PRETERM LABOUR
Preterm labour

Dr Lama Al-Mehaisen, MD, MRCOG
Consultant obstetrician & gynaecologist
Urogynaecology
Preterm labour

- is defined by WHO as Onset of labour prior to the completion of 37 weeks of gestation, in a pregnancy beyond 24 wks of gestation.

- The period of viability varies in different countries from 20 to 28 wks. Preterm labour is considered to be established if regular uterine contractions can be documented at least 2 in 10 minutes with progressive change in the cervical score in the form of effacement of 80% or more and cervical dilatation >1cm
If uterine contractions are perceived in the absence of cervical change, the condition is called Threatened Preterm Labour.

This condition tends to be over diagnosed and over treated.

Nearly 50-60% of preterm births occur following spontaneous labour.

30% due to preterm premature rupture of membranes

Rest are iatrogenic terminations for maternal or fetal benefit.
introduction

Half of all neonatal morbidity occurs in preterm infants.

In spite of all major advances in obstetric and neonatal care, there has been no decrease in incidence of preterm labour over half a century.

On the contrary, it has been increasing in the developed countries as more and more high risk mothers dare to get pregnant.
Incidence

- Preterm birth occurs in 5-12% of all pregnancies and accounts for majority of neonatal deaths and nearly half of all cases of congenital neurological disability, including cerebral palsy.
One of the major reasons for increase in incidence of premature births is the increase in numbers of multiple pregnancies, particularly higher order pregnancies, resulting from the use of fertility drugs and assisted reproduction.
Pathogenesis

Preterm labour may be:

- Physiological
- Pathological

The molecular basis of initiation of labour is unclear but a number of theories have been proposed.

- Progesterone withdrawal
- Oxytocin stimulation
- Premature decidual activation
A large variety of aetiological factors have been implicated but in majority of cases no definite cause is found.

- Obstetric complications
- Racial factors
- Demographic factors
- Psychosocial factors
- Past obstetric history
- Infection
- Genetic factors
Obstetric Risk factors

1. Conditions that cause overdistension of uterus:
   - Multiple Pregnancy - carries one of the highest risk. About 50% of twins nearly all higher multiple gestations.
   - Hydramnios

2. Preterm premature rupture of membranes (PPROM)

3. Idiopathic preterm labour

4. Pre eclampsia

5. Antepartum hemorrhage

6. Second trimester bleeding not associated with placental causes

7. Iatrogenic preterm termination for pre-eclampsia, fetal distress, intrauterine growth restriction, abruptio placentae and intra uterine fetal death

8. Cervical weakness

9. Uterine müllerian anomalies
Racial factors

- Black women have twice the risk as compared to whites.
- This may be explained by multiple factors like socioeconomic status, medical disorders and genetic predisposition.
Demographic Factors

- Women with low BMI and poor maternal weight gain in pregnancy are at increased risk.
- Age - women younger than 17 and older than 35 yrs.
- Poor education
- Women living alone
- Minimal or no prenatal care
- Low socioeconomic status
Psychosocial Factors

- Anxiety
- Stress
- Depression
- Negative life events
- Perception of racial discrimination and domestic violence
- Excessive alcohol intake
- Smoking
Past obstetric history

- Previous h/o preterm birth (17-20% recurrence risk) or second trimester pregnancy loss.
- 3 or more abortions (may result in cervical incompetence)
- DES exposure
- Conceptions following in-vitro fertilization
- Cervical incompetence - 10-25% of second trimester losses.
Infection

- Result in 50% of spontaneous preterm births.
- Asymptomatic bacterial vaginosis
- Trichomonas vaginalis
- Chlamydia trachomatis
- Ureaplasma urealyticum
- Mycoplasma hominis
- Asymptomatic bacteriuria
- Systemic infections like pyelonephritis, pneumonia, acute appendicitis.
Genetic

- Important component of idiopathic group.
- Single gene polymorphisms of cytokines in both mother and fetus may be responsible
- Spontaneous preterm labour and preterm birth.
Prediction of Preterm labour

A number of scoring systems have been proposed. The most promising markers currently available are:

- Fetal fibronectin levels
- Ultrasound assessment of cervical length
- Obstetric history
Fetal Fibronectin (fFN) -

- It is an extracellular glycoprotein secreted by the chorionic tissue at maternal-fetal interface.
- It is present in amniotic fluid, placental tissue and decidua basalis.
- It acts as a biological glue which binds blastocyst to endometrium.
- It can be normally present in cervicovaginal secretions up to 20-22 wks.
- Around 22 wks chorion fuses completely with underlying decidua. This prevents fibronectin to leak into the vaginal secretions any further, until at term, a few wks before labour when cervix dilates or membranes rupture.
- Therefore presence of fFN between 27 to 34 wks can provide important marker of preterm labour.
Swabs can be taken from ectocervix or post vaginal fornix. ELISA with monoclonal antibody is used to detect fetal fibronectin.

Presence of fibronectin indicates increased risk of preterm labour (89% sensitive and 86% specific).

A negative fFN indicated very low risk of preterm delivery.
Length of cervix

- Cervical insufficiency is defined as cervical changes in absence of uterine contractions.
- Cervix can be assessed digitally or by ultrasound.
- Funneling is also independent risk factor.
Interventions have been aimed at general improvement in nutrition, rest, hydration and psychological support.

- Adequate antenatal care
- Cervical cerclage
- Nutritional intervention: iron, calcium, vit-C, zinc, proteins
- Bed rest and hydration
- Antibiotics: antibiotic therapy at 24 wks and repeated in labour reduced the incidence of bacterial vaginosis and trichomoniasis but did not have significant effect on preterm labour
management

Includes tocolysis to halt uterine contractions.

- Administration of steroids to decrease perinatal morbidity
- Magnesium Sulphate
- Calcium Channel blockers
- Prostaglandin synthetase inhibitors
- Atociban
- Nitric oxide
1-Tocolytics

Aim of tocolysis is to prolong pregnancy and prevent premature births.

1. Beta-agonists:
   - Beta-2 agonists:
     - Cause vasodialation, bronchodialation and uterine muscle relaxation
       - Ritodrine
       - Terbutaline
       - Salbutamol
   - Beta-3 agonists: induce uterine relaxation with similar potency but less cardiovascular side effects compared to ritodrine
2. Magnesium Sulphate

3. Calcium Channel blockers
   - Act by reducing influx of calcium ions into the cell membrane thereby reducing the tone of smooth muscles
   - Nifedipine is most commonly used.
4. Prostaglandin synthetase inhibitors

Drugs like indomethacin, aspirin, ibuprofen belong to this group.

Indomethacin has been most commonly used. Fetal complications like oligohydramnios, premature closure of ductus and necrotising enterocolitis have restricted their use.

5. atociban

Oxytocin antagonists have been evaluated as tocolytics and atociban is now licenced in UK for treatment of preterm labour.
6-Nitric oxide

- Nitric oxide is a potent endogeneous hormone causing smooth muscle relaxation
- Nitroglycerine has been used for the treatment of preterm labour
Corticosteroids

Steroids decrease the incidence of respiratory distress syndrome, intraventricular hemorrhage and neonatal mortality.
intrapartum management

- Monitoring: Fetal hypoxia and acidosis may increase the risk of intraventricular hemorrhage.
- The preterm fetus should be monitored closely for signs of hypoxia during labour, preferably by continuous electronic fetal monitoring.
- Antibiotic prophylaxis: In countries with high incidence of group B streptococcal infection.
- Delivery: Delivery must be conducted in the presence of expert neonatologist capable of dealing with complications of prematurity.
- Ventouse is contraindicated in preterm deliveries.
- Caesarian section: only for obstetric indications.
Prevention of preterm delivery

Progesterone

- Progesterone has been known to be important in maintaining pregnancy for more than 80 years and 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.
- Hydroxyprogesterone caproate is licenced in the USA for preterm birth prevention in women with a previous preterm birth.
- In women with a short cervix, some studies have suggested that vaginal progesterone may prevent preterm birth.
- Crucially, there is no evidence from any study that progesterone can reduce the longer-term adverse effects of preterm birth, that of neurodevelopmental disability and respiratory morbidity.
PROM

- Rupture of fetal membranes occurring before 37 wks of gestation.
- It complicates about 3% of pregnancies and contributes to one third of preterm births.
- Risk factors are same as that of preterm labour.

PPROM

Rupture of fetal membranes occurring before 37 wks of gestation before the onset of labour.
Ppom diagnoses

- History of sudden escape of watery amniotic fluid. It needs to be differentiated from stress urinary incontinence and profuse normal vaginal discharge.
- A sterile speculum examination confirms that the fluid is coming through the os.
- Nitrazine test: turns blue from yellow if amniotic fluid leak.
- Ultrasound examination shows oligohydramnios
Complications of pPROM

Maternal complications:
- Preterm delivery
- Chorioamnionitis
- Placental abruption
- Retained placenta
- PPH
- Endometritis

Neonatal complications:
- Prematurity
- Pneumonia and early neonatal sepsis
- Pulmonary hypoplasia
- Foetal death
pPROM

Management

Correct and prompt diagnosis is imperative for optimum management.

- pPROM remote from term: Conservative management is advisable, provided acute cord complications like prolapse and compression, placental abruption and fetal distress have been excluded.
- Oligohydramnios is not an indication.
- Antibiotics: help to prolong latency and improve perinatal outcomes.
- Corticosteroids: should be given to patients between 24 and 34 weeks of gestation.
A rigorous vigil is kept for features of chorioamnionitis.

Fetal surveillance by non stress test and biophysical profile are done daily.

Delivery must be planned when:

- any evidence of clinical infection
- Non reassuring features on fetal monitoring
- When pregnancy has reached 34 wks.
Management of PPROM

- PPROM occurs in approximately 2% of all pregnancies and accounts for up to one-third of preterm deliveries.
- Fifty percent of women deliver within 1 week and 75% within 2 weeks of PPROM.
- The earlier in pregnancy that PPROM occurs the shorter the interval to delivery.
- Although postnatal survival following PPROM is directly related to birthweight and gestational age at delivery, in pregnancies complicated by PPROM prior to 23 weeks, pulmonary hypoplasia may develop leading to an increased risk of neonatal death, even if delivery occurs at later gestational ages.
- Pulmonary hypoplasia following PPROM occurs in approximately 50% of women with PPROM at 19 weeks, falling to about 10% at 25 weeks.
- The presence of amniotic fluid greater than 2 cm on ultrasound is associated with a lower incidence of pulmonary hypoplasia.
PPROM is diagnosed through clinical history and the demonstration of a pool of liquor in the vagina on speculum examination.

Management balances the risk of prematurity (if delivery is encouraged) versus the risk of maternal and fetal infection (if delivery is delayed).

In general, conservative management is followed in PPROM before 34 weeks gestation unless there is evidence of chorioamnionitis and immediate induction of labour is advised in women after 37 weeks’ gestation.
Conservative management includes intensive clinical surveillance for signs of chorioamnionitis including regular recording of:

- maternal temperature
- heart rate
- cardiotocography
- maternal biochemistry, with a rising white cell count or a rising C-reactive protein indicating development of chorioamnionitis.
- Lower genital tract swabs are routinely taken

In the majority of cases of PPROM there is time for:

- administration of corticosteroids and *in utero* transfer before the onset of PTL.
- Tocolysis is contraindicated due to the increased risk of maternal and fetal infection in patients with PPROM.
pPROM nearer to term (34-36 wks):

- It is preferable to induce labour unless fetal lung maturity or gestational age is doubtful.
- Serial transabdominal amniinfusions in <26 wks pregnancies with pPROM and severe oligohydramnios in selected women reduce the risk of pulmonary hypoplasia and improve neonatal survival.
General

- Preterm infant is small in size with relatively larger head.
- Sutures are widely separated with large fontanelle, buccal pad of fat is absent, ear cartilage is deficient and hair is wooly and fuzzy, skin is thin shiny and there is relatively thin vernix.
- In male testes are undescended and in females labia are widely separated.
- Body systems are functionally immature, CNS is not fully developed leading to decreased physical activity, poor sucking and swallowing, sluggish reflexes.
- Resuscitation at birth is difficult because of small size and stiff lungs.
- Other complications include sepsis, necrotizing enterocolitis, retinopathy of prematurity, hyaline membrane disease and, jaundice, hypoglycemia, hypothermia, infection, regurgitation, aspiration pneumonia.
Delivery of preterm baby should be attended by a trained paediatrician.

Baby should be dried promptly and kept under radiant warmer to maintain euthermia.

Excessive stimuli must be avoided.

Oxygen therapy should be administered judiciously with lowest flow rates to maintain saturation around 90%.

Hyperoxia (saturation>95%) should be avoided to minimize risk of ROP.
Respiratory distress syndrome

A common cause of mortality and morbidity.

Mainstay of treatment includes:

- adequate ventilation
- Oxygenation
- Circulation
- temperature control
- Administration of exogenous surfactant: through endotracheal tube at about 100mg/kg body weight.
Retinopathy of prematurity

- Common cause of impaired vision in preterm babies.
- Incidence: 68% in infants <1251 g.
- In many babies ROP regresses on its own but it may progress to retinal detachment and blindness.
- Severe ROP should be treated by laser or cryotherapy
Long term prognosis

Preterm babies have higher risk of:

- neurological disability
- Low IQ
- Visual and hearing impairment.
- Severity of handicap is inversely related to gestational age at birth
Conclusion

All that is possible so far is to gain a few days with the use of tocolytic agents which gives sufficient time to administer corticosteroids which have made a significant impact on neonatal morbidity and mortality.
Cervical cerclage

Tranvaginal cervical cerclage may be placed in three different circumstances:

- following multiple midtrimester losses or preterm deliveries (history indicated cerclage);
- when the cervix shortens (usually <25 mm) in women with a history of cervical surgery or previous preterm birth (ultrasound indicated cerclage);
- the cervix is dilating in the absence of contractions (rescue cerclage).
The exact mechanism by which cerclage helps to prevent or delay PTL is not entirely understood.

It is likely, however, that cerclage provides structural support to a weakened cervix, and enhances the cervical immunological barrier by improving retention of the mucous plug and preventing ascending infection by maintaining cervical length.

Similar to progesterone, cervical cerclage does not appear to reduce the risk of PTD in multiple pregnancies.
Types of cerclage

- McDonald transvaginal cerclage: Transvaginal purse-string suture inserted at the cervicovaginal junction without bladder mobilization.

- Shirodkar (high transvaginal) cerclage: Transvaginal purse-string suture inserted following bladder mobilization, to allow insertion above the level of cardinal ligaments.

- Transabdominal cerclage: Suture inserted at the cervic-isthmic junction via laparotomy or laparoscopy. Transabdominal cerclages can either be inserted preconceptionally or in the first trimester of pregnancy.
Cervical Cerclage Procedure

The suture being placed around the open cervix

Open cervical canal

Suture before tying

Suture pulled tightly

Cervical canal narrowed after tying the string

Placenta

Uterus

Cervical Band

Cervix

Cerclage Correction of the Cervix