BABY AT RISK

SUBJECT: ABNORMAL MIDWIFERY

COMPLICATIONS OF THE NEW BORN: ***Time: 20 hours***

Course objective:

By the end of the session the learner should be able to:
Identify and manage babies with special need/ at risk.

- **Low birth weight babies**
  - Preterm baby
    - Definition
    - Causes
    - Clinical appearance
    - Management of preterm babies
  - Small for dates and Small for gestational age term babies
    - Definition
    - Causes
    - Clinical appearance
    - Management of preterm babies
- **Neonatal Jaundice**
  - Review the normal process of transport, conjugation and excretion of bilirubin.
  - Discuss the types and causes of jaundice
  - Risk factors associated with jaundice
  - Management of jaundice
- **Foetal compromise / fetal distress**
  - Definition of fetal distress
  - Signs of fetal distress
  - Management of fetal distress
- **Asphyxia neonatorum**
  - Definition of asphyxia neonatorum
  - Types/degrees of asphyxia
  - Predisposing factors
  - Management of birth asphyxia
- Resuscitation of a newborn
- **Respiratory distress syndrome**
  - Definition
  - Cause
  - Prevention
  - Treatment
- **Baby of a diabetic Mother**
  - Associated risks and management

- **Hypoglycemia**
  - Definition
  - Clinical features
  - Management of hypoglycaemia
- **Hypothermia**
  - Definition
  - Cause
  - Diagnosis
  - Pathophysiology of hypothermia
  - Classification of hypothermia
  - Management of hypothermia
    - Moderate hypothermia
    - Severe hypothermia

- **Neonatal sepsis**
  - Definition
  - Causes of sepsis
  - Classification of neonatal sepsis
    - Early onset sepsis
    - Late onset sepsis
  - Clinical features of neonatal sepsis
  - Management of sepsis
- **Ophthalmia Neonatorum**
  - Definition
  - Causes of Ophthalmia Neonatorum
  - Clinical features of Ophthalmia Neonatorum
  - Management of Ophthalmia Neonatorum
- **Birth injuries and trauma**
  - Describe cause, clinical features, and management of Birth injuries and trauma to include but not limited to:
    - Caput succedaneum, cephalhaematoma, subaponeurotic haemorhage, fractures (skull, clavicle, humerus, femur, spine), nerve injuries (facial Palsy, brachial plexus injuries, erb's palsy, Klumpke's palsy, total plexus palsy), soft tissue injury/ organ injuries, muscle injuries, skin injuries.
    - Haemorrhage (haemorrhagic disease of the newborn, DIC, Thrombocytopenia,
    - Intracranial haemorrhage
      - Subdural haemorrhage
      - Subarachnoid haemorrhage
      - Intraparenchymal haemorrhage
      - Periventricular- intraventricular haemorhage

- **Congenital abnormalities**
  - Causes of Congenital abnormalities
  - Malformations of central nervous system
  - Malformations of gastro-intestinal system
  - Cardiac malformations
  - Malformations of genitor-urinary system
  - Musculoskeletal malformations
  - Skin disorders
  - Chromosomal disorders
    - Trisomy 21 (Down's syndrome)
    - Trisomy 18 (Edward's syndrome)
    - Turner's syndrome(XO)

1) LOW BIRTH WEIGHT BABIES

Baby whose birth weight is 2500g or less.

a. Preterm baby

i. Definition

1. A preterm infant is a baby born before the 37th completed week

ii. Causes

1. In many instances the cause of premature birth is not known.
2. Some of the causal factors are thought to be:
    a. Multiple births which causes early distension of the uterus hence early birth
    b. Maternal disease in pregnancy –(Hypertension ass. with the pregnancy leading to early induction of labour, **eg.** *preeclampsia and eclampsia).*
    c. Premature rupture of membranes.
    d. Maternal age outside optimum child bearing age (20-35 years)
    e. Fetal factors such as placental insufficiency leading to early termination of pregnancy.

iii. Clinical appearance

Wakefulness

- When the infant is awake, the lower extremities are rarely extended.
- There may be slow prolonged contraction of the facial muscles, quivering movements or transient smiles

Cry

- The cry is feebler than that of a full term infant.
- A premature infant usually cries very little, if at all.

Skin and Appendages

- The skin is covered by a small amount of vernix caseosa.
- Lanugo is present on the sides of the face and on the extremities and the back.
- There is scanty hair on the head and the eyebrows are usually absent.
- The nipples and areola are discreet.
- The nails are soft.
- Generalized oedema is apparent at birth and later the tissue fluid decreases, leaving the skin loose and wrinkled.
- Blood vessels can be easily seen under the skin because subcutaneous tissue is thin.

Neck and Thorax

- The thorax is cone shaped and the rib cage is weak, owing to immature osseous calcification.
- Obstruction to the free flow of air causes marked sternal retraction, a rapid heart rate and respiratory noises.
- Occasionally, cardiac murmurs are heard.
- A change in position may cause periods of apnoea.

- Very small infants will not open the mouth to breathe.
- The nose should therefore be checked for occlusion frequently.

Favourable Prognostic Signs

- The premature neonate has a higher chance of survival if:
- • Birth weight is more than 1500g
- • There is no persistent cyanosis and there is some activity on stimulation
- • Gagging and swallowing reflexes are fairly active
- • Skin is not wrinkled and subcutaneous fat is present
- • Body temperature is stable
- • There are no signs of abnormal conditions such as jaundice, pallor and/or sternal retraction

Management of a premature infant

- Avoid depression of the foetal respiratory centre.• *Sedatives of opium derivatives should not be used during premature labour.*
- • Shorten the perineal phase during delivery of a preterm baby by performing an episiotomy.
- As this will reduce the possibility of intracranial injury.
- • Transfer a woman in premature labour to a well-equipped hospital for adequate resuscitation and care of the premature infant

Care of a premature infant

- The efficient care of the premature infant is equally important.
- You should take the following steps:
    - • Clear the airway using a fine mucus extractor/catheter
    - • Administer oxygen at 1 litre per minute till respiration is well established and colour is satisfactory
    - • Put the infant in an incubator or cover with warm towels and transfer to a special baby care unit as soon as practicable
    - • Ideally infants weighing less than 2 kilograms that have been delivered in a health centre or in the home should be transferred to a well equipped hospital with nursery for baby care

Further management aims of a premature infant

- Once immediate steps have been taken to ensure the wellbeing of the premature infant, further management aims at:
    - • Maintenance of respiration and good colour
    - • Provision of warmth
    - • Prevention of infection
    - • Ensuring good progress and growth
    - • Educating the mother to take care of her infant
    - • Ensuring baby gets adequate nutrition

Maintenance of Respiration

- Assist in the establishment of respiration since the respiratory centre in the medulla is immature.
- The lungs tend to be atelectatic and are not well developed due to inadequate surfactant.
- The diaphragm and chest muscles are weak.
- The airway should be repeatedly cleared.
- The infant should be laid with its head to one side and the foot of the cot should be slightly raised to aid with the drainage of mucus.
- Watch the infant closely for signs of respiratory distress and cyanosis.
- Give 30-40% of oxygen

Provision of Warmth and Maintenance of Body Temperature

- Heat regulation centre in premature babies is underdeveloped.
- Small babies weighing less than 1.5 kilograms should ideally be nursed in an incubator with temperature of about 30 degrees Celsius and relative humidity of 65%.
- If there is no incubator available, they should be nursed in warm towels.

Feeding

- Breast milk is ideal because of its digestibility, nutrients and the immunity it gives to the newborn.
- If the stomach content is aspirated before the first feed, regurgitation and inhalation of stomach contents are not likely.
- The first feed should be small and ideally given per tube.
- 5% **glucose** water may be given, which has the advantage of counteracting acidosis and provides fluid and energy.
- If the infant can tolerate it expressed breast milk should be offered next.
- The amount of feeds given depends on the size of the infant and it's tolerance levels.
- However, 10mls is usually offered for the first few feeds. Infection control and prevention measures are highly recommended with regard to handling expressed milk.
- Artificial milk, that is half strength cow's milk, lactogen and so on, may be resorted to only if the mother is in poor condition.
- The recommended amount is:
    - 90mls of milk per kilogram of body weight per day for the first week of life.
    - 150mls for the second week and
    - 180 - 210mls per kilogram of body weight during the third week.
- To avoid over distension of the stomach, vomiting and subsequent inhalation, small feeds, of greater concentration, are given at one to two hourly intervals.
- ***Try always to treat each infant individually and give the amount of milk the individual infant needs, depending on their appetite, tolerance to feeds and general condition***

Method of feeding

- Method of feeding is determined by the infant's size, general health and presence of sucking and swallowing reflexes.
- Breast feed as soon as the infant's condition allows.

- Infants of 1.8 kilograms and over, with good sucking and swallowing reflexes, may be spoon fed.
- In cases where neither of the aforementioned options is possible, naso-gastric tube feeding is preferred because once instituted it can be left for a week before it is changed and carries less risk of bronchial aspiration.
- The latter is often associated with oro-gastric feeding, especially if the tube is not well pinched when being withdrawn.

Naso-gastric method of feeding

- Should you decide to use the naso-gastric method of tube feeding the following points should be taken into consideration:
    - A small size polythene tube (polytex) should be used for feeding infants weighing 1500g or less. A rubber catheter FG10 can also be used.
    - Although the tubes come in presterilised packets, it is advisable to boil them for a few minutes before use to make them supple and easy to pass.
    - The arms of the infant are wrapped and the head of the cot raised.
    - The nostrils should be cleared with wet cotton swabs.
    - The required length of the tube to be passed is determined by measuring from the bridge of the infant's nose to its sternum.
    - When the tube is passed, the stomach contents are aspirated and tested with blue litmus paper.
    - The aspirate colour and amount should be noted and recorded.

General Feeding Steps to be Taken

- The following steps should generally be taken when feeding the baby:
    - Cleanliness must be observed. Feeding utensils should be decontaminated and soaked in a solution of jik (1:6) for 10 minutes then dried.
    - Wind should be brought up by raising the infant to sitting position or gently rolling them against your hand or rubbing their back with your right hand.
    - The baby should be put on the right side after feeding with the head of the cot raised to allow any vomited milk to run out of the mouth.
    - Have an aspirator at hand to remove regurgitated milk from the naso-pharynx.
    - Record the actual amount of feed.
- Supplements of vitamins A, B, C, D, folic acid and iron are usually given to the premature infant because they have no store of iron, vitamins and mineral salts before birth.

Infection prevention and Control

- Staff in baby care unit should be in good health and have no foci of infection or colds.
- Staff should be meticulous in cleanliness and should be proficient at resuscitation of the baby.
- Frequent hand washing is imperative in a premature baby nursery. *Principles of infection prevention should always be practiced*.
- Visitors should not be allowed into the premature unit because they may bring in micro-organisms.

- Only the parents should handle the infant if nursed at home or maternity centre.
- The infant should not be brought out into the open until it can maintain its body temperature.

Monitoring premature infant

1. Respiration of the infant, that is, do they exhibit laboured breathing and periods of apnoea.
2. The temperature should also be recorded four hourly since fever and hypothermia are bad signs.
3. Auscultation of the heart and recording of the heart rate (Apex beat).
4. Observe closely for colour changes like jaundice occurring within 24 - 36 hours of birth.
5. Other colour changes include cyanosis, pallor and greyness are also significant and should also be reported.
   Rashes, discharge from the eyes or moist umbilical cord, grey colour and constantly low temperature are usually signs of infection and should also be reported.
6. Note the amount of feed taken by the infant, the method of feeding and any vomiting of feeds.
7. Abdominal distension and oedema of the face, abdomen and legs should be reported if severe.
8. Note if the infant is passing urine well.
9. The neonate should be weighed 12 – 24 hours after birth.
10. The haemoglobin level should be estimated at birth and thereafter on a weekly basis to exclude anaemia.
11. The general behaviour of the infant with particular attention to its activity should be noted.

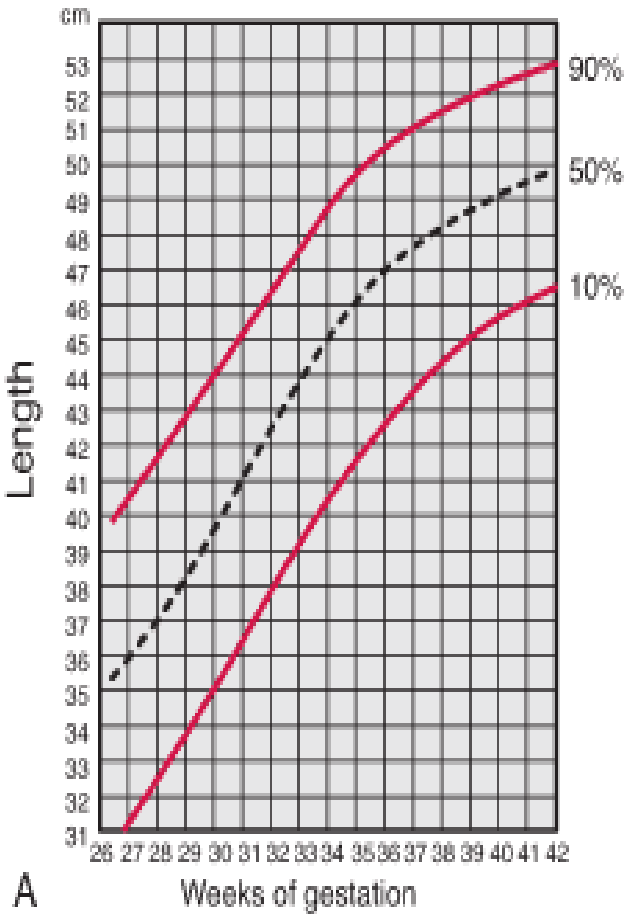
Education to the mother

SMALL FOR DATE BABIES/SGA TERM BABY

- ***Definition-***
- *A baby whose weight is below the 10th centile for gestation.*

CAUSES OF SGA

1. Parity-first babies are normally lighter than those born subsequently.
2. Maternal age - There is a tendency for a mother below the age of 20 or over 35 years to have lighter babies.
3. Social class -Women in low socioeconomic class.
4. Chronic maternal malnutrition.
5. Genetic factors
6. Maternal diseases in pregnancy
7. Tobacco smoking and narcotic drugs
8. Multiple pregnancy-the greater the number the lighter they are e.g. 2 fetuses one placenta.
9. Fetal factors-Intrauterine infections, congenital abnormalities, growth retardation.

- 
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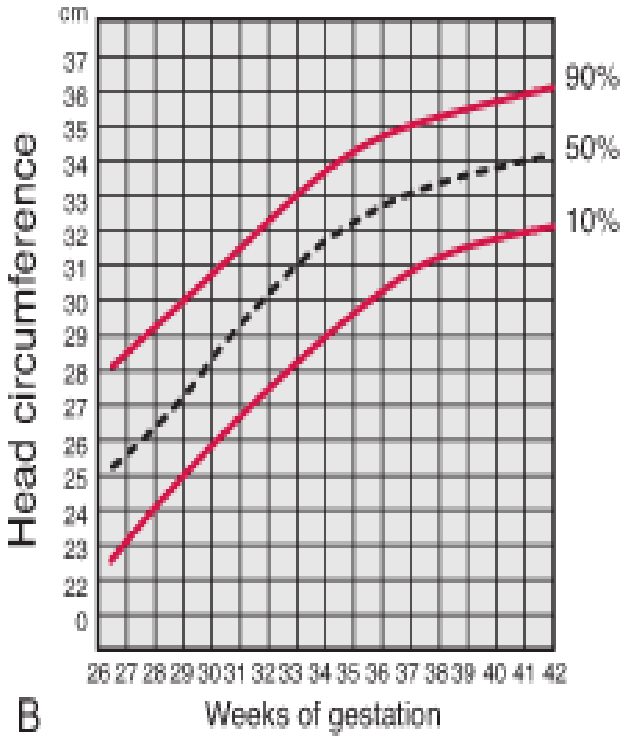
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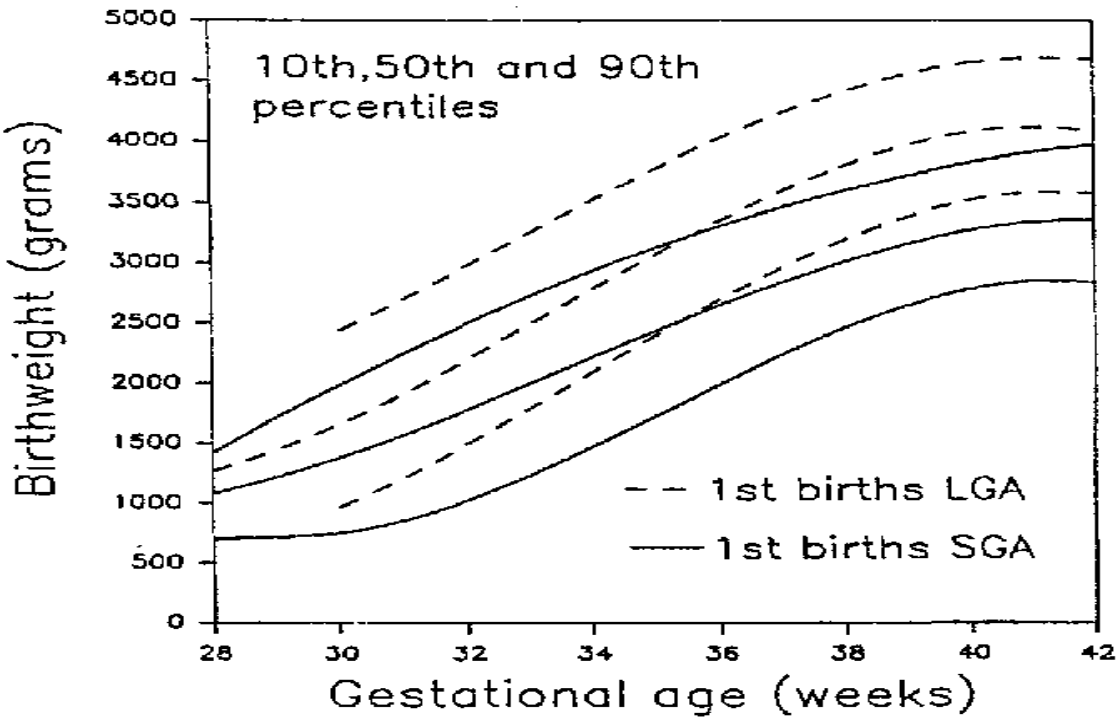
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Birthweight (grams)
28
30
32
34
36
38
40
42
Gestational age (weeks)

CHARACTERISTICS OF LIGHT FOR DATES BABIES

- **Appearance**-Baby has a disproportionately large head. The baby is long and thin.
- **Head-**Skull bones are hard, sutures and fontanelles almost closed. Hair sparse.
- **Ear-**Pinna has cartilage
- **Eyes**-Open and appear alert.
- **Chest**-Small and narrow. Respiration is good unless the baby is asphyxiated. Breast tissues are palpable.
- **Abdomen-**Ribs are easily visible, abdomen is scaphoid (boat shaped).Umbilical cord is thin.
- **Skin-**often dry and peeling. Has abundant palmer and plantar skin creases
- **Activity**-Baby alert and active, reflexes are well developed
- **Measurement**-Weight is low for gestational age but the length is less affected.
    - Occipitofrontal head circumference may be within the normal range for a term infant.

COMMON PROBLEMS TO LIGHT FOR DATE BABIES

1. May suffer from fetal hypoxia and intrauterine death because of placental insufficiency.
2. At risk for meconium aspiration because they are frequently subjected to intra uterine asphyxia.
3. May suffer from asphyxia neonatorum because of placental insufficiency but not RDS
4. Suffer hypoglycemia
5. Could have chromosomal disorders.
6. Could suffer from hypothermia because of less brown fat.
7. Infection

MANAGEMENT

1. Adequate feeding
2. Prevention of heat loss
3. Infection prevention

MANAGEMENT IN LABOUR WARD

- Keep the baby warm
- Resuscitation is done as necessary
- Give Vit. K and transfer the baby to ICU
- Inform pediatrician or doctor
- Early feeds to prevent hypoglycemia
- Blood taken for glucose test-at birth and 6hrly for 24 hours

CONTRASTING FEATURES OF PRETERM AND SMALL FOR DATE BABIES

	Preterm	**Small for dates babies**
1.	**Definition**-Is one born before 37 completed weeks of gestation and after 28 weeks gestation	A baby born below 10th centile of gestational age
2.	Length-45cm or less	Some babies appear long, thin and having large head
3.	Weight-weighs 2500g or less	Weight is below the 10th centile for estimated gestational age
4.	Sutures and fontanelles are wide	Sutures and fontanelles are slightly wide.
5.	Ears-Pinnae of the ears are soft and flat	Pinna has cartilage
6.	Nails-soft but not always short	Nails are hard and long
7.	Skin-Red and shiny	wrinkled, dry, lack subcutaneous fat
8.	Skull-Skull bones are soft	Skull bones are hard
9.	Eyes-Eyes are closed	Eyes alert and wide open
10.	Plantar creases-not visible	Creases present

NEONATAL JAUNDICE

a) Students' activity

Review the normal process of transport, conjugation and excretion of bilirubin.

b) Definition

Jaundice is defined as the yellow colouration of skin and mucous membranes due to high bilirubin levels in the serum

c) Types of Jaundice

i) **Physiological Jaundice**

(a) More than 50% of full term infants and 80% of preterm infants will have some physiological jaundice.
(b) In a full term, well baby physiological jaundice never appears before 24hrs of age, never exceeds ***200-215umol/l(12-13mg/dl)*** and usually fades by 1 week of age.
(c) Babies remain completely well
(d) Sets in on day 3 after birth.
(e) Disappears within 2 weeks.
(f) Common in newborn especially in pre-term.

ii) **Pathological Jaundice**

(a) Characterized by bilirubin levels of **165umol/l(10mg/dl)** or greater by 3rd or 4th day of life.
(b) Preterm and breastfed infants are more prone to exaggerated physiological jaundice.
(c) Jaundice starts on the first day of life.
(d) Jaundice lasts longer than 14 days in term baby, 21 days in preterm infants.
(e) Jaundice accompanied with fever or other signs of illness.
(f) Deep jaundice - palms and soles of the baby are deep yellow.

d) **Causes of Jaundice**

i) **Causes of Physiological jaundice**

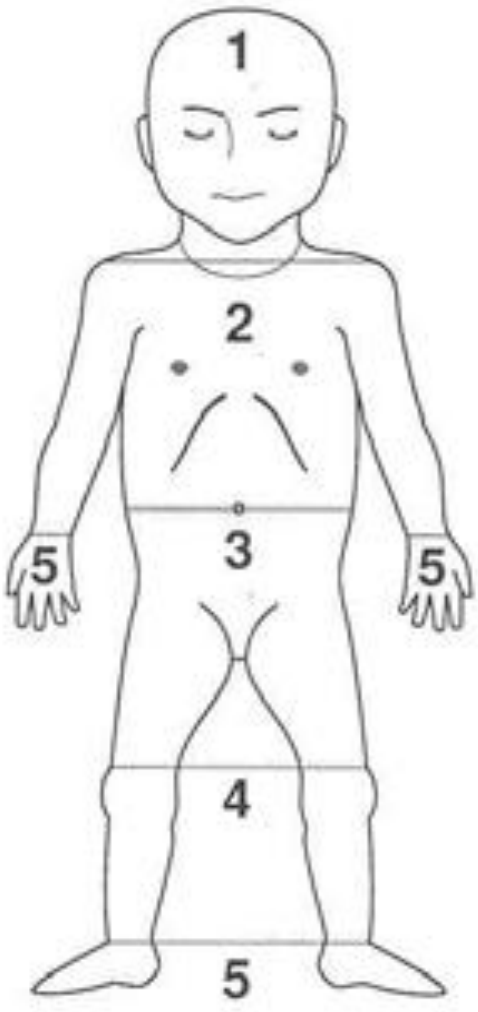
(a) Due to normal physiological breakdown of large red blood cell mass.

ii) **Causes of pathological jaundice**

(a) Serious bacterial infection.
(b) Haemolytic disease - blood group (Rhesus and ABO) incompatibility.
(c) Congenital syphilis or other
(d) intrauterine infections.
(e) Liver disease - hepatitis or biliary atresia.
(f) Hypothyroidism.
(g) Asphyxia.
(h) Birth injuries.

Assessing Severity of jaundice (before initiation of photo therapy)

- Jaundice in newborn progresses from head to toe
- The extent of yellowness of the skin is useful to assess the level of bilirubin
- Kramer's criteria are used to clinically estimate severity



Clinically Estimating bilirubin level

Jaundice restricted to	Serum bilirubin levels
Face and trunk	≤ 12 mg %
On hands and feet	≥ 15 mg %

Management of neonatal jaundice

- ✓ The aim of management is to reduce the level of bilirubin and preventing CNS toxicity.
- ✓ Prevention of hyperbilirubinemia is achieved by Early and frequent feeding
- ✓ Reduction of bilirubin is achieved by phototherapy and/or exchange transfusion.
- ✓ The decision to treat depends on the severity and the cause of jaundice.

HISTORY/RISK FACTORS

a) Birth trauma/bruising
b) Prematurity
c) History of hemolytic disease or jaundice in siblings
d) Delayed feeding or meconium passage.
e) Jaundice in the first 24 hours
f) Prolonged jaundice
g) Lethargy
h) Hypoxia, acidosis, hypothermia, dehydration, starvation.

LAB EVALUATION

- Serum bilirubin,
- Direct coombs,
- Indirect coombs,
- hemoglobin/hematocrit estimation
- Reticulocyte count
- ABO blood group and rhesus type.
- Peripheral blood smear.
- Red cell structure for abnormal cells.
- White cell count to detect infection serum sample for igs for the TORCH infections.
- G6PD assay .
- Urine for galactose

TREATMENT STRATEGIES

1) **PHOTOTHERAPY**

During phototherapy the neonate's skin surface is exposed to high intensity light which photo chemically converts fat soluble unconjugated bilirubin into water soluble bilirubin which can be excreted in bile and urine.

INDICATIONS FOR PHOTOTHERAPY

- Golden rule is: ***Smaller, sicker, sooner, quicker***. i.e with smaller or preterm infants and sicker infants where jaundice is present sooner (within 12-24hrs) phototherapy is started quickly (at lower serum bilirubin levels.
- Healthy term infants jaundiced after 48hrs-between 280-360umol/l (17-22mg/dl)
- Preterm infants<1500-between 85 -140umol/l(5 and 8 mg/dl)
- Preterm infants>1500g, sick infants and those with hemolysis-140-165mmol/l(8-10)

TYPES OF PHOTOTHERAPY

1) **Conventional systems**

- These rely on high intensity light delivered by fluorescent lamps.
- Effectiveness of conventional phototherapy depends on:
- The wavelengths, distance between lights and infant, amount of skin exposure.
- Infant is usually placed at a distance of 45-60cm from phototherapy light with the entire skin exposed (cover infants testis and possibly the ovaries with a nappy.
- Turning the neonate frequently ensures maximum skin exposure.

- Phototherapy treatment may be continuous or intermittent.
- Continuous therapy is interrupted only for essential care e.g. feeding the infant, whereas intermittent therapy may be given for periods of 6hrs on and 6hrs off.

2) **Fiber optic light systems**

- Fibre optic blankets or woven fiber optic pads which deliver high intensity light with no ultraviolet or infrared irradiation are wrapped around the infant under the clothing thus ensuring that more skin is exposed to light.
- These pads reduce some side effects of phototherapy e.g. increased insensible fluid loss.
- In addition they eliminate the need for eye protection.
- At present time fiber optic phototherapy combined with standard phototherapy seem to provide optimum results.

Side effects :

i) lethargy,
ii) Irritability
iii) Decreased eagerness to feed,
iv) Loose stools,
v) Hyperthermia,
vi) Dehydration,
vii) Skin rashes and burns,
viii) Alteration in state or neurobehavioral organization,
ix) Isolation and lack of usual sensory experiences including visual derivation.
x) Neonates may also experience hypocalcaemia, low platelet counts, increased osmotic fragility, bronze baby syndrome, riboflavin deficiency and DNA damage.

MANAGEMENT OF A BABY UNDERGOING PHOTOTHERAPY

a) **Eye care-**Another potential side effect of high intensity light on the retina.
   a. Position of eye shields is closely monitored to ensure they are over the eyes, do not occlude the nose and that the head band is not tight.
   b. The infant is also observed for any eye discharge or weeping.
b) **Bilirubin levels**-Estimated daily.
   a. Reduction in bilirubin levels appears to be greatest in the first 24hrs of phototherapy.
c) **Skin care-**Observed frequently for rashes, dryness, excoriations and cleaned with warm water when the midwife considers it necessary.
d) **Temperature-**Infant maintained in warm thermo neutral environment and observed for hyper or hypothermia. Heat loss is minimized as far as possible.
e) **Hydration-**Fluid intake and urine output are monitored. Good hydration is maintained with demand feeding if possible and if breastfeeding, the mother is encouraged to continue.
f) **Neurobehavioral status-**
   a. Include sleep and wake states, feeding behaviors', responsiveness, response to stress and interaction with parents and other care takers.

g) **Sensory and visual deprivation**-
   a. To reduce the effects of isolation when feeding, eye patches are usually taken off and the infant removed from lights.
   b. Parents can be encouraged to hold, feed and care for their baby as much as possible.

h) **Parents' needs**-Midwife provides information, support and reassurance to parents.

i) **Hypocalcaemia**-in neonate's hypocalcaemia is defined as a total serum calcium level of <1.7mmol/l.
   a. Symptoms includes:
   b. *jitteriness, irritability, rash, loose stools, fever, dehydration and convulsion*.
   c. Neonates under phototherapy should be given supplemental calcium.

2) EXCHANGE TRANSFUSION

Removes bilirubin from the body and incase of hemolytic disease, also replaces sensitized erythrocytes with blood that is compatible with the mothers and infants serum.

INDICATIONS OF EXCHANGE TRANSFUSION

- Golden rule is *smaller, sicker, sooner, quicker*
- Healthy full term infants-400-500umol/l (23-29 mg/dl
- Sick and preterm infants with hemolysis -300-400umol/l(17-23mg/dl
- Small infants weighing<1500 -255umol/l(15mg/dl)
- Phototherapy has largely replaced exchange transfusion when treating neonatal jaundice.
- Except in Rh incompatibility, exchange transfusion may now be seen as a second treatment of choice used only when phototherapy has failed.
- Exchange transfusion would certainly be considered when there is a risk of bilirubin toxicity or kernicterus.
- *Risks*-
- *AIDs, Hepatitis, 3 deaths per 1000 procedures, necrotizing enterocolitis, hypocalcaemia, cardiac overload, thrombocytopenia, hypothermia and hypoglycemia*.
- Procedure carried out in a neonatal ICU with experienced neonatal nurses caring for the infant before, during and after the procedure.
- The transfusion is given by umbilical vein.
- Removal of blood and replacement is done by removing approximately 5mg/kg at once and replacing this with donor blood.
- This is continued until a total volume of 170mg/kg of infant blood has been replaced.(representing twice the infants total circulating volume of 85ml/kg).
- Isovolaemic exchange transfusion is an alternative to the traditional exchange transfusion method.
- The method involves simultaneously removing the baby's blood and administering new blood thus eliminating fluctuations in blood flow and maintaining a more consistent blood pressure.
- The baby's blood is removed from one side and new blood administered by another route at the same time and rate.

Ministry of Public Health and Sanitation

Management and Treatment of jaundice based on serum bilirubin levels

Day	Phototherapy				Exchange transfusion			
	Healthy term baby		*Preterm or any risk factors*		*Healthy term baby*		*Preterm or any risk factors*	
	mg/dl	*micromol/l*	*mg/dl*	*micromol/l*	*mg/dl*	*micromol/l*	*mg/dl*	*micromol/l*
1	Any visible jaundice		Any visible jaundice		15	260	13	220
2	15	260	13	220	25	425	15	260
3	18	310	16	270	30	510	20	340
>4	20	340	17	290	30	510	20	340

USAID FROM THE AMERICAN PEOPLE MCHIP Maternal and Child Health Integrated Program

FOETAL COMPROMISE / FETAL DISTRESS

a) Definition of fetal distress

- Refers to the compromise of the fetus due to inadequate oxygen or nutrient supply.
- This occurs due to maternal or fetal factors.
- Severe cases may lead to brain injury or stillbirth.

b) Signs of fetal distress

- Fetal tachycardia which is an early sign of oxygen deprivation
- Fetal bradycardia or fetal heart rate decelerations related to uterine contractions
- Passage of meconium stained amniotic fluid

c) Management of fetal distress

- Inform the doctor immediately
- Do continuous fetal monitoring if possible.
- If the mother is on oxytocin, stop immediately and place her on a favorable position usually left lateral position.
- For cases of oxygen deprivation such as eclampsia, or shock due to antepartum hemorrhage, oxygen may be given via face mask.
- Expedite delivery

- C- section
- Episiotomy instrument assisted delivery

- Prepare for resuscitation
- The paediatrician should be present during delivery

ASPHYXIA NEONATORUM

a) Definition of asphyxia neonatorum

- This is failure to establish respiration at birth.

b)

c) Types/degrees of asphyxia

- **Mild asphyxia**
  - Heart rate not severely depressed (60-80 bpm)
  - Short delay in onset of respiration
  - Good muscle tone
  - Responsive to stimuli
  - Deeply cyanosed
  - Apgar 5-7
  - No significant deprivation of oxygen during labour
- **Severe asphyxia**
  - Slow feeble rate (less than 40bpm)
  - No attempt to breathe
  - Poor muscle tone
  - Limp, unresponsive to stimuli
  - Pale grey
  - Apgar less than 5
  - Oxygen lack has been prolonged before or after delivery, circulatory failure is present, baby is shocked

d) Predisposing Factors

- ***Maternal Factors***
  - Impaired oxygenation of the mother-cardiac or respiratory disease, eclamptic fit, induction of G.A
  - Reduced perfusion of placental site-Maternal hypertension or hypotension in response to shock, hemorrhage, aortocaval occlusion, hypertonic uterine action e.g. stimulation by syntocinon.
  - Impaired placental function e.g. umbilical cord prolapsed or compression
- ***Fetal Factors***
  - Obstruction of the baby's airway by mucus, blood, liquor or meconium
  - Depression of the respiratory centre due to the effects of drugs administered to the mother e.g. narcotic drugs, diazepam or cerebral damage due to traumatic delivery or labor.

- Immaturity because of underdeveloped lungs, lack of surfactant and soft pliable thoracic cage.
- Intranatal pneumonia
- Severe anemia caused by feto maternal hemorrhage or rhesus incompatibility
- Congenital abnormalities e.g. congenital hypoplastic lungs coexisting with diaphragmatic hernia or renal agenesis, choanal or tracheal atresia.
- Prolapsed cord, rhesus incompatibility.
-

PHYSIOLOGY OF ASPHYXIA

- Failure of organs of gas exchange prenatally, intrapartum or postpartum will lead to hypoxemia and respiratory acidosis.
- If this persists tissue hypoxia and metabolic acidosis will develop with subsequent end organ injury.
- Initial response to hypoxia is an increase in the frequency of respirations and a rise in heart rate and blood pressure.
- Respiration then ceases (primary apnea) as HR and BP begin to fall.
- At this point tactile stimulation and free flow oxygen are adequate to induce respirations.
- However if asphyxia continues the infant develops gasping respirations followed by secondary or terminal apnea while the HR and BP continues to fall.
- Positive pressure ventilation is then required for resuscitation.
- The above sequence of changes can occur in utero therefore, one must assume that an infant who is apneic at birth is in secondary apnea and resuscitative efforts should proceed quickly.

MANAGEMENT OF MILD ASPHYXIA

- Clear the airway immediately
- Stimulate the baby to cry by flicking soles of feet or blow cold air from your mouth stream of oxygen is directed to the baby's mouth to breath.
- Clamp and cut the cord.
- Wrap the bay with prewarmed linen and transfer to a resuscitaire.
- If breathing problem is caused by administration of pethidine or morphine to the mother during the 2^{nd} stage of labour, neonatal naloxone hydrochloride 0.01mg/kg may be given I.m or i.v
- Sodium bicarbonate 2-5mls given to correct metabolic acidosis.
- 5% or 10% dextrose solution given to correct hypoglycemia. Administered slowly 1ml per minute.
- **Vit. k** 0.5-1mg given to prevent intracranial hemorrhage
- If the baby doesn't respond to the above treatment summon or call for medical aid because prolonged lack of oxygen will cause severe asphyxia which will lead to brain damage.

RESUSCITATION OF A NEWBORN

- Dry the baby thoroughly not forgetting to dry the head
- Do not dry babies born of meconium first instead suck the meconium then dry baby born
- Keep the baby warm

Check if the baby is breathing spontaneously or crying:

- *If yes*:
  - Give to mother for skin to skin and early breast feeding
- *If no*:
  - CALL FOR HELP
  - Note the time
  - Wrap in a dry towel/hat

Assess

- Breathing - rate and quality
- Heart rate - fast, slow, absent
- Colour - pink, blue, pale
- Tone - if floppy

Assess Breathing

- Look at the chest movements
- Listen for breathing sounds
- Feel for breath on your hand/face

Assess Heart Rate

- Using a stethoscope, auscultate the chest and assess Baby's heart rate

Open airway – Position

- Head in neutral position
- Use a small towel under shoulders

Suction

- Suction is very rarely necessary
- Direct suction from larynx (only under direct vision) is necessary if baby is born through thick meconium
- Otherwise only suction very gently with soft suction catheter.
- If suction is needed use a penguin suction device or soft catheter rather than a bulb suction device start suction FROM Mouth to Nose

If breathing, and no in-drawing or grunting:

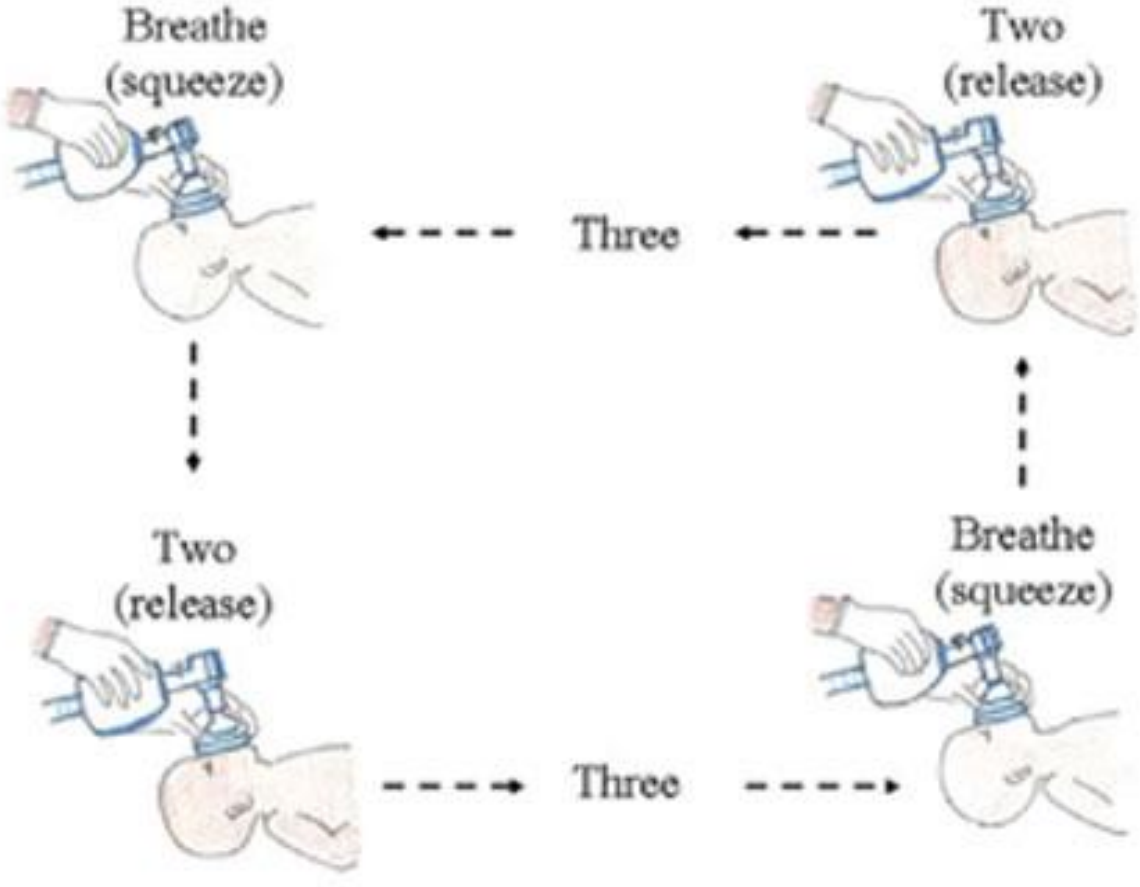
- Give baby to mother
- Keep under observation until stable for 6 hours

If not breathing…

Place mask with bag over mouth, chin and nose

- Use clear round mask
  - Size 0 or 1
  - Ambu bag volume 500 mls
- Give 30 inflation breaths each lasting 2-3 seconds
- Re-assess heart rate after first five breaths

- Increasing heart rate or maintained at over 100 beats per minute is a sign of successful oxygenation
- Continue giving breaths at 40 -60 breaths per minute
- Re-assess airway and breathing after every 1-2 minutes



If no Heartbeat…

- If no heart beat or < 60 per minute:
  - Make sure airway open and
  - breaths adequate
  - Give chest compressions
- Most common reason for low heart rate is inadequate oxygenation

Giving chest compressions

- Encircle chest so operator's thumbs meet on the sternum below the nipple line
- Compress chest by one third of its depth, 3 times for every breath
- Once heart rate is > 60 beats/min, chest compressions can be discontinued

Observations	Management
Not breathing, Heart rate <60bpm	CPR (3:1)
Not spontaneously breathing, or gasping, but HR between 60-100bpm	Bag at 30 – 60bpm, no chest compressions
Breathing spontaneously, but with signs of breathing difficulty, HR >100	Support on Oxygen

Summary of Resuscitation Steps

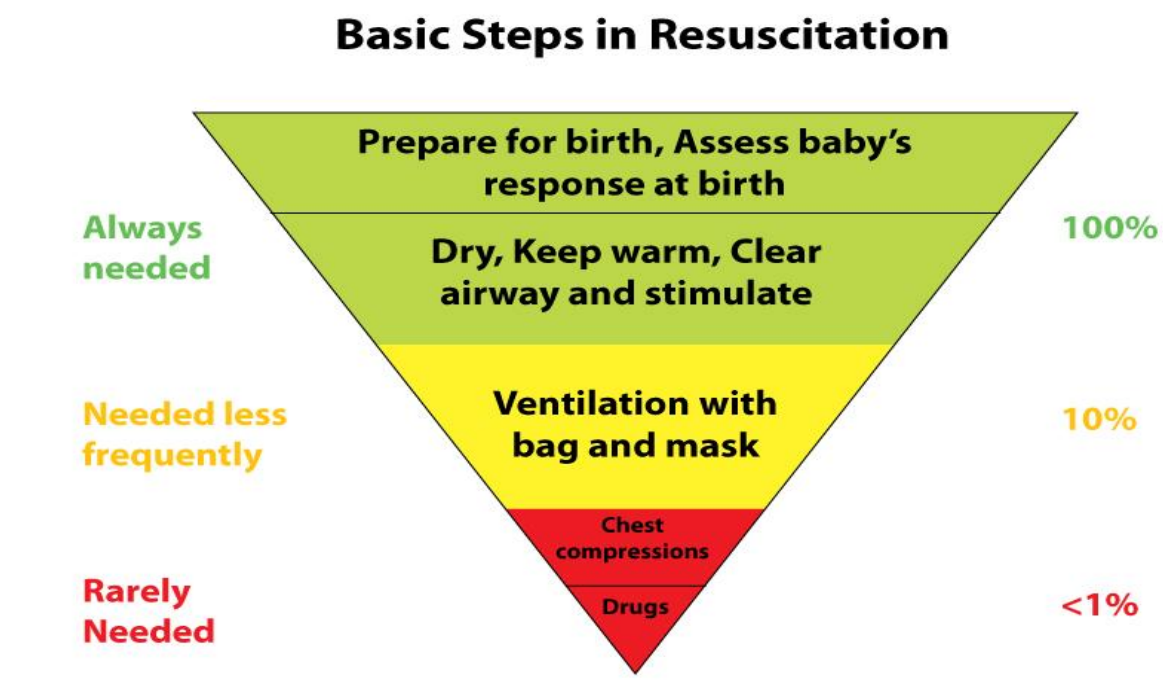
When to stop resuscitation?

- If no gasping or breathing after 20 minutes of 'bag and masking'

OR

- Gasping but no breathing after 30 minutes

Decision to stop resuscitation efforts depends on local resources...



RESPIRATORY DISTRESS SYNDROME

- **Definition**
- **The most common clinical features include:**
  - RR > 60 per minute, with or without associated
  - cyanosis,
  - nasal flaring,
  - intercostal and sternal retractions and
  - expiratory grunting.

- **Cause**
  - **i) Deficiency of surfactant.**
    - Results from inadequate synthesis, secretion or storage of pulmonary surfactant.
    - Surfactant is a substance that lowers the surface tension of the alveoli by keeping the alveoli inflated and preventing the interior walls from adhering.
    - Without sufficient surfactant, the alveoli cannot reinflate and collapse.
    - If insuffient surfactant is present the alveolar walls adhere together.
    - As a result, oxygen and carbon dioxide cannot be exchanged which creates a threat to life.

- The alveolar themselves become damaged and die creating thick scar tissue (HMD) in the alveolar space.
- The alveoli are replaced with fibrous non functional tissue that stiffens the lungs.

Diagnosis

- Based on gestational age of the infant, clinical presentation and chest x-ray findings.
- Physical examination features include tachypnea, retractions, expiratory grunting and poor air entry.
- CXR show lung fields classically having a ground glass appearance with normal to small lung volumes and evidence of atelectasis as shown by appearance of air bronchograms.

ii) Other causes

(a) Hypo or hyperthermia.
(b) Hypoglycemia
(c) Polycythemia
(d) Metabolic acidosis
(e) Drug intoxication
(f) Drug withdrawal
(g) CNS insult (asphyxia, hemorrhage, neuromuscular disease, phrenic nerve injury, skeletal abnormality.

Prevention of respiratory distress syndrome

- Adequate prenatal care
- Adequate treatment of maternal infections during pregnancy.
- Prevention of preterm labor if possible.
- Give the mother dexamethasone at least 48 hours before delivery
- Prevention of hypothermia at birth
- Prevention of perinatal asphyxia

Treatment of respiratory distress syndrome

- Initial therapy includes supportive care of the preterm infant (glucose, fluids, colloids for hypotension, antibiotics)
- Respiratory assessment includes arterial blood gas sampling and noninvasive oxygen monitoring with pulse-oximetry.
- There is need for intubation if the infant isn't able to maintain a pao2>60 and paco2 less than 50mmhg.
- Infants >30 weeks gestation may benefit from a trial of CPAP (mechanical ventilation)
- The infant is usually placed in a warmer environment to reduce metabolic demands

BABY OF A DIABETIC MOTHER

- Heavy for dates in most cases due to excessive intra-uterine growth.
- His birth weight will be above 90th centile (Large for gestational age)
- Macrosomia is due to maternal hyperglycemia which triggers off increased fetal insulin production.
- Hyperinsulinism in turn causes increased growth and fat deposition.
- Have increased incidence of congenital abnormalities, prematurity

➢ Common problems of Baby of a diabetic Mother

- Hypoglycaemia
- Hyaline membrane disease – infant suffers from delayed surfactant maturation.
- Polycythaemia- prone to polycythaemia and consequently jaundice.
- Hypocalcaemia of late onset 5-10 days but rare. Normal calcium levels 1.75-2.25mmol/l

Management

1) **Labour and delivery**- trial of labour or elective caesarean section considered because of big baby. Careful fetal heart rate monitoring. Maternal blood glucose control. Watch for possible shoulder dystocia due to failure to rotate into anteroposterior diameter of the pelvis.
2) **Prevention of hypoglycaemia.** Baby should be admitted into neonatal care unit for the first 24 to 48hours.
3) **Hyaline membrane syndrome** (refer to specific management)
4) **Hypocalceamia** – monitor and correct with calcium supplements. Calcium gluconate 10% 1mmol/kg in 24hours. Oral supplemental calcium can be givenwhen able to tolerate.

HYPOGLYCAEMIA

This is a condition of low blood glucose in the body.
Criteria for hypoglycaemia are:
Full term infants - blood sugar < 2.2mmol/l (40mg/dl)
Premature infants - blood sugar < 1.1mmol/l (20mg/dl)

Symptoms of hypoglycaemia

- Major symptoms include **apnoea, convulsions** and **coma**.
- Minor symptoms include **jitteriness, irritability, tremors, apathy, cyanotic spells** and **temperature instability.**
- Many babies may remain asymptomatic.
- It is unusual for a newborn with hypoglycaemia to have an autonomic nervous system response with **sweating, pallor** and **tachycardia** as occurs in adults.

- It is, therefore, not possible to confidently diagnose neonatal hypoglycaemia clinically as the symptoms are so similar to infection.

Causes Of Hypoglycaemia

These include:

• **Decreased substrate** (a substance upon which an enzyme acts) availability, for example, in small for gestational age infants and premature infants

• **Increased glucose utilisation,** for example, inborn errors of amino acid metabolism, glycogen storage disease,
and galactosaemia

• **Infants of diabetic mothers and large for gestational age infants** are also at risk of developing hypoglycaemia

• **Miscellaneous factors like birth asphyxia and endocrine deficiencies in growth hormone and cortisol**.

Management

The major aim of management is to prevent hypoglycaemia from developing.
However, if it does occur, it should be detected early, before symptoms are fully apparent.
The following steps should be taken:

a) Monitor blood glucose frequently depending on previous blood glucose levels.
b) Early and frequent feeding leads to good prognosis in asymptomatic hypoglycaemia. In diabetic infants hypoglycaemia can be prevented.
c) Treatment should be initiated without any delay and plasma glucose level rechecked directly to ensure that the problemis resolved.
d) 10 - 20% dextrose should be administered intravenously and carefully monitored because should it stop suddenly, because of extravasation into the tissues, there is risk of reactive hypoglycaemia.
e) If there is difficulty or delay in starting the infusion, then intramuscular glucagon can be given.

Prognosis

Infants with asymptomatic hypoglycaemia are usually normal at follow up assessment. Some of the babies with major symptoms of hypoglycaemia die or have a severe neurological handicap at follow up.
The problems they may have include:

• Mental retardation
• Convulsion
• Spasticity and microcephally

HYPERGLYCAEMIA

- This is defined as blood sugar levels greater than 9 mmol/l at which level glycosuria may occur.
- It frequently occurs in an infant who is receiving 10% dextrose infusion or parenteral nutrition.

- Hyperglycaemia usually responds to decreasing the glucose concentration or the infusion rate.
- Hyperglycaemia must be considered to be a sign of septicaemia.

Management

- Soluble insulin 0.1 units per kg body weight should be given intravenously and repeated as necessary to keep blood sugar below 9 mmol/l.
- Next you will look at other deficiencies closely related to hypoglycaemia and hyperglycaemia.

HYPOCALCAEMIA

- This is usually defined as a serum calcium concentration of less than 1.8 mmol/l (7.5mg/dl).
- The newborn rarely develops symptoms unless the plasma calcium is lower than 1.7 mmol/l.
- The condition usually occurs within 72 hours of life in the following situations:
  1) Premature neonates
  2) Associated with RDS
  3) Birth asphyxia
  4) Infants of diabetic mothers
  5) Neonatal sepsis

Risk factors

- Persistent hypocalcaemia is due to hypoparathyroidism.
- Inherited in either X-linked or autosomal recessive manner.
- Maternal hyperparathyroidism.

Clinical features

Tetany, jitteriness and **convulsions**, as well as seizures, which may be identical to those due to hypoglycaemia or other cerebral causes.
Occasionally bradycardia and apnoea may also result from hypocalcaemia.

Prevention

- Giving 10% Calcium Gluconate in intravenous infusion to ill infants, who are not taking oral feeds.
- Observe the infusion site carefully as extravasation may cause severe tissue injury.
- Severe and resistant hypocalcaemia such as that which occurs in congenital parathyroidism may require Vitamin D supplementation.
- Some cases of hypocalcaemia will not respond to calcium gluconate infusion and require magnesium sulphate.

Prognosis

- Most infants recover completely with no adverse neurodevelopmental consequences.
- Severe dental caries may be seen in the primary dentition of some infants with tetany due to hypocalcaemia.
- Remember that calcium is essential to the development of bones including teeth.

HYPERCALCAEMIA

This may occur as a complication of calcium overdose. Usually, serum calcium is greater than 2.75mmol/l, which is often due to excessive use of calcium gluconate in intravenous fluid therapy.

Other causes include:

• Renal failure
• Inappropriate anti-diuretic hormone secretion
• Hyperparathyroidism
• Vitamin D intoxication

HYPOTHERMIA

Definition

- Is body temperature of a newborn is below 36.5 C

Causes of Hypothermia in a Newborn

Environmental factors

- The room is too cold.
- The baby is exposed to cold draught.
- The newborn is wet.
- The baby is placed on a cold surface or near cold wall or window.

Newborn factors

- The baby is uncovered.
- The baby is not feeding well.
- The baby has an infection.
- Baby has birth asphyxia and does not have energy to keep warm.
- Mother & baby are not together.

Small babies are at particular risk of hypothermia

- Hypothermia occurs when the baby's body temperature drops below 36.5 C.
- This can happen within minutes especially in small babies who are at greater risk of heat loss.

Mechanisms of heat loss to the environment

- **Radiation**: The baby is warmer so loses heat to environment
- **Conduction**: A baby loses heat when placed on a surface which is a good conductor of heat e.g. cold delivery bed or weighing scale
- **Convection**: A baby loses heat when placed where there is draught (moving air)
- **Evaporation**: The baby is wet so loses heat by changing the liquid on its skin to water vapour

Management (The Warm Chain)

- Warm delivery room
- Immediate drying
- Immediate skin-to-skin contact, wrapping, Kangaroo Mother Care **(** KMC)
- Breastfeeding
- Bathing and weighing postponed
- Appropriate clothing and bedding
- Mother and baby together
- Warm transportation (skin-to-skin)
- Warm resuscitation
- Training and awareness

Ways of keeping a baby warm

If the baby is born at home or where there are no facilities the following should be instituted:-

- Immediate drying and wrapping in warm clothing
- Keep baby skin to skin with mother (KMC): he/she should be transferred using skin to skin method
- In the newborn unit use heated rooms or nurse in incubators if available, preferably the baby should be dressed.

- **Clinical presentation**
- **Pathophysiology of hypothermia**
- **Classification of hypothermia**
- **Management of hypothermia**
  - **Moderate hypothermia**
  - **Severe hypothermia**

NEONATAL SEPSIS

- Neonatal sepsis is a clinical syndrome characterized by signs and symptoms of infection with or without accompanying bacteremia in the first month of life.
- It encompasses various *systemic* infections of the newborn such as septicemia, meningitis, pneumonia, arthritis, osteomyelitis, and urinary tract infections.

Classification of neonatal sepsis

1) ***Early onset sepsis (EOS):***
   a) It presents within the first 72 hours of life.
   b) In severe cases, the neonate may be symptomatic *at birth.*
   c) Infants with EOS usually present with respiratory distress and pneumonia.
   d) The source of infection is generally the maternal genital tract.
   e) Some maternal/ perinatal conditions have been associated with an increased risk of EOS.

Risk factors seem to be associated with an increased risk of early onset sepsis:

1. Low birth weight (<2500 grams) or prematurity
2. Febrile illness in the mother with evidence of bacterial infection within 2 weeks prior to delivery
3. Foul smelling and/or meconium stained liquor
4. Rupture of membranes >24 hours
5. Prolonged labor (sum of 1st and 2nd stage of labor > 24 hrs)
7. Perinatal asphyxia (Apgar score <4 at 1 minute)

2) Late onset sepsis (LOS):

- It usually presents after 72 hours of age.
- The source of infection in LOS is either nosocomial (hospital-acquired) or community-acquired and neonates usually present with septicemia, pneumonia or meningitis.
- Various factors that predispose to an increased risk of nosocomial sepsis include:
  - *Low birth weight, prematurity, admission in intensive care unit, mechanical ventilation, invasive procedures, administration of parenteral fluids, and use of stock solutions.*
- Factors that might increase the risk of community-acquired LOS include:
  - Poor hygiene, poor cord care, bottle-feeding, and prelacteal feeds.
- In contrast, breastfeeding helps in prevention of infections.

Neonatal Infections.

- Sepsis or septicaemia is the presence of microorganisms in the blood. Sepsis has always been one of the prime causes of neonatal mortality.
- Neonates are susceptible to infection for many reasons, for example:
  - Their polymorphonuclear leukocytes are less efficient in phagocytosis.
  - The infant receives passive transplacental immuno-globulins from the mother, which protect against common viral infections and some bacterial infections for the first three to six months of life but does not include 1gA, 1gE or 1gM immunoglobins.
  - The level of 1gG is much lower in premature infants.
  - The inflammatory response is less rapid and extensive than later in life.
  - The baby is bacteriologically sterile, which results in little competition from existing bacterial flora when they are exposed to pathogens.
- The preterm and small for gestational age infants are particularly predisposed to infection.

Intrauterine (Congenital) Infections

- Transplacental infections in the first trimester include toxoplasmosis, rubella and herpes simplex type II.
- In the second trimester, possible infections include Treponema pallidum.
- The third trimester and labour, infections will include herpes zoster, hepatitis B, B-haemolytic streptococcus, Haemophilus influenzae and pneumococcus.

Ascending Infections

- These occur after early rupture of the membranes and represent the most common form of intrauterine infection.
- They are often a result of repeated vaginal examinations.
- **Causative organisms**
- Escherichia coli, Klebsiella Pseudomonas, Proteus aureas and Streptococcus feacalis.
- All of these are bowel organisms, which may have been introduced when performing vaginal examinations.
- **Other causative organisms**
- Group B haemolytic Streptococcus and group A Streptococcus, and occasionally Staphylococcus aureas.

Intrapartum Infections

- These organisms colonise the infant as it passes through the birth canal.
- Prolonged rupture of membranes also predisposes the neonate to intrapartum infection. **Causative organisms**
- Herpes simplex II, Neisseria gonorrhoea, hepatitis B, Chlamydia Trachomatis,Candida albicans.

Nosocomial Infections

- These are infections acquired in the hospital.
- They include bacterial infections, like staphylococcus, sallmonella, shigella and anaerobic bacteria as well as viral infections like rotavirus, adenovirus, echovirus, coxsackie.
- They may also be fungal infections, for example, candida albicans.
  Highly susceptible infants, who should be observed closely, include:
  - Premature neonates
  - Babies born following prolonged rupture of membranes
  - Babies born following prolonged and difficult labour
  - Babies who have undergone prolonged resuscitation
  - Babies who have undergone operations for surgical correction of congenital anomalies
  - Infants born by mothers with diabetes, toxaemia of pregnancy and chronic anaemia
  - Babies whose mothers have active PTB
  - Babies delivered in unhygienic surroundings, especially those born before arrival (BBA's)
  - Bottle fed babies

The presence of one or more of the following signs is very suggestive of infection:

• Refusal to suck
• Vomiting
• Diarrhoea with or without blood or mucus in stools

• Abdominal distension
• Irritability
• Weak or high pitched cry
• Listlessness or lethargy and loss of interest in the surroundings
• Twitching of limbs or generalized convulsions
• Diminution or absence of reflexes especially Moro or startle reflex
• Full fontanelles
• Alteration in rate and rhythm of respiration, especially laboured or grunting
• Nasal discharge
• Small red patches on the skin
• Ecchymoses, that is, large bleeding areas on the skin, frank bleeding from the rectum and mouth
• Presence of rash, especially pustules
• Jaundice
• Cyanotic attacks

Remember:

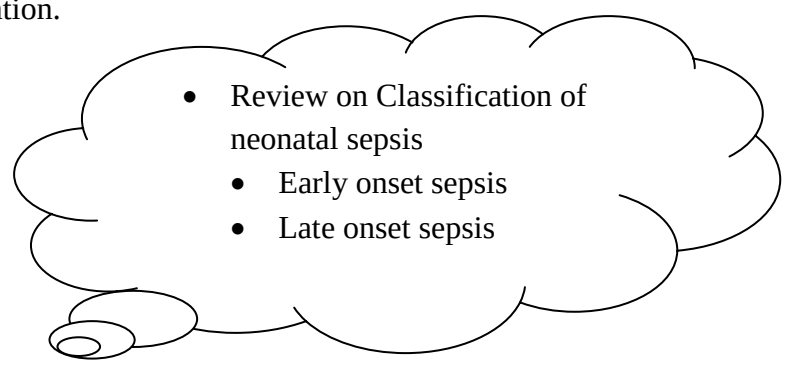
The temperature may be raised, but a LOW temperature in the presence of an infection is not uncommon in the neonates.

To confirm your diagnosis the following investigations may help:
• Hb estimation
• WBC count
• Urinalysis
• Blood culture
• Lumbar puncture
• Malarial parasites on blood slide

Prevention of Infection

Be observant and create a safe environment that decreases chances of the infant acquiring infections after birth.

1) Encouraging and assisting mothers with breast feeding, hence increasing the infant's immune protection.
2) Ensuring careful and frequent hand washing by all caretakers.
3) Adequate spacing of cots when neonates are in the nursery with other infants.
4) Always using individual equipment for each infant.
5) Avoiding any irritation or trauma to the infant's skin and mucous membranes, as intact skin provides a barrier against infection
6) Discouraging visitors who have infections or who have been exposed to communicable disease, from visiting the hospital or home.
7) Isolating infected babies when absolutely essential.
8) Observing for and appropriately treating, any infection in the mother prior to the infant’s birth.
9) Giving prophylaxis treatment to an infant born of mothers with infections.
10) Effective health education to the mother on importance of infection control and prevention.



MANAGEMENT OF SEPSIS

- **Investigations**
  - **Since treatment should be initiated in a neonate suspected to have sepsis without any delay, only minimal and rapid investigations should be undertaken.**
- **Blood culture: It is the gold standard for diagnosis of septicemia and should be performed in all cases of suspected sepsis prior to starting antibiotics.**
- **Septic screen:**
  - **All neonates suspected to have sepsis should have a septic screen to corroborate the diagnosis.**
  - **However, the decision to start antibiotics need not be conditional to the sepsis screen result, if there is a strong clinical suspicion of sepsis.**

A practical sepsis screen

Components	Abnormal value
Total leukocyte count	<5000/mm3
Absolute neutrophil count	Low counts for term and for VLBW infants
Immature/total neutrophil	>0.2
Micro-ESR	>15 mm in 1st hour

1) **Lumbar puncture (LP):**
   The incidence of meningitis in neonatal sepsis has varied from 0.3-3% in various studies.

   The clinical features of septicemia and meningitis often overlap; it is quite possible to have meningitis along with septicemia *without* any specific symptomatology.
2) **Radiology:**
   a. Chest x-ray should be considered in the presence of respiratory distress or apnea.
   b. An abdominal x-ray is indicated in the presence of abdominal signs suggestive of NEC.

c. Neurosonogram and computed tomography (CT scan) should be performed in all patients diagnosed to have meningitis.

3) Urine culture:

a. Urine cultures have a low yield and are not indicated routinely.
b. However, neonates at risk for fungal sepsis, with urogenital malformation or vesicoureteral reflex or suspected of UTI (crying during micturition) should have a urine examination done to exclude UTI.

***Supportive*:**

- Adequate and proper supportive care is crucial in a sick neonate with sepsis.
- He/she should be nursed in a thermo-neutral environment taking care to avoid hypo/hyperthermia.
- Oxygen saturation should be maintained in the normal range; mechanical ventilation may have to be initiated if necessary.
- If the infant is hemodynamically unstable, intravenous fluids should be administered and the infant is to be monitored for hypo/hyperglycemia.
- Volume expansion with crystalloids/colloids and judicious use of inotropes are essential to maintain normal tissue perfusion and blood pressure.
- Packed red cells and fresh frozen plasma might have to be used in the event of anemia or bleeding diathesis.

Antimicrobial therapy:

- The choice of antibiotics depends on the prevailing flora in the given unit and their antimicrobial sensitivity.
- Decision to start antibiotics is based upon clinical features and/ or a positive septic screen.
- However duration of antibiotic therapy is dependent upon the presence of a positive blood culture and meningitis

Indications for starting antibiotics:

- The indications for starting antibiotics in neonates at risk of EOS include any one of the following:
    (a) Presence of >3 risk factors for early onset sepsis
    (b) Presence of foul smelling liquor
    (c) Presence of 2 antenatal risk factor(s) *and* a positive septic screen and
    (d) Strong clinical suspicion of sepsis.
- **The indications for starting antibiotics in LOS include:**
    (a) Positive septic screen and/or
    (b) Strong clinical suspicion of sepsis.

OPHTHALMIA NEONATORUM

Definition

- A condition characterized by inflammation and presence of any purulent discharge from the eyes of an infant within the first 21 days of birth.

Causes of Ophthalmia Neonatorum

- Causative organisms
- Staphylococcus albus or aureus
- Escherichia coli
- Bacillus proteus
- Pseudomonas aeruginosa
- Chlamydia trachomatis (*widespread and difficult to identify and treat*)
- Neisseria gonorrhoeae (*most dreaded due to its destructive action*)

Clinical features of Ophthalmia Neonatorum

- Conjunctival discharge which is purulent, mucoid or mucopurulent depending on the cause.
- Conjunctival hyperemia and chemosis usually with swelling of the eyelids
- Increased irritability due to pain and tenderness in the eyeball.

Management of Ophthalmia Neonatorum

- Prevent by treating vaginal discharge in pregnancy.
- Educate mothers on correct hygiene postnatally.
- A swab must be taken from any purulent discharge for culture and sensitivity.
- Antibiotic eye iontment depending on culture results.
- Chloramphenical is commonly used but **erythromycin or gentamycin** is used for **chlamydial** infection.
- Polymixin is used for **Pseudomonas aeruginosa**
- The baby should be isolated in a room with the mother.
- Infected eye should be cleaned with sterile swab soaked with normal saline, this will be repeated every four hours.
- Asepsis will be followed strictly.
- Baby should be laid on the side of the infected eye.
- Blindness may complicate gonococccal ophthalmia and is due to damage to ulceration of the cornea.

BIRTH INJURIES AND TRAUMA

Birth injuries can be split into the following groups:

- Injuries to the head
- Intracranial injuries
- Peripheral nerve injuries
- Fractures of the long bones
- Organ injuries

Injuries to the Head

Caput Succedaneum

This is characterised by oedema of the subcutaneous layers of the scalp. The oedema lies over the presenting part of the head as it passes through the birth canal. The swelling is maximal at birth and resolves within a few days.

A localized caput or **chignon** may be produced if delivery was aided by vacuum extraction.

Cephalhematoma

This is sub periosteal haematoma, which most commonly lies over one of the parietal bones. Spontaneous absorption occurs, but this may take several weeks. No treatment is necessary.

Skull Fracture

Skull fractures used to occur in a parietal or frontal bone as a result of difficult forceps delivery. However, forceps delivery is now very rarely used. If it does happen, it is best to seek neuro- surgical advice about the management.

Intracranial Injuries

Although traumatic intracranial injuries have become rare, they may occur following difficult instrumental deliveries of infants with malposition or breach deliveries. Preterm infants are particularly vulnerable, due to fragile bones.

Direct causes include the tearing of the intracranial membranes containing blood vesels.

Indirect causes include anoxia leading to venous engorgement on the skull and rapid or an abnormal type of moulding caused by prolonged or obstructed labour or by instrumental delivery.

Risk factors

- Premature labour
- Face to pubis presentation
- Breech delivery
- Asphyxia neonatorum

Clinical presentation:

- Colour is pale
- Respirations show abnormal variations and the condition of the infant deteriorates with increasing rate of respiratory and other vital functions due to increasing cerebral haemorrhage
- The infant has a high-pitched cry

In many instances, the condition gradually improves

Later signs of cerebral irritation may appear **twelve hours after birth** and are rarely seen later than the second or third day after delivery.

Other signs that may appear later

- ✓ An infant who was limp and quiet after birth becomes restless.
- ✓ The child may be heard to utter a high even piercing cry
- ✓ The facial expression is that of an unnaturally wide awake baby.

- ✓ The brow is wrinkled, showing a deep frown, which increases with disturbance or movement.
- ✓ The infant is irritable and cannot tolerate handling, bright lights and sudden noise.
- ✓ The degree of muscular twitching or rigidity of the limbs varies. Stiffness of the neck or actual head retraction may be present.
- ✓ Sucking and swallowing reflexes are poor, with refusal to feed, or regurgitation during or after feeds.
- ✓ Temperature may be subnormal or high.
- ✓ Anterior fontanel may be bulging or feel tense on palpation.
- ✓ Vomiting, convulsions and sudden phases of intense cyanosis may occur in serious cases.

Periventricular Haemorrhage

- ✓ This is acommon problem of preterm infants.
- ✓ The bleeding is around the ventricle.
- ✓ It is rarely seen in term infants but may accompany trauma and pre-natal hypoxia.

Subdural Haemorrhage

- ✓ This condition may occur following trauma during the delivery of the preterm infant when there is increased compliance of the skull and a prolonged or precipitous delivery, especially with abnormal presentations.
- ✓ It results from damage to the superficial veins where the great vein of Galen and the inferior sagittal sinus combine to form the straight sinus.
- ✓ It may also result from laceration of the tentorium and falx, particularly at their junction.
- ✓ It is rarely seen in term infants.

Subarachnoid Haemorrhage

- ✓ This haemorrhage is of venous origin.
- ✓ There is bleeding from the veins within the subarachnoid space, which may follow mild trauma or asphyxia at birth.
- ✓ The condition may be asymptomatic but can present with irritability or seizures during the first few days.
- ✓ Later hydrocephalus may develop.

Diagnosis

- ✓ CSF is uniformly blood stained.
- ✓ A CT scan.

Most infants require no treatment and their long term prognosis is good.
It is only in rare instances of massive haemorrhage that the prognosis is poor.

Management

- Infants born in a state of white asphyxia should be resuscitated and wrapped in warm clothing for transfer to hospital if in a health centre.
- In long term care, the baby is placed in a room selected for its quietness, warmth and protection from direct light and draughts.
- Clear the airway of excess mucus and keep the head slightly raised to avoid obstruction of the airway.
- The baby should be handled gently and quietness maintained where possible.
- The type and method of feeding should be made according to the condition and ability of the individual baby.
- The infant's temperature should be taken and recorded four hourly and tepid sponging should be done if the baby has pyrexia.
- The infant's linen should be changed, and toilet needs met in the cot every three to four hours.
- Oxygen therapy, may be necessary so keep oxygen at hand.
- Many of these infants make good progress in the neonatal period, but not until much later is it possible to assess the degree of mental damage which has resulted from the trauma at birth.
- Therefore, they should be referred to the paediatric clinic for follow up.

Fractures of the Long Bones

- The clavicle is the bone most frequently broken.
- Injuries are usually noticed when the infant fails to move one arm as freely as the other because of the pain.
- Sometimes a lump can be felt over the bone from callus formation.
- Other fractures, which can happen although uncommon, are fractures of the femur, usually humorous, during intrauterine manipulations.
- Orthopaedic advice should be obtained for their management.
- Healing is usually rapid and complete.

Peripheral Nerve Injuries

Nerve injuries in the newborn infant may be due to stretching, compression, twisting, hyperextension or separation of the nervous tissue.

Facial Nerve

- This is damage to the facial nerve by pressure from the tip of the forceps.
- Palsy can also follow an apparent normal delivery.
- You will find that, on the affected side, the infant is unable to shut the eye completely. The corner of the mouth drops and the nasal-labia fold is less marked than on the unaffected side.
- When the infant cries, the mouth is drawn to the normal side.
- In most cases recovery occurs spontaneously within a few days.

Brachial Nerve Palsy

- Injury to the brachial plexus may be due to excessive lateral flexion, rotation or traction upon the neck.
- This usually occurs during a difficult delivery, either from shoulder dystocia or a breech presentation.
- The clinical picture depends on the nerve roots involved.
- If the roots of C5 and C6 are damaged, then Erb's palsy results (upper brachial plexus injury).
- The arm lies on the side of the trunk with internal rotation at the shoulder.
- The elbow is extended, there is pronation of the forearm and flexion at the wrists.

Klumpke's palsy (lower brachial plexus palsy) occurs when the wrist and the finger flexors are affected resulting in a claw hand deformity with wrist drop and limb fingers the upper arm is unaffected. The spinal root C8 and T1 are affected.

- There is no treatment for brachial plexus injuries. However, passive movements of the joints will prevent contractures.
- Mild injuries recover within a few days, while more severe lesions can be expected to recover spontaneously in two to four months.
- Occasionally, there may be incomplete recovery.

Radial Nerve Injury

- This type of injury is rare but may result from fracture of the humerus, especially with difficult delivery of the arm during breech extraction.
- The use of the 'deltoid region' as a site for intramuscular injection (now usually avoided) results in a radial nerve injury, because the deltoid muscle of the newborn infant is so small that correct localisation of the needlepoint is difficult.

Organ Injuries

The following injuries to the internal organs may occur, especially with difficult deliveries like breech extraction:

- Liver and spleen may rupture, especially when there is hepatosplenomegaly (rhesus haemolytic disease, diabetic infants)
- Adrenal haemorrhages may occur, but are usually a post mortem finding, being unsuspected in live infants
- Kidneys may rupture during delivery in breech preterm infants
- Testicles may be bruised and haemorrhages commonly seen in breech presentation

CONGENITAL ABNORMALITIES

These are structural deformations that are present at birth (1.5% of babies)

Most of malformations are now recognised prenatally from routine ultrasound scanning or prenatal testing of the foetus.

Most of these defects have unknown causes but are believed to be due to:

- ❖ Genetics
- ❖ Adverse effects of drugs on the foetus
- ❖ Radiation, metabolic disturbances in the mother
- ❖ Lack of space for the foetus to grow, for example, oligohydramnios
- ❖ Infections affecting the mother

Chromosome Disorders

Every cell in the body contains 46 chromosomes (diploid number) in its nucleus. Forty-four are autosomes (xx or xy). Half (the haploid number) are derived from each parent at the time of fertilisation. During meiosis, the chromosomes separate and align themselves around the centre of the cell and half migrate into each daughter cell. Occasionally, one of the chromosomes does not separate in time (nondisjunction) and stays with its partner in one daughter cell, leaving the other daughter cell with no chromosomes of this type. Sometimes a process known as translocation occurs where part of one chromosome is added to another during the crossover process of meiosis.

Specific chromosomal abnormalities, which have been identified, include:

Trisomy 21 - Down's syndrome

Trisomy 14 - Patau syndrome

Trisomy 18 - Edward's syndrome

XO syndrome - Turner syndrome,ovarian dysgenesis

XXY syndrome - Klinefelter syndrome

Down's Syndrome (Trisomy 21)

Down's syndrome is the commonest chromosomal disorder occurring in 1.4 per 1000 live births. It results from the presence of 47 chromosomes since the infants have three number 21 chromosomes. The majority (95%) are the result of non dysjunction during mitosis. The risk increases with maternal age from 1:350 at 35 years to 1:100 at 40 years and 1:30 at 45 years. Another 3 - 4 percent are due to translocation and are not related to maternal age. If translocation affects the mother, there is a 20% risk of an affected child. If it affects the father the risk is about 6%. One or two percent are mosaic, that is, with a normal cell line as well as a cell line with an extra 21 chromosome. Chromosome analysis can be done on samples obtained by chorionic villus sampling, or amniocentesis in women at increased risk because of maternal age, or where either parent has a chromosomal translocation.

Clinical presentation: •

- ✓ Eyes which slant upwards and outwards with epicanthic folds slit eyes
- ✓ A round face, small mouth with protruding tongue and a shorter upper lip
- ✓ Low set ears, flat occiput

- ✓ Palpable third fontanelle
- ✓ Hands which are short with incurving of the little finger and single transverse palmar crease (simian crease)
- ✓ The cleft between the great toe and the others is great.
- ✓ Profound hypotonic • Increased incidence of duodenal atresia and congenital heart disease
- ✓ Many affected individuals tend to have a low intelligence quotient (IQ)

The survival of a baby with this disorder depends on associated malformation but survival rates are usually good.
In management, a multi professional approach will be needed because these children have many needs to be addressed.

Drug or Substance-Addicted Infants

If a mother abuses drugs during her pregnancy, the infant may be born with withdrawal symptoms, known as Neonatal Abstinence Syndrome (NAS).
These drugs include narcotics, alcohol, barbiturates, codeine, benzodiazepines, cocaine and tricyclics antidepressant.
The abuse of such drugs is associated with foetal and neonatal deaths, prematurity and intrauterine growth retardation.
There is also an increased risk of sudden infant death syndrome (SIDS).
Pregnant drug abusers often have chaotic lifestyles with accompanying social and economic problems. Hence they are at more risk of STIs/HIV and Hepatitis B virus.
Therefore, this puts the mother and baby in the risk group.

Neonatal Abstinence Syndrome (NAS)

As mentioned earlier, infants born to drug abusers are born with withdrawal symptoms.
Signs of withdrawal:

- ✓ Tremor, high pitched cry, irritability
- ✓ Hyperactivity, hyper tonicity
- ✓ Sweating, pyrexia, convulsions
- ✓ Sneezing, vomiting, disorganised sucking
- ✓ Diarrhoea
- ✓ Respiratory distress

In opiate misuse, the symptoms of NAS will generally appear within the first 24 – 48 hours of life, but they have been reported to take up to six days to appear.
Methadone and barbiturates abstinence signs may not appear for two weeks and may go up to a period of several weeks or months.

Nursing Care

- ✓ Infants should be nursed in a quiet environment with reduced light and noise stimulus.
- ✓ Cuddle the baby so that it feels secure and give small frequent feeds for comfort and adequate nutrition.
- ✓ Control convulsions by giving phenobarbitone syrup.
- ✓ Give intravenous fluids if feeds are not tolerated.

Medical Treatment

This varies in different countries depending on the drug misused and severity of presenting signs.

- ✓ Narcotics, giving 0.05mg/kg of morphine every 3 - 4 hours, increasing dosage if necessary until the observable signs are controlled (Roberton, 1993).
- ✓ Chlorpromazine is also used starting at 3mg/kg/24 hours in divided doses increasing dose until presenting signs are controlled.

The midwife's role includes:

- Build up a good working relationship with the mother
- Communication should be clear and non-judgmental
- Explain the baby's presenting signs and emphasize that the behaviour is not a rejection of their parents
- Encourage parents to take active part in the care of their baby
- Emphasize the possible effects of breast feeding, which would be harmful especially with cocaine and heroine.
- Parents should seek advice from pharmacist or paediatrician
- On discharge, you should coordinate the follow up and refer to appropriate professionals for rehabilitation

Foetal Alcohol Syndrome (FAS)

It is clear that heavy alcohol use results in the Foetal Alcohol Syndrome. Alcohol also affects brain cells size, resulting into a smaller mass of tissue.

FAS is characterised by:

Intra uterine growth retardation

Failure to thrive

Developmental delay and dysmorphic facial features

It is thought that ethanol (a component of alcohol) disrupts cell differentiation and growth in the foetus and also impairs normal placental function

Clinical presentation

- Small eyes with exaggerated epicanthic folds
- Shallow or absent philtrum with a poorly formed nasal bridge
- Ears that appear large

- The infant may be fretful and difficult to feed
- Other associated abnormalities of the heart and musculoskeletal system, gut atresia, skin lesions and cleft palate
- Delay in mental and motor development and hence learning and behavioural problems
- It is important for the pregnant woman to know that these defects are irreversible.
- You should also monitor signs of alcohol withdrawal and prepare for follow up in the community after discharge.