UNIT 8 COMPLICATIONS IN LATE PREGNANCY-II

Structure

8.0 OBJECTIVES

After going through the contents of this unit, you will be able to:

- diagnose a case of Premature Rupture of Membrane (PROM) and decide the type of management in each;
- enumerate and diagnose complications due to PROM;
- diagnose and manage a case of preterm labour;
- institute the measures for prevention of PTL;
- diagnose post term pregnancy and identify the etiological factors;
- make a decision as to when and how to terminate the pregnancy;
- screen and indentify pregnancies complicated by IUGR;
- provide appropriate antenatal care by careful monitoring of fetal growth and its well being; and
- make a balancd decision for management at various stages.

8.1 INTRODUCTION

In the previous unit, you have read about preeclampsia, eclampsia and APH. Another common problem encountered is premature labour with or without rupture of membrane. As delivery of a term baby ensures better child survival, you as a doctor should able to prevent and manage a case of pre term labour.

Post maturity may be another problem, if not managed in time, may result in fetal death or severely asphyxiated baby. So this unit deals with problems of maturity and their management. IUGR is a major problem with the fetus. You will realise that careful monitoring of fetal growth and well being is extremely important as birth weigth is a significant determinant of perinatal mortality and morbidity and later childhood morbidity. In India, about 30% of the babies are growth retarded. You have already learnt in Unit 2 that improving maternal nutrition, avoiding pregnancy during adolescence and lactation and increasing the interval between pregnancy to more that 2 years will help in reducing small for date babies.

Biomedical technology has helped us monitor fetal well being especially in guiding us to plan the delivery of mother suffering from IUGR.

8.2 PREMATURE RUPTURE OF MEMBRANES

Premature rupture of membranes (PROM) is a common complication in the third trimester of pregnancy. It is defined as spontaneous rupture of amniotic membranes before onset of labour. In the normal course of events, membranes rupture during labour or just before onset of labour pains.

You must be aware that under normal circumstances fetal membranes rupture during the active phase of labour. Whenever you come across a patient who complains of watery discharge per vagina before the onset of labour, in all likely hood you are dealing with a case of PROM. PROM complicates about 10% of all cases and very often you may not be able to find any cause. Following rupture of membranes if delivery occurs within 12 hours the risk of infection to mother and fetus are minimal. In those cases where delivery does not occur for 12 hours or more, bacteria which are normally present in the vagina start ascending up to cause infections in the mother and the fetus. In those cases where pregnancy has reached about 35 weeks or more one would like to induce labour to prevent infection. Clinical problem arises when pregnancy is 34 weeks or less where induction of labour results in a premature baby associated with the risk of respiratory distress syndrome and other complications.

You must appreciate the fact that **PROM is responsible for 30% of cases of preterm labour.** The functions of amnitoic fluid are:

a) Protective medium from external trauma

b) Media for excretion and deglutination

c) Permits fetal movement and fetal growth

d) Prevents cord compression

8.2.1 Aetiology

PROM as we have just mentioned may occur without any apparent cause. However factors that reduce the tensile strength of fetal membranes have been implicated.

i) **Apparent causes**

a) Overdistention of uterus (twins, hydramnios)

b) Cervical incompetance

c) Uterine anomalies

d) External cephalic version

e) Direct trauma to the uterus

f) Infection

g) Stress

ii) **Inapparent causes**

At this point, it is important to note that in more than half number of cases no obvious cause can be found. In these cases infection of amniotic membranes has been implicated.

Bacteria which are normally present in vagina and other pathogenic bacteria can cause ascending infection if pH of vagina changes or cervical os is dilated. In some studies it has been found that infection of membranes weakens them and predisposes to premature rupture.

8.2.2 Diagnosis

It is extremely important for you to recognise the presence of PROM. In most cases it is quite easy especially when you find on speculum examination amniotic fluid coming through cervical canal. At this stage you can look for signs of vaginitis and cervicitis. Inspection of sanitory pad used by the patient appears wet and odourless. There will be situations where the diagnosis is not clear and could be due to stress incontinance or vaginal infection. It is essential in such cases to proceed with the following laboratory investigations.

a) **Nitrazene test**

Normally vaginal secretions are acidic whereas amniotic fluid is slightly alkaline. Checking pH of fluid with a litmus paper may help in differentiating vaginal secretions from amniotic fluid.

b) **Fern test**

A drop of fluid can be put on a slide, dried and seen under microscope for ferning pattern Amniotic fluid will show a fern pattern whereas vaginal secretions will not show such a pattern

8.2.3 Complications

Once there is suspicion of PROM you must know the complications that may ensue.

a) **Intrauterine infection**

After rupture of membranes bacteria which are normally present in vagina ascend up and cause infection of amniotic membrances, fetus and even uterine wall. Bacteria responsible for infection are group B Streptococcus, peptostreptococcus. E.coli. fusibacterium. Like in any other infections. investigations like total leucocyte count and cultures should be carried out.

b) **Preterm labour**

After rupture of membrances majority of patients go into labour. 50-60% with in the first 12-24 hours and as many as 80-90% deliver with in 7 days. If at the time of birth, maturity of the baby is less than 34 weeks, a number of problems can develop in such babies, most important being hyaline membrane disease. In such cases glucocorticoids like inj. Dexamethasone or inj. Betamethasone 12 mg intramuscularly 2 doses in 12 hours apart is indicated to accelerate the lung maturity.

c) **Curd prulapse**

Occasionally one loop of umbilical cord may prolapse at the time of PROM which can cause fetal death if not detected. When PROM occurs with the fetal parts not fitting into pelvis, chances of cord prolapse are high. You must make it a point to look for a loop of umbilical cord and when detected the condition calls for immediate delivery of the baby.

d) **Abruptiu placentae**

This complication can occur following PROM, especially if the pregnancy is complicated by polyhydramnios.

8.2.4 Management

Let us now proceed to the management of a case of PROM. In a given case of PROM we have two models of treatment namely:

a) Conservative management

b) Termination of pregnancy

a) **Conservative Management**

You must appreciate the fact that conservative line of management will prolong the pregnancy. Your aim should be to attempt to achive a period of gestation of about 35 weeks, keeping in mind of course the risk of infection. When PROM occurs before 34 weeks of gestation, this line of management is indicated. The conservative treatment consists of :

A) Bed rest

B) Use of sterile vulval pads

C) Antibiotics: Ampicillin. Cephalaxin. Garamycin or Erythromycin is preferred. Antibiotics may be changed as required.

D) Tests to detect infections of amniotic fluid : Total leucocyte count, cervical swab culture and sensitivity. In recent years ultrasound is being used to asses the liquor volume periodically.

b) **Termination of Pregnancy**

You must consider termination of pregnancy in the following situations as there will be no purpose served by continuing pregnancy either from maternal or fetal point of view.

A) Pregnancy 34 weeks or more duration.

B) Those already in labour: Cervix 75% or more effaced > 3 cm dialated as these patients are unlikely to respond to conservative management.

C) Those with signs of intrauterine infection: Fever (37.8 degree Centigrade), maternal tachycardia, fetal tachycardia (>180/min), foul smelling vaginal discharge or uterine tenderness or significant leucocytosis in the mother.

D) Those with intrauterine fetal death or severe congenital malformation incompatible with life.

Amnioinfusion

Amnioinfusion has been performed in order to prevent cord compression; solutions such as Ringer lactate or normal saline are infused into the amniotic cavity either trans- abdominaly or transcervically. Repeated infusions may be needed at weekly interval till delivery.

Referral

You must consider a case of PROM for specialised care whenever you find PROM before 34 weeks of gestation.

Check Your Progress 1

1) Define PROM.

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2) Enumerate three clinical conditions that are associated with PROM?

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3) Enumerate three complications that occur in premature rupture of membranes.

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4) What are the alltibiotics of choice in PROM ?

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8.3 PRETERM LABOUR (PTL)

It is important for you to appreciate that preterm labour is a very important clinical problem, responsible for 50- 75"/u of all the newborn dying within 7 days after birth. PTL accounts for 75% of all admissions to neonatal nursery. These babies need specialised neonatal care which is extremely costly and difficult. Many of the survivors may have long term sequelae.

8.3.1 Definition

Preterm labour (PTL) is defined as onset of labour before 37 weeks of gestation. Ten per cent of all pregnancies are complicated by PTL. It may be higher among poor socio-economic strata specially in women of less than 17 years or more than years of age.

8.3.2 Aetiology

It is useful for us to categorise causes of PTL into maternal, fetal alld placental causes.

Maternal causes

a) Pregnancy induced hypertension: When blood pressure is uncontrolled labour may needs to be induced or patient may spontaneously go into labour.

b) Renal disease

c) Diabetes mellitus

d) Anaemia

e) Heart disease .

t) Cervical incompetence

g) Uterine anomalies: bicornuate, unicornuate etc.

Fetal causes

a) Congenital malformation of fetus

b) Intrauterine death

c) Multiple pregnancy

Placental causes

a) Abruptio placentae

b) Placenta praevia

c) Hydramnios

Let us be aware of the fact that in 30-40% of cases no obvious cause can be found.

Predisposing factors

As we proceed, it is interesting to know that some of the predisposing factors in cases of PTL.

a) Age of mother: < 17 or > 35 years

b) Low socio-economic status

c) Occupation: manual workers, doctors, nurses etc.

d) Smoking and drug addictions

e) Parity: primi or grand multipara

8.3.3 Diagnosis

Let us now go on to the diagnosis of PTL. History of labour pains before 37 weeks of gestation should make one suspect PTL. On exanlination, uterine contractions Call be felt coming every 3-4 minutes alld lasting for 35-40 seconds. Vaginal exalnination reveals cervix to be dialated more thall 2-3 cm and effaced 50% or more. In some cases membralles may also be ruptured.

8.3.4 Investigation

It is important to investigate a case of pretenn labour thoroughly. While investigating you will try to detect the cause of PTL as far as possible. The results of ulvestigations will help us to make a decision as to cases in which medical or surgical intervention is likely to be beneficial to the patient. Please refer to the sub-section of etiology of PTL where we have already enlisted detectable etiological causes. However, infection has been implicated in ! cases wllere no obvious cause has been foWld. Tllerefore, the complete haemogralll , urine culture alld vagulal swab culture should be perfornled. You Call detect chorioamnionitis by performing the following tests on almniotic fluid obtained by doing amniocentesis i.e. Gramstain, bacterial cultures, leucocyte count, lecithin-sphingomylin ratio or foam stability test to assist fetallwlg maturity. .

8.3.5 Management

As you are already aware, a baby born before 34 weeks of gestation is prone tor dangerous neonatal complications. Hence you will agree that every effort must be made to prevent/ arrest PTL. If pregnancy is already 35 weeks or more. labour may be allowed to take place in order to arrest PTL you must ensure:

a) Admission to hospital

b) Bed rest in lateral position

c) Infusion of I.V. fluids in initial 30 minutes

d) Administration of uterine relaxants (tocolytic agents) i.e. drugs that reduce uterine contractions.

Tocolytic agents

a) Beta mimetic drugs (isoxuprine, salbutomol, ritodrine etc.)

Isoxuprine is the most commonly used drug in India. It call be given orally as one the tablet (10 mg) four times daily and it call also be given as intramuscular injections 10 mg intramuscular every 6th hourly) or as intravenous infusion (40 mg dissolved in 500 ml of dextrose or Ringer lactate). Intravenous infusion should be started at 10-15 drops/minute and dose should be increased only after checking pulse rate and blood pressure. If pulse rate becomes more than 120/minute or BP falls below 90/60 mm of Hg, infusion should be stopped or should be made very slow. If care is not taken isoxuprine drip can cause heart failure, pulmonary edema or even death.

Once the uterine contractions are arrested, I. V drip should be stopped and intramuscular injections started. When there are no uterine contractions for more thatl 24 hours oral isoxuprine can be started. With this regitne you are most likely to succeed.

b) Nifedepine

This drug used to treat hypertension is also used to treat PTL. It is given initially as 30 mg orally foll()wed by 10-20 mg 8th hourly. When given orally it does not cause much of hypotension but you must be on look out for headache which is a common side effect of Nifedepine.

Contraindications for Tocolysis

You should not use tocolysis in the following situations:

a) Pregnancy> 35 weeks

b) Intrauterine death

c) Malformed uterus

d) PROM

e) Abruptio placentae

t) Cervical dilatation> 4 cms

g) Cervical effacement >70 %

Role of glucocorticoids

You are aware that Respiratory Distress Syndrome (RDS) is the most dangerous complication in babies born with PTL. RDS develops because of lack of pulmonary surfactants, a factor which prevents alveoli from collapsing during expiration. Normally this appears after 34 weeks of gestation. Administration of glucocorticoids to the mother in tIle form of inj. Dexamethasone or inj. Betamethasone 12 mg I.M. 2 doses 12 hours apart helps in acceleration of lung maturity due to increased production of surfactants in the baby there by reducing the chances of baby developing RDS.

Referral

If after starting treatment it appears that labour will not stop and baby born will be premature it is better to shift such patients to a hospital with facilities for nursery care. In those cases where delivery is expected before patients reachitlg large hospital, delivery can be conducted but baby may have to be tratlsferred to referral hospital. It is always better to deliver a woman with PTL in tIle hospital where facilities for good neonatal care are available.

Intrapartum care

Following points need to be taken care of when you conduct delivery in a PTL case, so as to reduce injury to fetus.

- Episiotomy should be given
- Cord clamped after pulsations are stopped
- Cover the baby in a warm dry towel immediately after birth to prevent hypothermia.
- Caesarean section may be better than vaginal delivery when the baby presents asbreech

Neonatal Management

You are aware that babies born as premature may develop a number of problems but most common and serious complication is respiratory distress syndrome due to lung immaturity.

a) **Hyaline Membrane Disease (HMD):** It leads to RDS which as we have discussed earlier call be prevented by administration of glucocorticoids to mother. Babies with RDS will need ventillatory support and surfactant therapy.

b) **Hypothermia:** Due to lack of subcutaneous fat these babies may develop hypothermia. It can be prevented by using room heaters. drying the baby and covering the baby with a warm towel. Keeping the baby hugged close to mothers chest and another way of keeping the baby warm.

c) **Infections:** Premature babies are more prone for infections such as pneumonia, meningitis. septicemia. Antibiotics are given to treat such infections.

d) **Feeding:** Due to poor suckling reflex. newborn babies may have difficulty in sucking milk from breast nipple. Often feeding with spoon may have to be tried. Precaution should be taken to prevent regurgitation of milk.

e) **Jaundice:** Premature almost always have jaundice in the first week of life. If bilirubin levels are more than 15 mg%. phototherapy and exchange transfusion may be needed These babies may develop kernicterus if jaundice is not properly treated.

f) Necrotising enterocolitis.

g) Intraventricular haemorrhage.

Check Your Progress 2

1) Define Preterm Labour (PTL).

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2) To what extent PTL contributes to perinatal mortality?

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3) What are the essential investigations you will do in a case of preterm labour?

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4) Name the tocolytic agents that you could use in PTL.

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8.3.6 Recent Advances

For babies born prematurely artificial surfactant are given by nebulisers. This treatment is very costly and available in only few centers. It helps to prevent RDS due to hyaline membrane diseases.

You have already studied that uterine anomaly is one of the causes of PTL. You also need to remember that social intervention instituted in countries like Sweden and Singapore has had dramatic decline in the incidence of PTL.

8.4 POSTMATURITY

In the previous section you have seen the risks associated with preterm labour. As pregnancy progresses beyond 40 weeks, it has been found that there is a gradual decline in the placental function leading to fetal distress and occasionally fetal death. Therefore, you will agree with us that in such cases there is need to recognise fetal jeopardy and terminate the pregnancy. .

8.4.1 Definition

Pregnancies which are 42 weeks duration or more are defined as post mature pregnancy You must recall that only 4.5% pregnant women deliver on their expected date of delivery About 30-40% women deliver before completion of 40 weeks. Similarly 45-55% women deliver after their Expected Date of Delivery (EDD). About 2-4% of pregnancies are post term. It is important to realise the significance of post dated pregnancies as the placenta function declines in such pregnancies resulting in less blood flow to fetus whereas feta requirement increases due to increasing size. In some cases where placental blood flow not adequate fetus suffers from fetal distress and may die in uterus. It is difficult to say for how many days after term in a particular pregnant woman the fetus can safely grow inside the uterus. Therefore, whenever a pregnant woman completes 40 weeks, she needs careful monitoring of her pregnancy.

In our country as in some others, many women do not remember the date of their Last Menstrual Period (LMP) and hence the EDD cannot be calculated correctly. You may recall in some other instances in which it may not be possible to calculate the EDD correctly e.g. irregular cycles, conception during lactational amenorrhoea or whenever the woman had been on oral contraceptives. Please refer back to Unit 1 where we have already discussed, this issue. It is mandatory to take the menstrual history in sufficient details and also make efforts to go through her previous records which may help you to assess the period of gestation. If you do not evince sufficiently or care to document the above facts, you are likely to make a wrong diagnosis of past dates / post term pregnancy.

8.4.2 Aetiology

You will not find any definite cause for a woman to go post term.

A familial tendency has been recorded in some women; in yet others (50%) there is previous history of post term pregnancies. Some conditions, you will note are particular by associated with prolonged pregnancies. For example anenocephaly, fetal adrenal hypoplasia, absence of fetal pituitary, placental sulphatase deficiency etc. These clinical conditions show a common feature i.e. lack of high level of estrogen of that of normal pregnancy.

In a post term pregnancy you will note that the fetus continues to grow, often to an unusually large size. Besides manifestation due to decline in the placental function, fetus passes meconium in uterus. Large babies can be responsible for cephalopelvic disproportion. Shoulder dystocia is classically associated with a large baby. Subsequently there is the increased hazard of instrumental delivery and caesarean section.

We have already discussed the complication of fetal distress due to uncompromised placental function. Fetus passes meconium in uterus there by increasing the chances of meconium aspiration syndrome. Beyond 42 weeks oligohydramnios occurs and can predispose to fetal distress due to cord compression. Depending on the decrease in blood flow, fetal growth retardation can set in leading to loss of subcutaneous fat.

8.4.3 Management

From the discussion so far you have gathered that even in the absence of recognisable maternal complications, there remains little doubt that fetuses who continue their intra uterine existance beyond 42 weeks, suffer from serious morbidity and mortality. Hence, it would be advantageous to terminate the pregnancy by 42 weeks. Unfortunately we cannot make the decision straight away because:

1) Assessment of gestational age is often inaccurate.

2) It is difficult to identify precisely the fetus which will develop serious morbidity.

3) Many of the fetuses are healthy even when post term.

4) Induction of labour may not always be successful.

5) Caesarean section increases the risk of maternal morbidity

In view of the above you must have definite plan of management which includes proper fetal surveillance and institute an appropriate intervention. Pregnancy associated with medical or obstetric complication should NEVER be allowed to go post term.

i) **Fetal Surveillance**

In fetal surveillance as many of the following tests Possible should be performed.

a) **Fetal kick count**

Pregnant woman is asked to count movements of fetus for one hour after lunch and one hour after dinner. Whenever movements reduce by 50% or more or there are less than 3 movements per hour there is risk to fetus.

Cardiff count to 10

If foetal movements are less than 10 in 12 hour working period the woman requires further investigation.

b) **Non Stress Test (NST)**

Normally after fetal movement, fetal heart rate increases by 15 beats/minute and this rise persists for 15 seconds. If there is no increase in fetal heart rate after movement or increase is less than 15 beats, such a fetus may be at risk of fetal distress. Such a situation may require confirmation by another test. Fetal heart may be heard with a stethoscope or with an electronic machine or doppler.

c) **Oxytocin Challenge Test (OCT) /Contraction Stress Test**

In this test intravenous drip containing 2 unit oxytocin is started till uterine contractions lasting 35-40 seconds occur and those contractions occur every 3-4 minutes. Fetal heart is heard immediately after contraction is over. If fetal heart rate falls below 120 beats/minute such a fetus is at risk of fetal death. This test may take 60-90 minutes and should be

carefully done. This test should not be done in women with placenta previa, previous caesarean section or transverse lie.

d) **Biophysical Profile Score (BPS)**

This is a fetal assessment score designed by Manning et al. in 1980. They combined real time ultrasound and NST to have a scoring system to evaluate fetal well being. This is called the Biophysical Profile Scroe (BPS) or Manning Score. Various parameters included in BPS are :

1) NST

2) Fetal Breathing Movements

3) Gross Body Movements (GBM)

4) Fetal tone

5) Amniotic fluid volume

e) **Amniotic Fluid Index (AFI)**

Amniotic fluid is measured with the four quadrant technique i.e. measuring the largest part of fluid found in each of the four quadrants of uterus. The measurements are added. The result is the AFI. The fluid is decreased if the AFI is less than 10 cms and markedly decreased if less than 5 cms.

ii) Induction of Labour

Before induction it is necessary for you to do a per vaginal examination to assess the favourability of the cervix. A firm, long, unaffaced cervix with a closed os is unlikely to respond to induction of labour. In such cases cervix is made favourable by instilling prostaglandin gel into the cervix or by giving oxytocin drip. If cervix is favourable (soft, effaced, dialated) labour can be induced by artificial rupture of membrane followed by the syntocinon drip. ARM reveals the amount and the colour of the liquor. If it us meconeum stained C.S. is indicated.

8.4.4 Intrapartum Care

Once labour sets in, it should be monitored very carefully. Uterine contractions and fetal heart should be monitored every 30 minutes as fetal distress and incoordinate uterine actions are more common in the these pregnancies.

At the time of delivery if meconium is present suction of nose and mouth should be done immediately after the delivery of the head but before the delivery of trunk.

If during labour fetal heart becomes slow or meconium is noted and there, is no chance of delivery within few hours, caesarean section is warranted. As you know that the babies tend to be larger and chances of shoulder dystocia are high, it should be managed by using a manure to depress the anterior shoulder.

Check Your Progress 3

1) Define postmature pregnancy.

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2) Name three complications of post mature pregnancy.

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3) .....% of pregnant women deliver after 40 weeks of gestation.

4) What are the advantages of induction of labour by ARM in post mature pregnancy?

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8.5 IUGR

IUGR is a pathological decrease in the rate of fetal growth. However, for all practical purposes, we consider the fetus as growth retarded, when its weight is below the 10th precentile or less than two Standard Deviation (SD) below the mean weight for a given gestational period.

8.5.1 Aetiology

While studying the aetiology of IUGR, you will appreciate that it is multifactorial. IUGR can occur due to :

Fetal causes	10-20 %
Maternal causes	30-35 %
Placental causes	30-35 %
Combined maternal and fetal causes	5-10 %

The main conditions in each of the above category are as follows :

Maternal Causes

Preeclampsia

Chronic hypertension

Chromic renal disease

Connective tissue disorder

Diabetes with vascular lesions

Sickle cell anaemia

Cardiac disease class III or IV

Severe malnutrition

Smoking

Alcohol ingestion

Placental Causes

Abnormal placentation

Chronic villitis

Placental infarcts

Placental hemangiomas

Chorioangiosis

Hemorrhagic endovasculitis

Placenta previa

Fetal Causes

Chromosomal abnormalities

Multifactorial defects

Infections

Multifetal pregnancies

As you have studied earlier in the physiology of pregnanacy optimal placental function is essential for fetal growth and well being. The following conditions in mother lead to decrease in the placental perfusion and thereby causes placental insufficiency. In India, by far the most common conditions are pre-eclampsia in primi gravidae (10-12%), malnutrition, advanced cardiac disease especially rheumatic heart disease and chronic hypertension. Drugs like Phenytoin can cause teratogenic injury and fetal growth retardation.

Coming to the placenta itself, abnormal placentation, placenta praevia, abruptio placentae and placental infarcts are recognised. As you have already seen, fetal conditions are responsible in 10-20% cases and abnormalities of chromosomal origin in at least 1/3rd of cases like autosomal trisomies, genetic defects like phenyl ketonuria etc. However, in 10% of the cases fetal growth retardation occurs due to infection. We must be aware that these infections are acquired by the mother during pregnancy and are transmitted to the fetus; or the mother may be the carrier when she conceives. You are all aware of viral infection like rubella, protozoal infections like toxoplasmosis, bacterial infections like Listeria Monocytogens, But you must not lose sight of malaria which has staged a come back in the last few years.

Fetal congenital malformations account for 20% of fetal causes of IUGR. Congenital heart disease, microcephaly are obviously associated with growth retardation.

8.5.2 Classification

The growth retarded infants are classified as Type I, Type II and Type III.

Symmetric IUGR (Type I)

You must realise that symmetric IUGR accounts for one third of all cases of IUGR and is due to low genetic growth potential, Intra uterine infection, severe maternal malnutrition, chromosomal aberrations and congenital anomalies. Usually the insult is operative before 16 weeks of gestation. A symmetrically growth retarded infant is small in all parameters as there is an intrinsic fetal pathology. Postnatal catch up of growth is poor and long term prognosis is unfavourable.

Asymmetric IUGR (Type II)

Asymmetric IUGR accounts for two thirds of IUGR babies and results from placental insufficiency in high risk pregnancy cases like Hypertension, Anaemia, Heart disease, Bleeding during pregnancy etc. Thus IUGR usually begins in the second or early third trimester and there is **relative sparing of head cells.** The infant has a long, thin and wasted appearance. Head size is proportionately bigger than trunk size. These infants have i a normal postnatal catch up and long term prognosis is good.

Intermediate IUGR (Type III)

This is due to mixed aetiology. To begin with IUGR is symmetrical but becomes asymmetric during later part of pregnancy as extrinsic insult is superimposed on intrinsic fetal problems. The fetal complications which are likely to occur, manifest not only during pregnancy but also during neonatal and late neonatal period.

8.5.3 Fetal Complications

The complications can take place during antepartum, intrapartum or neonatal period,

a) **Antepartum**

Still Birth

There is a definite relationship between intrauterine malnutrition and still births. It has been recorded in the literature that IUGR is responsible for 20-30% of all cases of still, births. Fetal death in IUGR may occur at any time, but occurs more frequently after 35 weeks of gestation.

Oligohydramnios

Oligohydramnios as you will appreciate is common, especially, in severe IUGR, In fact the degree of oligohydramnios is being considered as an important factor in the prognosis of fetal outcome. It is possible that oligohydramnios in IUGR is caused due to the decreased fetal urinary output as a result of decreased renal blood flow caused by redistribution of blood flow with preferential shunting of blood to the brain.

b) **Intrapartum Fetal Acidosis**

If you happen to perform an electronic fetal monitoring and if there is acidosis, you will record late decelerations, severe variable decelerations, decreased beat to beat variability and frequently episodes of bradycardia. Acidosis is said to manifest during labour or in about 40% of cases resulting in high incidence of caesarean delivery.

c) **Neonatal Complications**

The diagnosis of IUGR is confirmed when the fetal weight is below 10th percentile. The typical picture of an IUGR infant is loose skin with very little subcutaneous fat. Most of the time, the head circumference is larger than abdominal circumference. You must appreciate at this point that the neonatal course of an IUGR infant is different from that you constitutionaly small baby.

The most important complications are related to:

1) **Perinatal asphyxia and acidosis:** Meconium aspiration syndrome and Hypoxic ischaemic encephalopathy
2) **Metabolic disturbances:** Hypoglycemia, hypocalcemia, hyperviscosity, hypothermia
3) **Specific causes of fetal retardation:** Infection, chromosomal abnormalities

8.5.4 Screening for IUGR and Diagnosis

So far, we have studied the causes of IUGR and the serious complications that can occur in the fetus and the neonate. You must realise that some of these complications have far reaching effects on the newborns and hence it is absolutely necessary to screen for IUGR so that these cases can be investigated further and managed appropriately or even referred for specialized care.

A high index of suspicion will pay great dividend. The challenge you have to face is to identify the fetus who is growing inappropriately in the uterus. As already discussed, true IUGR occurs in certain group of mothers. Therefore, we should take a good history and use the gravidogram in order to identify fetal growth retardation.

a) History

A detailed history is taken to identify high risk population. The following is an exhaustive list which should be elicited during history taking:

General History

- Age: < 17 or> 35
- Low socio economic status
- Smoker/alcoholic/drug addict.
- High altitude
- Low pre pregnancy weight: < 50 kg
- Stature: < 145 cms

Past Obstetric History

- Previous history of IUGR
- Previous abortions, still births and neonatal death
- Chromosomal or congenital anomalies

Medical History

- Hypertension
- Renal disease
- Systemic lupus erythomatosis
- Severe cardio pulmonary disease
- Haemoglobinapathy
- Urinary tract infection

Present Pregnancy

- Viral infection
- Radiation exposure
- Drugs intake
- Multiple pregnancy
- Bleeding during pregnancy
- Preterm contractions

b) **Uterine Fundal Height Measurement**

Let us go back to the Unit 1 of this block i.e. Antenatal care. We had discussed the usefulness of the 'gravidogram' as a tool to monitor fetal growth. Serial measurements of fundal height should be plotted against a standard curve; if the value is well below 50th percentile, it should arise a suspicion of IUGR. All such cases can be referred for specialized care. With the help of gravidogram 45-80% of Small for Gestational Age (SGA) fetuses can be identified.

In a country like ours, the gravidogram is invaluable in screening for lUGR. Inappropriate fetal growth can also be suspected if the fundal height measurement is 2 cm less than the measurement for the appropriate period of gestation. You can also diagnose IUGR, if there is a discrepancy of more than four weeks between the actual height and expected height of uterus (see Fig. 4.1).

c) **Confirmation of Diagnosis**

You are aware that it is difficult to diagnose IUGR clinically unless the growth retardation is very gross. Therefore, once IUGR is suspected, it is necessary to confirm it by ultrasound examination. In addition to confirming the diagnosis, ultrasound examination can be used very effectively for monitoring the fetal well being.

i) **Head Circumference/Abdominal Circumference (HC/AC) Ratio**

It is useful for you to know that HC/ AC ratio can detect asymmetrical IUGR in uteroplacental insufficiency. Normally the ratio should decrease as the gestational age increases. With loss of fat and subcutaneous tissue the ratio will increase. In normal pregnancy HC/ AC is more than one till 32 weeks; one between 32-36 weeks and less than one after 36 weeks. HC/ AC ratio Call also be used to distinguish between asymmetrical and symmetrical IUGR, as in symmetrical IUGR the ratio continues to be one or less.

d) Estimated Fetal Weight

Several investigators have described mathematical equations to calculate the fetal weight. A formulation commonly used is that of Hadlock et al. by which tile fetal weight estimations are usually made within 5-10% of true fetal weight. Fetal weight estimates are valuable in diagnosis of small fetuses but do not differentiate between IUGR babies and babies who are small and healthy.

e) Femoral Length/Abdominal Circumference (FL/AC) Ratio

As you can understand all the earlier parameters and ratios described are gestational age ! dependent. If gestational age is unknown obviously these parameters are useless. FL/ AC is a gestational age independent variable. After 20 weeks of gestation FL/ AC ratio , remains same till term in normal pregnancy. The normal ratio is 22 (±2). Any value above, 24 denotes IUGR. But you must understand that FL/ AC ratio is not useful in determining , symmetrical

lUGR.

f) Amniotic Fluid Index (AFI)

An association between IUGR and decreased amniotic fluid volume is well recognised, Utero placental insufficiency results in fetal hypoxia with a diminished renal plasma flow and decreased glomerular filtration with less urine formation. A liquor pocket size of 1cm or less is considered abnormal. Corelating fetal outcome with liquor pocket size, it is observed that with a pocket of less than I cm, perinatal mortality was 187,5 per 1000, With a marginal pocket of 1 to 2 cm, the perinatal mortality was 4.65 per 1000, while with. normal liquor volume. It is 1.97/1000.

g) Placental Grade

You must know that a small fetus with grade increase in risk of small for gestational age estimated fetal weight alld less than grade 3 than 87 mm suggests IUGR in 62% of cases

h) Fetal Ponderal Index (FPI)

If you recall, a growth retarded fetus is essentially malnourished with lack of subcutaneous fats. This can be detected with the help of a Index (PI); the PI is obtained by dividing the estimated fetal weight by the third power of the femoral length. The normal value for the less should be considered abnormal and strongly suggests fetal retardation.

i) Doppler Ultrasound

While we studied the pathophysiology, we stressed that a decrease in utero placental blood flow is an important event that occurs in IUGR. Hence, assessment of doppler flow in uterine, umbilical or internal carotid artery not only helps in detection of cases of IUGR but also gives us an indication of the degree of fetal compromise.

Wave form analysis on doppler studies by demonstrating resistance to blood flow in fetal umbilical and uterine vessels can predict fetal well being. The peak systolic and end diastolic volume is measured and systolic to diastolic flow of < 3 is taken as normal in umbilical and uterine artery. Comparison of umbilical and fetal carotid velocimetry also has a high predictive value to detect a compromised fetal state. Flow velocity wave forms also relate to fetal outcome. Lack of diastolic component or reversed end diastolic flow in umbilical vessels or descending aorta is all omnious sign. Such pregnancies either need to be terminated or require to be intensely monitored.

Check Your Progress I

1) When do you call a fetus to have IUGR?

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2) Sytmmetrical IUGR operates usually before.....weeks.

3) How will you clinically screen for IUGR during antenatal care?

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4) What parameters on ultrasound examination will help you to confirm asymmetrical IUGR?

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8.5.5 Management of IUGR

After confirming the diagnosis you will learn about management during pregnancy by fetal monitoring and decision making about when to terminate preganancy.

a) **Antepartum Fetal Surveillance**

You will surely agree that there is a need for very close antepartum fetal monitoring ill case of IUGR which includes monitoring of both fetal growth and fetal wellbeing.

Fetal Growth Monitoring

If you refer to earlier sections, monitoring of fetal growth has been discussed. Besides clinical examination of SF height, Baby size and amount of amniotic fluid. serial estimation of Biparietal Diameter (BPD) is important. BPD growth of < 2 mm per week between 13-34 weeks or < 1 mm per-week between 35-40 weeks indicates poor fetal growth.

Fetal Wellbeing

You have already learn about the method of monitoring of fetal wellbeing in Section 8.4.3 in postmaturity. Let us revise. Methods to assess fetal wellbeing include fetal kick count. Fetal Heart Rate (FHR) monitorial. Non stress test (NST), Contraction Stress Test (CST), and Biophysical Profile Score (BPS) and amniotic fluid Index (AFI).

d) Biophysical Profile Score (BPS)

This is a fetal assessment score designed by Manning et al. in 1980: They combined real time ultrasound and NST to have a scoring system to evaluate fetal well being. This is called the Biophysical Profile Score. (BPS) or Manning score.. Various parameters include in BPS are:

1) NST
2) Fetal Breathing Movements
3) Gross Body Movements (GBM)
4) Fetal tone
5) Amniotic fluid volume

Interpretation of Biophysical Profile

We have familiarised overvalves component of fetal biophysical score. The scoring is made as shown in Table 4.1.

Such a scoring system gives a guideline which will help you in managing the IUGR pregnancy logically. Manning et al. (1987) tested over 19,000 pregnancies using bioprofile interpretations and management shown in the following Table 4.2.

Table 4.1: Components and their Scores of the Biophysical Proflie Scored over a 30 minute period

Variable	Score 2	Score 0
Fetal breathing movements(FBM)	At least one FBM of> 30 Sec.	FBM of < 30 Sec. or no FBM
Fetal movements (GBM)	> 3 Discrete GBM	< 2 GBM
Fetal Tone	At least 1 episode of fetal limb flexion to rapid extension	No limb moveme slow flexion or semi-extension
Fetal reactivity	>2FRR acceleration	No or <2 FRS a cceleration
Qualitative amniotic fluid volume	> I pocket of> I cm depth in two perpendicular planes	Largest Best pocket < 1 cm in two perpendicular planes

A score of 10 is considered normal and its management is conservative. Repeat BPS is done

after 3 days or 1 week depending upon high risk factors present in pregnancy. A score of 8 is managed similarly except if liquor is less or it is a post date pregnancy. A score of6 is considered equivocal and BPS should be repeated in 24 hours and if persists, the patient should be evaluated for delivery. A score of 4 or less is abnormal and immediate delivery is planned unless the fetus is grossly immature.

b) Management during Pregnancy

By now, you must have realised that all cases where IUGR is confirmed should be admitted to the hospital. Attempts should be made to control underlying factors like hypertension. You will appreciate that bed rest especially in left lateral position improves placental perfusion thereby helping fetal growth. Drugs like progestogens, Betasympathomimetics and low dose aspirin have been administered in the hope of improving fetal prognosis. However, their value has not be proven definitely. If you recollect, one of the serious fetal complication was meconium aspiration syndrome; some studies have shown that aminoinfusion not only reduces the risk of this complication, but also contributes to fetal growth.

Meanwhile, it is essential to reconfirm the period of gestation, monitor fetal growth and fetal well being using more than one test and doing the tests serially and interpreting the results carefully in the light of clinical findings.

We have already discussed the complications that call occur in a case of IUGR. In order to avoid them, a careful antepartum fetal surveillance plays a crucial role. You will need to assess the fetal growth and the fetal well being. We will describe some of the tests. You must appreciate that some of them are very simple and useful.

c) **Management During Delivery**

i) **Factors Governing Decision for Termination**

You will realise that management of labour and delivery form an essential component of the care of the IUGR fetus. Once you have taken care to exclude fetal malformations, intrapartum asphyxia is the most frequent cause of fetal morbidity and mortality. As a rule, no patient with IUGR should be allowed to go beyond term; the principle underlying this should be clear to you. A biophysical profile and scoring can be done, but at this point we would like to reiterate that more importance should be given to AFI, NST and fetal breathing movements. You will recollect that low scores indicate an immediate termination of pregnancy. However, before resorting to intervention, you must ensure the facilitiesavailable for care of preterm and growth retarded babies. In most institutions, in our country babies of 34 weeks of gestation survive quite well. With these facts in mind, you may commence performing a biophysical profile by about 32 weeks of gestation.
Besides the dictates of scores of biophysical profile, deterioration in maternal condition (e.g. persistent hypertension) is another indication for termination of pregnancy.

ii) **Mode of Delivery**

The mode of delivery, as you can conclude depends on:

- Degree fetal compromise
- Presence of other risk factors
- Fetal presentation
- Favourability of cervix
- Availability of facilities for intrapartum monitoring

If labour has been induced prognosis satisfactory, you should ensure the following:

- An episiotomy
- Cutting short of 2nd stage of labour
- Early cord clamping in order to avoid circulation overload
- Presence of a neonatologist

iii) **Indications for Caesarean Section**

It is important for you to remember that perinatal mortality has improved tremendously with the liberal use of caesarean section. You may adopt the mode of termination of pregnancy

when you encounter any of the following situations:

- Obstetrical complication like PIH. Antepartum Haemorrhage
- Period of gestation less than 35 weeks
- Unfavourable cervix

iv) **Intrapartum Monitoring**

As you know intrapartum asphyxia is the leading cause of fetal death. Hence. you will agree that these patients require intensive intrapartum monitoring. Continous fetal monitoring using scalp electrode and scalp blood sampling is recommended. In the absence of these facilities. FHR is monitored every 15 minutes during first stage and every five minutes in the second stage.

v) **Neonatal Care**

As discussed earlier, special neonatal problems in IUGR babies are Hypoglycemia. Hypocalcemia. Hypocalcemia. Hyperviscosity, Necrotizing enterocolitis. You must appreciate that a small for gestational age infant (SGA) fare better than an appropriate for gestational age infant having same weight.

Almost 2/3rd of SGA infants suffer from hypoglycemia as glycogen stores of these infants are poor. Hypoglycemia can lead to polycythemia and hyperviscosity. Hyperviscosity may lead to reduced cerebral perfusion further complicating the effect of a reduced arterial concentration. Perinatal asphyxia causes vasoconstriction in gastrointestinal tract resulting in necrotizing enterocolitis. Prolonged perinatal asphyxia can result in neurodevelopmental disorders. Hence. the neonatal care should include:

1) **Resuscitation**

There is all increased risk of perinatal asphyxia in SGA infants. Resuscitation starts at delivery table with adequate suction. Meconium staining of liquor is common in lUGR leading to meconium aspiration syndrome. This is taken care of by timely suction through a laryngoscope. Oxygen as well as intubation facility should be available. If respiratory effort is poor. continous pressure ventilation (CPAP) helps in assisted ventilation.

2) **Supportive Care**

This includes attention to ventilation, oxygenation, cardiac output, tissue perfusion and glucose, fluid, electrolyte and acid-base balance.

3) **Maintenance of Temperature**

Both cold and heat put a stress on metabolic and physiologic homeostasis. Thermal nutrality is the temperature zone at which infant oxygen consumption is minimum. Generally this correlated with skin temperature between 36 to 36.5 degree centigrade. During winter months delivery place as well as infant crib should be kept warm before the arrival of infant to prevent sudden fall in temperature. Undue exposure of the infant should be avoided:

4) **Prevention of Infection**

It is important for you to remember that these infants are nursed with all barrier nursing

principles as the host defence mechanisms are poor. Risk of infection is more if patient had premature rupture of membranes or some manipulation was required. If gastric lavage indicates in utero infection, prophylactic antibiotics are given.

5) **Nutrition**

You must realise the importance of close monitoring of glucose levels of the baby and need for immediate feeding of the baby to avoid hypoglycemia. The lower acceptable limit for glucose concentration is 40-45 mg/dl. If level is not being maintained with oral feeding, intravenous glucose infusion is given. In a preterm SGA infant glucose infusion is routinely given soon after birth.

) **Polycythemia**

Venous haematocrit of more than 60 % is present in 50% SGA infants. These infants may~ have neurologic, pulmonary or cardiac symptoms including lethargy, jitteriness, poor feeding, respiratory distress, cyanosis and occasional, seizures. The infants are also more

prone to hyperbilirubinemia. Partial plasma exchange is carried out in symptomatic infants.

7) **Treatment of Congenital Infection**

There may be congenital infection with rubella, CMV toxoplasma etc. which had caused IUGR initially. The infants born may be completely asymptomatic but should be screened for the presence of infection and treated.

Check Your Progress 5

I) What are the parameters included in assessing the Biophysical score?

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2) A patient has undergone a Non Stress Test (NST). There is a rise of 15 beats/min above baseline with fetal movement. The test is said to be.....

3) Can a patient with IUGR be allowed to go beyond term?

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4) List four complications that a growth retarded infant is prone to develop.

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S) Tick (3) the correct answer:

Hypoglycemia in a growth retarded infant is due to

a) Impaired utero placental perfusion

b) Poor glycogen stores

c) Increased glucose consumption by small fetus

d) Late feeding

8.6 LET US SUM UP

We have learnt that 10% of all pregnancies end before 37 weeks of gestation and a number of maternal and fetal causes can cause PTL.Sometimes no cause can be fond. If pregnancy is < 34 weeks, atempt should be made to stop labour contractions by giving drugs such as duvadilan or nifedepine. In those cases where contractions do not stop, glucocorticoid should be administered to the mother with aim of accelerating fetal lung maturity. As far as possible, delivery of premature baby should occur in a place where newborn nursery is vailable. Babies born prematurely can have a number of problems like hyaline membrane diseases, hypothermia, infections etc. premature baby.

In pregnancies of more than 34 weeks duration at the time of diagnosis of PROM, termination of pregnancy is indicated. In those cases where pregnancy is less than 34 weeks duration, conservative management should be considered. Conservative management aims at continuation of pregnancy till 35 weeks so as to avoid risks of prematurity. Conservative treatment comprises of bed rest, use of antibiotics and detection of infection at an early stage. However, in majority of cases patients deliver within first 7 days after onset of PROM. It is better to transfer the fetus in utero rather than after delivery as the fetal salvage is much better.

If a pregnancy goes beyond 40 weeks, fetuses are at a risk of fetal distress and intrauterine death. Whenever any test indicates fetal distress, labour should be induced. During labour, fetal heart rate should be counted carefully every half hourly. If meconium is noted at the time of delivery, suction of nose and mouth of the baby should be done to prevent meconium aspiration.

In the section of IUGR have learn about definitions, aetiology andclassfication of IUGR.You should suspect IUGR clinically during pregnancy and confirm your diagnosis with the help of several ultrasound parameters. Antenatal fetal monitoring has made a big dent in obstetric management of high risk pregnancy as in IUGR cases. You have learn about several tests to monitor fetal growth and wellbeing; interpret them and correlate the results with expected fetal outcome. Management of IUGR has been highlighted with clear cut guidelines for referral and drug therapy. Monitoring during labour and judicious delivery also improves fetal survival by reducing intrapartum hypoxia. You have also learnt about special neonatal problems.

8.7 KEY WORDS

Amniocintocis : Puncture of amniotic sac to obtain amniotic fluid

ARM : Artificial Rupture of Membrane

BPS : Biophysical Profile Score

Chorionic Villi : Obtaining a sample of chorionic tissue from continuing pregnancy

Cordocentesis : In utero puncture of umbilical vessels to obtain fetal blood

CST : Contraction Stress testing of fetal wellbeing after inducing contractions, also known as Ox ytocin challenge test

EDD : Expected Date of Delivery

IDDM : Insulin Dependent Diabetes Mellitus

Kick Count : Counting fetal movement perceived by mother

NST : Non stress test of fetal well being

Perinatal : Pertaining to period from 28 weeks of gestation till one week after delivery

PIH : Pregnancy Induced Hypertension

PTL : Pretern Labour

SGA : Small for gestational age infant

8.8 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) Spontaneous rupture of membrane before onset of labour.

2) — Over distention of uterus
   — Cervical incompetence
   — Ascending lnfection from vagina

3) — Preterm labour
   — Cord prolapse
   — intrauterine infection

4) Ampicillin, Cephalexin, Garamycin, Erythromycin. Anyone of the four could be used.

Check Your Progress 2

1) Labour before 37 completed weeks of gestation.

2) 50- 75% of new born dying within 7 days after birth are due to PTL.

3) Complete Haemogram, Urine culture, Vaginal swab culture.

4) Beta mimetic, Nifedepin, Indomethacin

Check Your Progress 3

1) Pregnancy of 42 completed weeks duration or more.

2) — Fetal distress
   — Cephalo Pelvic Disproportion
   — Meconium Aspiration Syndrome

3) 45-55% women

4} To note meconium stain of liquor and the quantity of liquor

Check Your Progress 4

I) When weight of a fetus is below 10th percentile for a given gestational age.

2) 16 weeks.

3) By history taking and gravidogram.

4) HC/ AC ratio or FL/AC ratio and AFI should confirm the diagnosis (only after establishment of gestational age accurately).

Check Your Progress 5

1) — Non Stress Test (NST),
   — Fetal Breathing Movements (FBM),
   — Gross Body Movements (GBM),
   — Fetal tone
   — Amniotic Fluid Volume.

2) Reactive

3) No (preferably should be terminated at 37 weeks).

4) — Asphyxia -Hypocalcemia
   — Hypoglycemia
   — Infection

5) b) You should suspect

8.9 FURTHER READINGS

Arias, F., *Practical Guide to High Risk Pregnancy. and Delivery*. 2nd Edition, St. Louis, Mosby Year Book, 1993.

Cunningham, G., *Williams Obstetrics*. 19th Edition, Connecticut, Prentice Hall International, 1993.