID to be widely used in the management of PTL was indomethacin. It is a reversible, non-specific competitive cyclooxygenase (COX) inhibitor.

COX inhibitors cross the placenta and potential adverse effects for the baby include:

1. premature closure of the ductus arteriosus with consequent pulmonary HTN.
2. necrotising enterocolitis
3. Intraventricular haemorrhage.
4. neonatal renal dysfunction,which probably occurs because inhibition of fetal PG synthesis reduces renal perfusion and fetal urine output, resulting in reversible oligohydramnios

The effects are completely reversible with early identification and discontinuation of treatment

Calcium channel blockers

. Comparing nifedipine with other tocolytics (including beta-sympathomimetics, NSAIDs, magnesium sulphate and OTR antagonist [OTR-A]), no significant reductions were shown in the primary outcome measures of birth within 48 hours of treatment or in perinatal mortality.

However, adverse drug reactions, discontinuation due to side-effects,neonatal RDS, necrotizing enterocolitis, intraventricular haemorrhage and neonatal jaundice were least for OTR-A, intermediate for nifedipine and greatest for beta-sympathomimetics. it has the advantages of oral administration and relatively low cost in comparison to atosiban

Prevention

1-Treatment of bacterial vaginosis (BV)

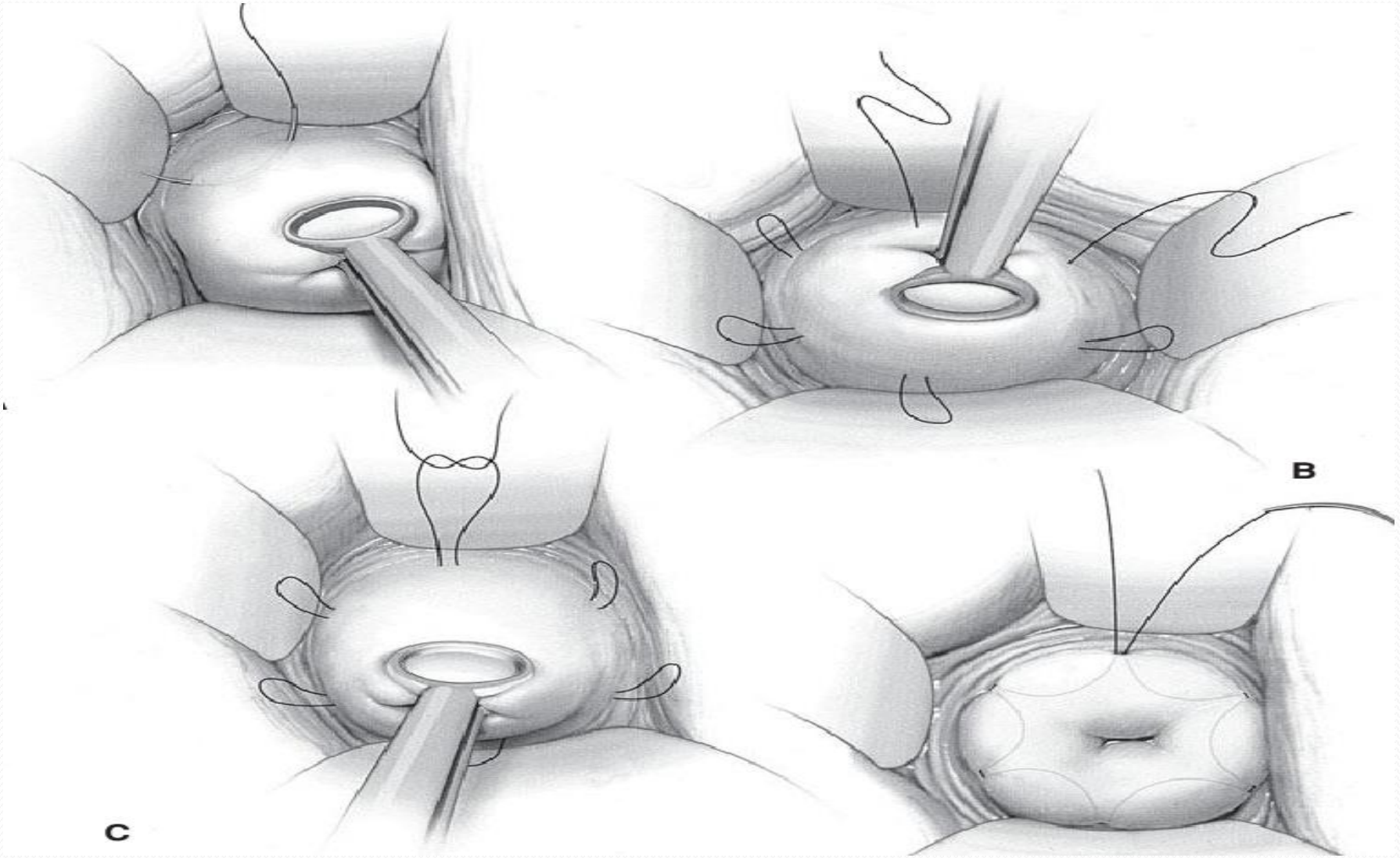
this may reduce the incidence of preterm prelabour rupture of membranes

2-Progesterone

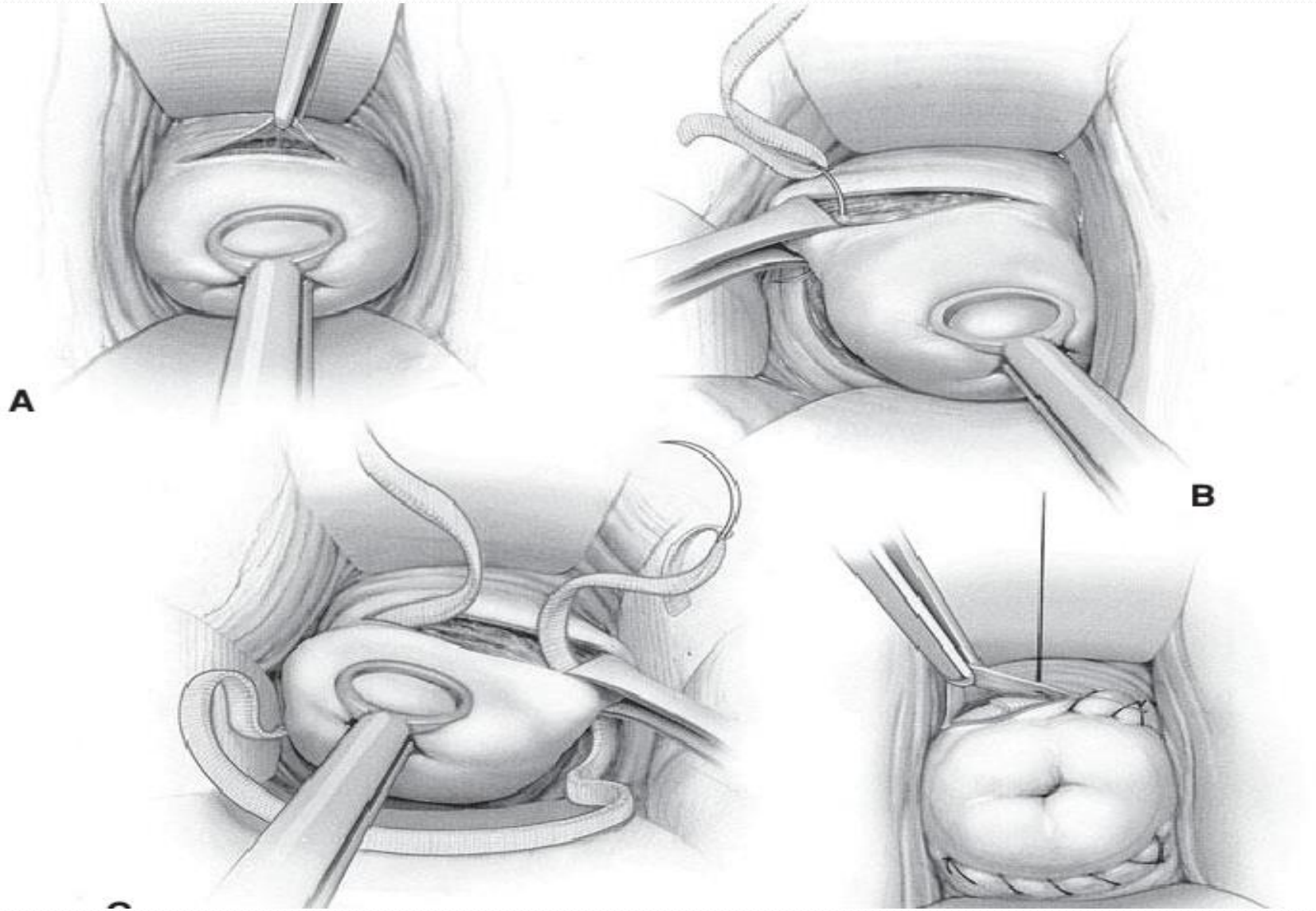
Progesterone is thought to promote uterine quiescence and inhibit the production of proinflammatory cytokines and PGs within the uterus. In women with a previous preterm birth, there is some evidence that intramuscular hydroxyprogesterone caproate is effective in reducing the risk of recurrence.

3-Cervical sutures (cerclage) May be of benefit in selected cases. Not thought to be useful in multiple pregnancies.

Mc Donalds operation



Shirodkar operation



4-Cervical pessary

Recent data suggest that the arabin pessary may reduce the risk of PTD in women with a singleton or multiple pregnancy. Further studies are ongoing.

5-Reduction of pregnancy number

Selective reduction of triplet or higher-order multiple pregnancies (to 2) reduces the risk of preterm labour while slightly increasing the risk of early miscarriage

Cervical pessary

prediction:

1-Past obstetric history

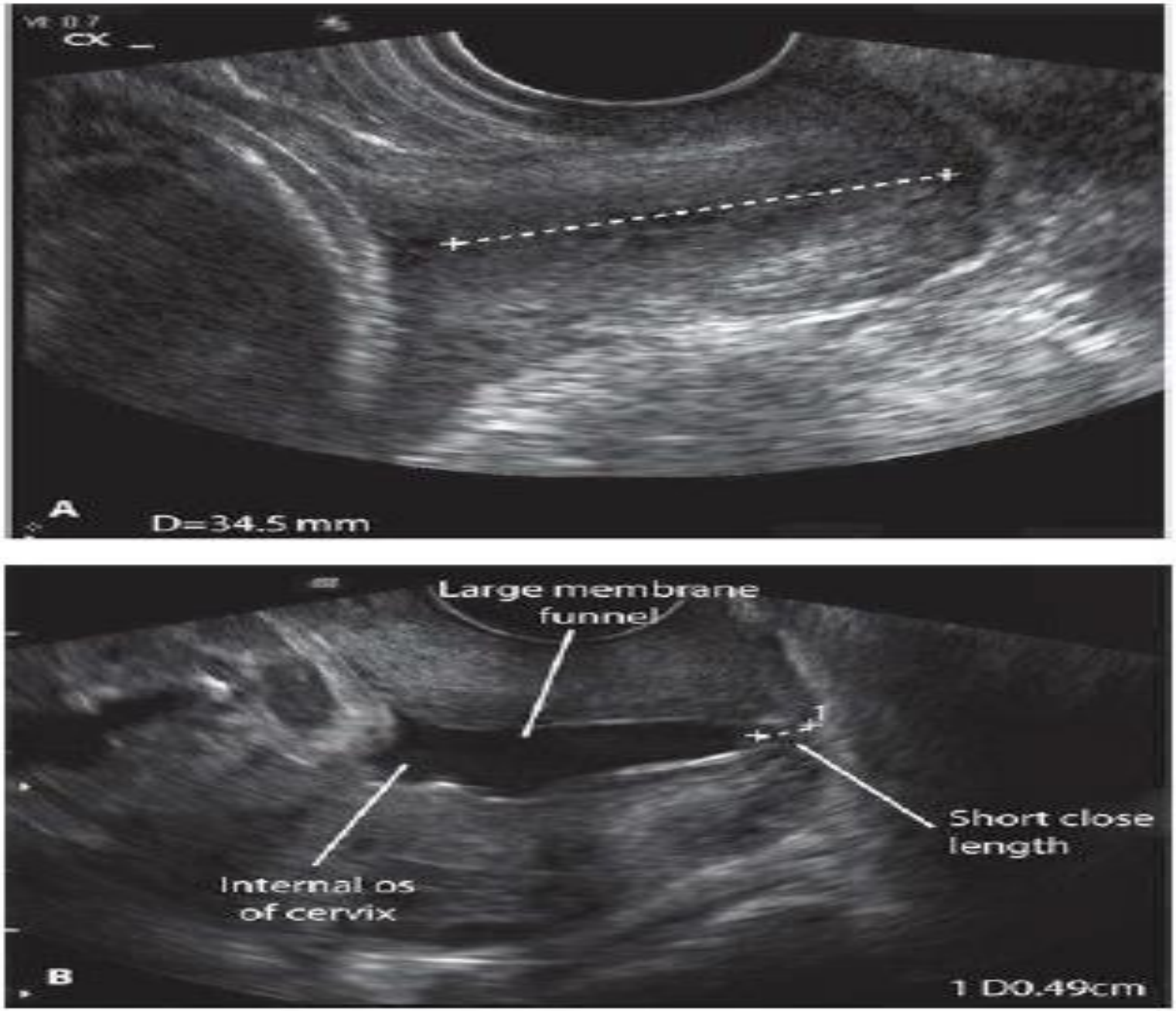
Having had a previous PTD increases the risk of PTL in a subsequent pregnancyfour times in comparison to a woman who had a previous delivery at term

2-transvaginal sonographic measurement of cervical

length in the second trimester;

3-measurement of fetal fibronectin in cervical

vaginal fluid in the second trimester.



(A) Normal cervix; (B) cervical length and funnelling on ultrasound.