



CLINICAL PRACTICE GUIDELINES FOR THE MANAGEMENT OF NEONATES AT A DISTRICT HOSPITAL



Republic of Namibia

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contents



INTRODUCTION | 5

1. ESSENTIAL NEWBORN CARE AT DELIVERY / 2

1.1 Immediate Care at Delivery / 2

2. NEONATAL RESUSCITATION / 3

2.1 Post Resuscitation Care / 5

2.2 Cessation of Resuscitation / 5

3. ROUTINE CARE OF ALL NEWBORNS AFTER DELIVERY / 6

3.1 Care on the Postnatal Ward / 6

3.2 On Discharge / 7

4. RAPID ASSESSMENT AND IMMEDIATE MANAGEMENT OF ALL NEONATES / 8

4.1 Triaging / 9

4.2 Management of Neonatal Convulsions at a Hospital / 10

5. NON-INSTITUTIONAL DELIVERIES (BORN BEFORE ARRIVAL AT A HOSPITAL) / 11

6. ABANDONED/ORPHANED BABY AT A HOSPITAL / 12

7. PRETERM AND LOW BIRTH WEIGHT BABIES / 13

7.1 Complications Associated With Prematurity And Low Birth Weight Babies / 13

7.2 Management Of A Low Birth Weight Baby (1.5-2.5 Kg) / 14

7.3 Feeding Low Birth Weight Babies / 15

7.4 Kangaroo Mother Care / 21

7.5 Vitamin Supplements And Iron For Preterm Babies / 22

7.6 Apnoea Prevention / 22

7.7 Key Facts For Providers / 22

7.8 Follow- Up / 23

8. MANAGEMENT OF BIRTH ASPHYXIA AT A DISTRICT HOSPITAL / 24

- 8.1 Babies At Risk Of Birth Asphyxia / 24
- 8.2 Post Resuscitation Management Of Asphyxiated Babies / 25
- 8.3 Sarnat Staging Of Hypoxic Ischaemic Encephalopathy / 26
- 8.4 Prognosis / 26
- 8.5 Referral Criteria / 26

9. NEONATAL INFECTIONS / 27

- 9.1 Management Of Neonatal Sepsis / 27
- 9.2 Management Of Neonatal Meningitis / 29
- 9.3 Conjunctivitis / 30
- 9.4 Management Of Congenital Syphilis At A Hospital / 31
- 9.5 Infection Of The Umbilicus / 32
- 9.6 Management Of Baby After Prom, Maternal Pyrexia In Labour And Maternal Uterine Infection / 32
- 9.7 Management Of Baby Born Following Offensive Vaginal Discharge / 32
- 9.8 Management Of Hiv Exposed Baby At All Levels Of Care (Refer To The Pmtct Guidelines) / 32

10. COMMON NEONATAL CONDITIONS / 33

- 10.1 Breathing Difficulties / 33
- 10.2 Apnoea / 35
- 10.3. Neonatal Hypoglycaemia / 36
- 10.4 Neonatal Jaundice / 38
- 10.5. Abnormal Body Temperature / 42
- 10.6. Vomiting And Abdominal Distension / 44

11. NEONATAL TETANUS / 48

- 11.1 Clinical Features Of Tetanus / 48
- 11.2 Management Of Tetanus Neonatorum / 48

Introduction



A newborn baby who is small or has a potentially life-threatening problem is in an emergency situation requiring immediate diagnosis and management. Delay in identification of the problem or in providing the correct management may be fatal. This guide provides clinical guidelines for use by the doctors, nurses, midwives, and other health care workers who are responsible for the care of newborn babies with problems during the first 4 weeks of life. The guide can also be used to identify less common conditions that require referral to a higher level.





1. ESSENTIAL NEWBORN CARE AT DELIVERY

The vast majority of newborns require no intervention at birth other than routine normal care. If this is done well, it vastly reduces the likelihood of problems.

Immediate Care at delivery

- Dry the baby with a clean towel whilst skin-to-skin on the mother's abdomen
- Observe the baby while drying: eg. Is the baby crying? (Chart 1)
- Check breathing - if abnormal, follow Resuscitation Protocol (Chart 1)
- Cover the baby with a warm, dry cloth and a cap
- If the baby is stable, wait for at least 1 minute and up to 3 minutes or wait for cessation of the cord pulsation to clamp or tie and cut the cord
- Check APGAR score at 1, 5 and 10 minutes
- Identify the baby-label
- Initiate breastfeeding within the first 30 minutes
- Check vital signs quarter-hourly for two hours (temperature, heart rate, respirations rate and effort)
- Conduct initial assessment of baby at one hour after delivery
- Weigh the baby, measure length and head circumference (delay weighing, measuring head circumference and length if the baby's condition does not allow or change immediately)
- Assess if baby is passing urine, stools in the first 24 hours
- Apply eye prophylaxis (Tetracycline eye ointment)
- Give Vitamin K 1mg intramuscularly
- Document all care provided and complete all necessary registers
- Transfer mother and baby to postnatal ward after two hours.



2. NEONATAL RESUSCITATION

Approximately 10% of newborns require some assistance to begin breathing at birth; very few, only about 1% need more than basic resuscitation to survive.

There is no need to slap the newborn; rubbing the back two or three times in addition to thorough drying is enough for stimulation.

A. Airway

- Keep the baby's head in a slightly extended position to open the airway.
- Do not suction routinely. Suction the airway if there is meconium-stained fluid and the baby is not crying and moving limbs. When the amniotic fluid is clear, suction only if the nose or mouth is full of secretions.
- Suck the mouth, nose and oropharynx by direct vision; do not suck right down the throat, as this can cause apnoea or bradycardia.

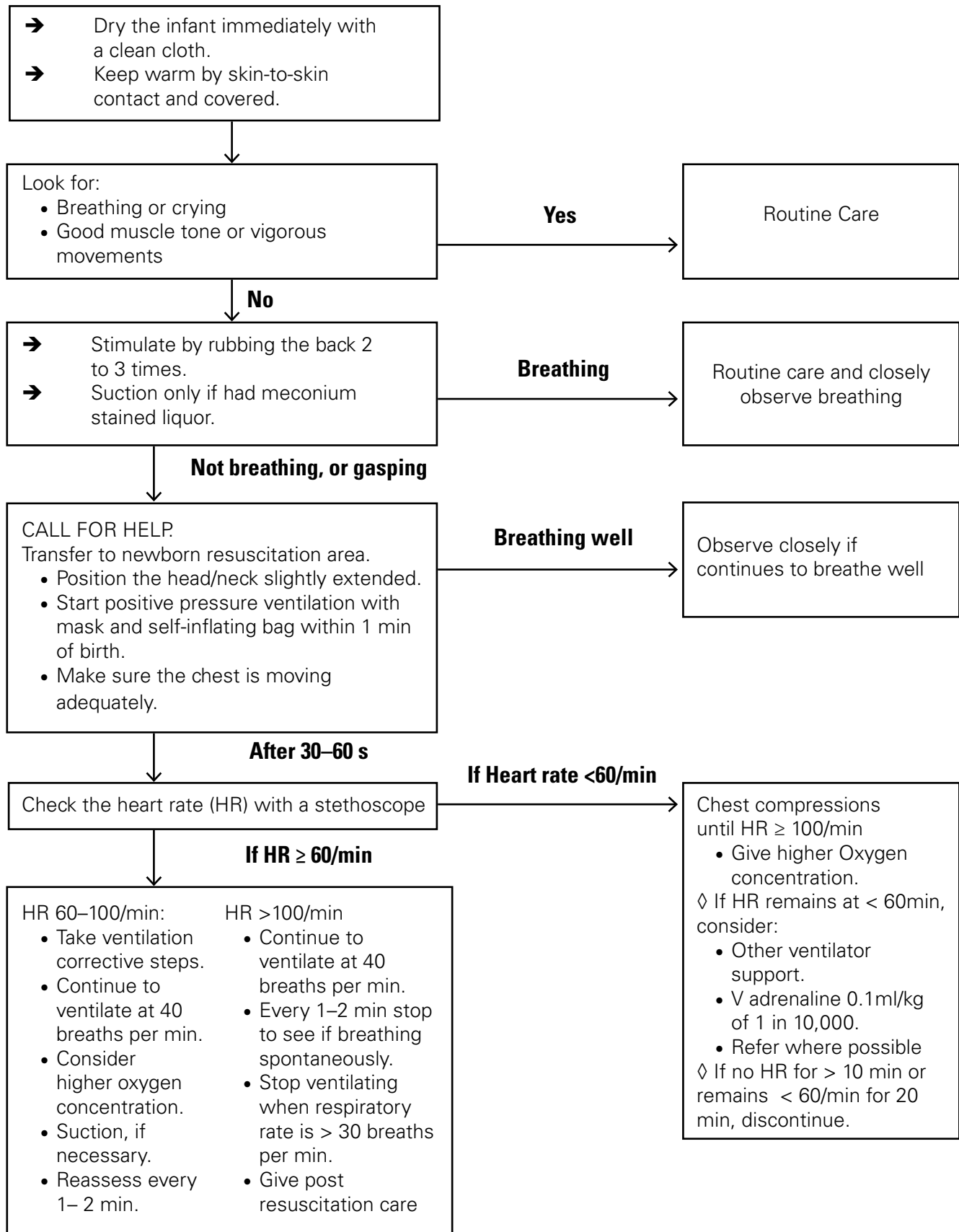
B. Breathing

- Choose a mask size that fits over the nose and mouth): size 1 for normal-weight babies, size 0 for small (< 2.5 kg) babies.
- Ventilate with bag and mask at 40–60 breaths/min. Term babies at room air and preterms at 40% oxygen.
- Make sure the chest moves up with each press on the bag. In the case of a very small baby, make sure the chest does not move too much (danger of causing pneumothorax).

C. Circulation

- Give chest compressions if the heart rate is < 60/min after 30–60s of ventilation with adequate chest movements: (three compressions: one breath every 2s).
- Place thumbs just below the line connecting the nipples on the sternum.
- Compress one third the anterior–posterior diameter of the chest.

CHART 1: NEONATAL RESUSCITATION ALGORITHM



2.1 Post Resuscitation Care

- Neonates who require resuscitation are at risk for deterioration after their vital signs have returned to normal.
- Once adequate ventilation and circulation has been established:
 - ➔ Stop ventilation.
 - ➔ Return to mother for skin-to-skin contact as soon as possible.
 - ➔ Closely monitor breathing difficulties, signs of asphyxia and anticipate need for further care.

2.2 Cessation Of Resuscitation

It is appropriate to consider discontinuing after effective resuscitation efforts if:

- The baby is not breathing and heartbeat is not detectable beyond 10min, stop resuscitation.
- If no spontaneous breathing and heart rate remains below 60/min after 20 min of effective resuscitation, discontinue active resuscitation.
- Record the event and explain that the baby has died.
- Give them the baby to hold if they so wish.



3. ROUTINE CARE OF ALL NEWBORNS AFTER DELIVERY

3.1 Care On The Postnatal Ward

- Check vital signs three hourly (temperature, heart rate, respirations rate and effort)
- Check haemoglobin once in the first 4 hours and blood glucose within 30 minutes of birth if less than 2.8 feed the baby and repeat after 30 minutes
- Check for danger signs such as; respiratory distress, hypothermia, fever, failure to suck convulsions, drowsiness, floppiness, jaundice, bleeding from the cord, hypothermia
- Ensure hygiene (follow infection prevention protocols)
- Do not bath the baby within the first 24 hours
- Check weight daily
- Assess the elimination pattern (if passing urine and stools)
- Keep warm by covering the baby with dry cloth and a cap
- Advise the mother on exclusive breastfeeding- on demand minimum 8 feeds in 24 hours
- Teach the mother on correct positioning, attachment and effective suckling of the baby
- Administer immunizations polio 0, BCG and hepatitis B according to immunization guidelines
- Assess the baby's exposure to; HIV, Hep B, TB and Syphilis; follow the appropriate guidelines
- Document all care provided.

3.2 On Discharge

- Conduct a full physical examination of a baby and document.
- Give health education to the mother on the following areas:
 - ➔ Danger signs such as convulsions, poor feeding, fever, hypothermia, being drowsy or unconscious, movement only when stimulated or no movement at all, central cyanosis, fast breathing, grunting, severe chest in-drawing and jaundice to seek medical care as soon as possible.
 - ➔ Hygiene of the baby
 - ➔ Advise mother to keep the cord clean and dry.
 - ➔ Advise mother not to add anything on the cord stump.
 - ➔ Exclusive breastfeeding
 - ➔ Family planning
 - ➔ PMTCT
- Advise mother to attend post-natal checks at 72 hours, 1 week and 6 weeks.
- Birth registration – Encourage the mother to register the baby
- Document all details in the child health passport book



4. RAPID ASSESSMENT AND IMMEDIATE MANAGEMENT OF ALL NEONATES

- Assess every baby for emergency signs as soon as the baby arrives, regardless of whether the baby is coming from another ward in the health care facility, is transferred from another health care facility, or is brought from home
- A few babies may have emergency signs that indicate a problem that is so serious the baby may die within minutes if not immediately treated
- The triage concept is used to identify emergencies. This is a logical and quick way of identifying how sick a child is
- It does not take the place of a thorough examination to make a diagnosis but is a screening tool to identify problems that require immediate attention
- All newborns should be reviewed immediately by a health worker
- Follow infection prevention principles and practices at all times when examining and treating babies.

4.1 Triageing

For triage we need to know the following:

	Emergency Signs	Emergency Treatment
AIRWAY and BREATHING	Not breathing, centrally cyanosed, noisy breathing, severe respiratory distress	Manage the airway, bag and mask ventilation, give oxygen
CIRCULATION	Cold hands Capillary Refill T >3secs Weak fast pulse	Stop any bleeding, give oxygen Start IV fluids 10ml/kg
COMA CONVULSION	Unconscious Convulsing Low blood sugar	Manage airway, give oxygen Give 10% glucose IV Position
DEHYDRATION	Lethargy Sunken eyes Prolonged skin pinch	Give IV fluids + NGT

Note: Fluid management is covered in the fluid guidelines

4.2 Management of Neonatal Convulsions at a Hospital

Signs and symptoms

- Repetitive jerking movements of limbs or face or continuous flexion and extension of arms and legs or purposeless movement of limbs
- Apnoea (spontaneous cessation of breathing)
- Repetitive blinking, eye deviation or staring
- Repetitive movement of mouth or tongue, lip smacking
- The baby can be conscious or unconscious
- May be awake but unresponsive.

Management

- Assess and treat airway, breathing, circulation problems.
- Check blood sugar, If less than 2.8 mmols/l (45mg/ dl), give 2 mls/kg of 10% dextrose. If blood glucose cannot be measured give empirical treatment with glucose.
- Control convulsions with a loading dose of phenobarbitone 15-20 mg/kg IV
- If still fitting after 10 minutes repeat phenobarbitone 10mg/ kg IV up to a maximum of 40mg/kg. Watch for apnoea. Always have a bag-mask available.
- If needed, continue phenobarbital at a maintenance dose of 5 mg/kg per day.
- Rule out causes of convulsions like hypoglycaemia, meningitis, hypocalcaemia and others.
- Treat the cause accordingly.
- Continue monitoring the neonate every 15 minutes until stable then hourly.
- Explain the condition of the neonate to the mother (Guardian).



5. NON INSTITUTIONAL DELIVERIES (BORN BEFORE ARRIVAL AT A HOSPITAL)

Definition

Babies who are born outside a health facility whether at home or on the way to the hospital.

Management

- Conduct the initial assessment
 - ➔ Assess airway, breathing and circulation
 - ➔ Assess the skin colour (cyanosis and jaundice)
- Check Hb and blood glucose
- Cover the baby with a warm, dry cloth and a cap
- Change the cord clamp
- Initiate breastfeeding
- Check vital signs quarter hourly for the first hour
- Apply eye prophylaxis (TEO)
- Give vitamin K 1mg stat intramuscularly
- Follow routine care of the newborn
- If there are any other complications manage accordingly.

Refer to appropriate guidelines.

- Ascertain the baby's exposure status to HIV, Syphilis, Hep B and TB.
- Provide child health passport and document all care provided
- Advise the mother/guardian to register the baby.

6 SIX



6. ABANDONED/ORPHANED BABY AT A HOSPITAL

Definition

Abandoned baby: Refers to a baby who has been left in public or private place without an adult assuming responsibility for the baby.

NB: Abandoned babies fall under the care of Child Protection Services.

Children under adoption fall under the care of Social Welfare Services.

Management

- Admit the baby and assess for emergency signs and manage accordingly.
- Do a thorough assessment to identify whether the baby has any conditions that need treatment.
- Treat any signs of infection.
- Keep the baby warm to prevent hypothermia.
- Assess age and gestational age.
- Follow appropriate feeding procedures for the baby - formula feeding is allowed in abandoned babies.
- This child should be in the care of the hospital until social welfare identifies a place for the baby.
- Report the issue to police (if abandoned) and social worker.
- All family issues should be referred to the social worker.
- Do HIV rapid test on the mother if HIV status is unknown and RPR and treat accordingly. Provide ARV prophylaxis (Niverapine) to neonates whose rapid test is positive. Get consent from the superintendent.
- At 6 weeks of age do DNA /PCR tests to determine HIV status and manage accordingly. NB: Test all high risk babies at birth.
- Document all care provided (refer to PMTCT Guidelines).



7. PRETERM AND LOW BIRTH WEIGHT BABIES

Definition

A low birth weight baby is one who weighs less than 2500 grams at birth. Nearly 75% of neonatal deaths occur among low birth weight neonates. Even after recovering from neonatal complications, some LBW babies remain more prone to malnutrition, recurrent infections, and neurodevelopmental handicaps.

LBW may be due to either prematurity or intra uterine growth restriction (IUGR). IUGR results in a baby who is small for gestational age (SGA). It is helpful to try and decide if the baby is premature or SGA as the management is slightly different. At times the newborn may be both premature and SGA.

Preterm baby (<37 weeks gestation) is diagnosed on the basis of period of gestation calculated from the last menstrual cycle of the mother. Preterm babies also have distinct physical features which help in their recognition refer to the Ballard's scoring chart. Gestational assessments should be done using the Ballard's score sheet.

Small-for-dates neonates have an emaciated look and loose folds of skin because of lack of subcutaneous tissue.

Low birth weight babies can be categorized in 3 groups:

- a. Extremely low birth weight- less than 1,000 g
- b. Very low birth weight- between 1-1.5 kg
- c. Low birth weight - 1.5-2.5 kg

7.1 Complications associated with prematurity and low birth weight babies

Low birth weight babies are prone to complications. Some problems that small babies are particularly susceptible to include:

- Feeding difficulty
- Hypothermia
- Respiratory distress
- Apnoea
- Hypoglycaemia
- Jaundice

- Anaemia
- Intraventricular bleeding
- Retinopathy of prematurity
- Necrotizing enterocolitis
- Metabolic acidosis

7.2 Management of a Low birth weight baby (1.5-2.5 kg)

7.2.1 Babies weighing between 2 - 2.5kg

- Babies with a birth weight of 2kg or above are usually strong enough to breastfeed and maintain their body temperature.
- Their mothers usually need additional support for exclusive breastfeeding. They should be kept warm at all times.
- Check and record the blood glucose level of all low birth weight babies 3 hourly for the first 24 hours.
- All low-birth-weight babies are at risk of infection and infection control should be closely observed.
- The mother and the family under the supervision of a health care worker can manage an otherwise healthy LBW newborn with a birth weight of 2kg or above at home.
- Routine care of the newborn should be done.
- Beware of them less than 36 weeks gestation.

7.2.2 Babies weighing between 1.5 - 2.0kg

- Babies weighing below 2 kg should be admitted to a preemie unit.
- Feed babies within 30 minutes of birth with EBM.
- These babies have a higher risk of developing complications.
- The baby should be monitored 3 hourly the first 24 hours to assess feeding ability, fluid intake, the presence of any danger signs and vital signs checked. If the baby remains stable they can be monitored 4 hourly thereafter.
- Check and record the blood glucose 3 hourly for the first 24 hours.
- Start caffeine for prevention of apnoea refer to page 26 (7.6 Apnoea Prevention).
- Babies with complications should be managed accordingly.
- Low-birth-weight neonates (weighing < 2 kg) who are clinically stable should be given Kangaroo Mother Care starting soon after birth and ensured at all times, day and night.

7.2.3 Management of very low birth weight babies (1 - 1.5kg birth weight)

- These babies should be admitted to the premie unit.
- The risk of developing complications is even higher in this group.
- The baby should be monitored hourly the first 24 hours.
- Babies with complications should be managed accordingly.

7.2.4 Management Of Extremely Very Low Birth Weight Babies (< 1Kg Birth Weight)

- These babies should be stabilized and referred.
- Keep NPO and start IV fluids- refer to fluid guidelines.

7.3 Feeding Low birth weight babies

Breast milk is the preferred milk because it has a high electrolyte and protein content necessary for rapid growth of the baby. The antibodies and other anti - infective factors in mother's milk are very necessary for the survival of a premature baby.

Which Route?

Birth weight, gestation age, respiratory rate and effort, presence or absence of sickness and individual feeding efforts of the baby determine the decision as to how a LBW neonate should receive fluids and feeds. The gestational age is one of the most important determinants as coordinated sucking and swallowing does not develop until about 34 week's gestation.

7.3.1 Feeding babies > 1.5kg

- Many of these babies will be able to suckle at the breast. Babies who can suckle should be breastfed.
- Those who cannot breastfeed should be given expressed breast milk with a cup/spoon. When the baby is sucking well at the breast and gaining weight, increase breastfeeds and reduce the cup feeds.
- Babies unable to feed from a cup and spoon should be given feeds through a gastric tube. The mother should express her own milk into a sterile container.
- In order to promote lactation, and enable the baby to learn to suck, all babies more than 1.5 kg and 32 weeks gestational age feeding by cup, spoon or tube should be put on the breast for 5 -10 minutes before each feed. This should be done with caution as these babies can easily aspirate.

Is the baby able to breastfeed effectively?

- When offered the breast, the baby roots, attaches well and sucks effectively
- Is s/he able to suck long enough to satisfy needs
- Is the baby gaining weight?

Is the baby able to accept feeds by alternative methods?

- When offered cup feeds, the baby opens the mouth, takes milk and swallows without coughing/ spluttering
- The baby is able to finish the required amount per feed.

7.3.2 Special Feeding Considerations For Babies Weighing 1- 1.5 Kg At Birth

These babies have the highest risk of feeding problems and necrotizing enterocolitis.

- **Day 1:** Give 25 ml/kg per day of enteral feeds, preferably expressed breast milk and IV fluids 55ml/kg/day. The feeds should be given via a gastric tube.
 - If the baby cannot tolerate enteral feeds, give IV fluids at 80 ml/kg per day
- **Day 2-5:** Increase feeds everyday by 25mls/kg/day if tolerated.
 - Adjust IV fluids so that total intake is according to the table below
 - Try to be fully enteral by 5 - 7 days
- Start enteral feeding when the condition of the baby is stable – the baby is able to maintain the suck and swallow routine without increasing respiratory distress and there is no abdominal distension or tenderness, bowel sounds are present, meconium passed and no apnoea.
- Use a prescription chart to calculate exact amounts for feeding and the timing of feeds.
- Check blood sugar every 6 h until enteral feeds are established.

Table 1: Feeding Chart

TOTAL INTAKE (ENTERAL AND INTRAVENOUS) mls/kg/day				
Day 1	Day 2	Day 3	Day 4	Day 5
80	90	100	120	150



7.3.3 Key facts for providers and mothers – Breast Milk Expression

It is useful for all mothers to know how to express their milk. Expression of breast milk is required in the following situations:

- To maintain milk production and for feeding the baby who is premature, low birth weight or sick and cannot breast feed for some time.
- Where mother and baby are separated due to poor maternal condition (e.g mother is in ICU for observation but is able to express).
- To relieve breast problem e.g. engorgement.

Technique of expression – teach her to:

- Wash her hands with soap and water thoroughly before expression. Wipe her breast with a clean, warm damp cloth. Teach the mother to clean the nipple area thoroughly to open the milk ducts. Sit or stand comfortably, and hold the clean container near her breast.
- Put the thumb on her breast above the nipple and areola, and her first finger on the breast below the nipple and areola, opposite the thumb. She supports the breast with her other fingers.
- Press her thumb and first finger slightly inwards towards the chest wall.
- Press her breast behind the nipple and areola between her fingers and thumb. She must press on the lactiferous sinuses beneath the areola.
- In a lactating breast it is possible to feel the sinuses. They feel like peanuts.
- If she can feel them, she can press on them, press and release.
- This should not hurt – if it hurts the technique is wrong. At first no milk may come, but after pressing a few times, milk starts to drip out.
- Press the areola in the same way from the sides, to make sure that milk is expressed from all segments of the breast.
- Avoid rubbing or sliding her fingers along the skin. The movements of the fingers should be more like rolling.
- Avoid squeezing the nipple itself. Pressing or pulling the nipple cannot express milk.
- Express one breast for at least 3 - 5 minutes until the flow slows; then express the other side; and then repeat both sides. She can use either hand for either breast.
- Explain that to express breast milk adequately may take 20-30 minutes. Having the baby close or handling the baby before milk expression may help the mother to have a good let-down reflex. It is important not to try to express in a shorter time. To stimulate and maintain milk production one should express milk frequently – at least 8 times in 24 hours.

7.3.4 Gavage (Tube Feeding)

7.3.4.1 Nasogastric tube feeding (NG tube)

- The **catheter** is measured from the tip of the nose to the ear lobe and then to the midpoint between the xiphoid and umbilicus. Mark the position with a piece of tape. This length of the tube should be inserted through the nose. For tube feeding; use size French size 5 or 6 nasogastric tube. Large for Gestational age or macrosomic babies ($> 3.5\text{kg}$) may require a French size 8.

7.3.4.2 Orogastric tube feeding (OG tube)

- For the **orogastric catheter**, the distance between angle of mouth to earlobe, and then to the midpoint between the xiphoid and umbilicus. Mark the position with a piece of tape. The length of tube is used for insertion.
- During **nasogastric or orogastric insertion**, the head is slightly raised and a wet (not lubricated) catheter is gently passed through the nose (nasogastric) or mouth (orogastric) down through the oesophagus to the stomach. Its position is verified by aspirating the gastric contents and checking their acidity with a litmus paper.



- At the time of feeding, the outer end of the tube is attached to a 10/20ml syringe (without plunger) and milk is allowed to trickle by gravity.
- There is no need to burp a tube-fed baby.
- The nasogastric or orogastric tube may be inserted before every feed or left in situ for up to 3 days and no more than 7 days.
- While pulling out a feeding tube, it must be kept pinched and pulled out gently.
- Tube feeding may be risky in very small babies. They have small stomach capacity and the gut may not be ready to tolerate feeds. Stasis may also result from paralytic ileus due to several conditions. Thus, tube-fed babies are candidates for regurgitation and aspiration. It is important therefore to take precautions.
- Before the next feed, aspirate the stomach, if the aspirate is more than 2mls/kg; top this up to make the required for the next feed. If there are still more aspirates the next feed the baby needs to be evaluated for illness. The feeds may have to be decreased in volume or stopped.

7.3.4.3 Steps of oro-/nasogastric tube feeding

1. Before starting a feed, check the position of the tube.
2. For each feed take a clean syringe and remove the plunger.
3. Connect the barrel of the syringe to the end of the gastric tube.
4. Pinch the tube and fill the barrel of the syringe with the required volume of milk.
5. Hold the tube with one hand, release the pinch and elevate the syringe to 5 - 10 cm above the level of the baby.
6. Let the milk run from the syringe through the gastric tube by gravity.
7. Do not force milk through the gastric tube by using the plunger of the syringe.
8. It should take about 10-15 minutes for the milk to flow into the baby's stomach: control the flow by altering the height of syringe; lowering the syringe slows the milk flow, raising the syringe makes the milk flow faster.
9. Observe the baby during the entire gastric tube feed. Do not leave the baby unattended.
10. Keep the gastric tube capped between feeds.
11. Avoid flushing the tube with water or saline after giving feeds.
12. Progress to feeding by cup/spoon when the baby can swallow without coughing or spitting milk.
This could be possible in as little as one or two days, or it may take longer than one week.
13. Replace the gastric tube with another clean gastric tube after 3-7 days, or earlier in case it is pulled out or becomes blocked.

7.3.5 Steps Of Cup Feeding

Baby should be awake and held sitting semi-upright on caregiver's lap. Put a small cloth on the front of chest to catch drip of milk.

1. Put a measured amount of milk in the cup.
2. Hold the cup so that the pointed tip rests on the baby's lower lip.
3. Tip the cup to pour a small amount of milk at a time into the baby's mouth.
4. Allow the baby to feed at his own pace, ensuring small/weak babies have time to rest and breathe between spurts of drinking. Avoid pouring milk into the baby's mouth.
5. Make sure that the baby has swallowed the milk already taken before giving anymore.
6. When the baby has had enough, he or she will close her mouth and will not take anymore. Do not force the baby to feed.

7.3.6 Judging adequacy of nutrition

The key measure of optimal feeding is the weight pattern of the baby.

A preterm LBW	Loses up to 10percent cumulative weight loss during the first week of life. Birth weight is usually regained by the end of 2 weeks of life. (May be longer in very premature babies). Observe for: • Inadequate feeding – insufficient breast milk, inadequate amounts prescribed if tube or cup fed (has the amount been increased appropriately?). • Mother sick so unable to come to every feed, orphan. • Structural abnormality e.g. cleft palate/lip • Persistent hypothermia due to low environmental temperature, which diverts energy from growth to heat production (may be a sign of underlying sepsis).
Small for Dates babies	Should not have any appreciable weight loss at all and they should start gaining weight early.

7.4 Kangaroo Mother Care

- Kangaroo mother care (KMC) is care of a small baby who is continuously carried in skin-to-skin contact by the mother/guardian and exclusively breastfed (ideally). It is the best way to keep a small baby warm and it also helps establish breastfeeding. KMC can be started in the hospital as soon as possible.
- Initiate Kangaroo Mother Care for all LBW babies less than 2,000g, continuous KMC for stable babies and intermittent KMC for sick babies.
- While the baby is recovering from an illness, the mother/guardian can begin to hold the baby in skin-to-skin contact for short periods of time (minimum of 1 hour at a time).
- Once the baby's condition is stable and the baby does not require special treatment (e.g. oxygen or IV fluid), the mother can begin continuous KMC.
- Before initiating KMC, counsel the mother on KMC. Ensure that the room is at least 25 °C.
- While the mother/guardian is holding the baby, describe to her each step of KMC, demonstrate them, and then allow her to go through the steps herself.
- Place the baby on the mother's chest: - Place the baby in an upright position directly against the mother's skin:
 - Ensure that the baby's hips and elbows are flexed into a frog-like position and the baby's head and chest are on the mother's chest, with the head in a slightly extended position.
- Place the baby on the mother's chest under the mother's clothes and cover with a pre-warmed blanket:
 - Use a soft piece of fabric (about 1 square metre), folded diagonally in two and secured with a knot. Make sure it is tied firmly enough to prevent the baby from sliding out if the mother stands, but not so tightly that it obstructs the baby's breathing or movement.
- After positioning the baby, allow the mother to rest with the baby, and encourage her to move around when she is ready.
- Provide counseling of benefit of KMC, newborn danger signs and general hygiene.
- Support the mother/guardian in putting and maintaining baby in KMC position.

7.4.1 KMC Discharge

Definition

When a KMC baby is discharged to continue KMC at home. This baby is still on KMC. Use the KMC readiness score chart.

NOTE: Where mother cannot manage follow up visits and there are no follow up services in the community delay discharge until the baby is at least 2000g.

- Give the appointment dates.
- Refer the baby to a follow up facility and link up with relevant HEW for community follow-up.

7.5 Vitamin supplements and iron for preterm babies:

Categories refer to very low birth weight

Supplement	Route	Timing and duration
Vitamin K National Guidelines	0.5mg in pre term neonates IM. 1mg in term neonates IM.	Birth
Multivitamin preparation	0.3-0.6ml (5-10 drops) /day (which usually provides vitamin A of 1000 IU/day and vitamin D 400.	When taking full feeds until 6 months.
Iron	Start iron supplements at 2 weeks of age if tolerating full enteral feeds at a dosage of 2–4 mg/kg per day until 6 months of age. Syrup usually contains 50mg iron in 5 mls or 10mg per ml so a 2 kg baby will get 0.5 mls.	2 weeks until 6 months

7.6 Apnoea prevention

- Babies with a birth weight of <1.5 kg or a gestational age <35 weeks are prone to apnoea and should be commenced on oral caffeine and monitored for apnoea. This is to prevent apnoea of prematurity.
- The loading dose of caffeine citrate is 20 mg/kg orally. A maintenance dose of 5 mg/kg per day should be prescribed 24 h later and can be increased by 5 mg/kg every 24 h to a maximum of 20 mg/kg per day, unless side-effects develop.
- Continue caffeine for 4 – 5 days after cessation of apnoea.
- Do not discharge a baby until he/ she has been apnoea-free for more than 7 days.

7.7 Key facts for providers– discharge of the LBW/preterm baby

A well LBW baby can be discharged when:

- S/he is fully breast fed or breast feeding supplemented by EBM by cup and gaining adequate weight for 3 consecutive days.
- Has not had apnoea for seven days.
- Is able to maintain normal body temperature outside the incubator.
- Mother is confident of taking care of the baby.
- Refer to KMC discharge sheet.

1. Write in the health passport:

- The birth weight and gestational age if known.
- Indicate if any problems in addition to LBW such as jaundice or sepsis.
- Ensure HIV exposure status is known and recorded in the passport.
- Ensure Vitamin K has been administered and recorded.
- Ensure oral polio BCG and Hep B has been received and recorded.

2. Follow-up schedule (at home or as close to home as possible):

- Scheduled visits for assessing growth and monitoring for illness.
- These visits should be at weekly intervals till the baby reaches 2.5kg weight.

3. Vaccinations in LBW/preterm babies:

If the LBW baby is not sick, the vaccinations schedule is the same as for term babies.

4. Counselling for care of LBW at home:

- Counsel on exclusive breast feeding, keeping baby warm and to seek health care early if they identify any of the danger signs in-between postnatal care visits. Ask the parent to repeat the danger signs so that you know they have remembered them.
- Inform mother about postnatal care visits.
- Inform mother about her own nutrition and health.

7.8. Follow- up

- Low birth weight babies have to be followed up in clinic weekly till when they reach 2.5kgs weight.
- Babies with a birth weight of < 1.5 kg, or who have had a complicated course, need a neurodevelopmental evaluation every 3 months for the first year of life.



8. MANAGEMENT OF BIRTH ASPHYXIA AT A DISTRICT HOSPITAL

Perinatal asphyxia is a common neonatal problem and contributes significantly to neonatal morbidity and mortality worldwide. Ninety percent (90%) of asphyxial insults occur in the antepartum or intrapartum periods as a result of lack of oxygen and/or perfusion to vital organs before during or immediately after birth. The initial effective treatment is resuscitation as above.

8.1 Babies at Risk of Birth Asphyxia

- Decreased blood flow from the placenta to the fetus:
 - ➔ Complicated labour
 - ➔ placental abruption
 - ➔ cord prolapse, cord entanglement, true knot, cord compression and abnormality of the umbilical vessel
- Impaired gas exchange across placenta or fetal tissues:
 - ➔ maternal hypertension (PIH or essential)
 - ➔ post maturity
 - ➔ maternal vascular disease
 - ➔ maternal diabetes
 - ➔ drug abuse
 - ➔ placental calcification, infarct or fibrosis.
- Increased fetal oxygen requirement:
 - ➔ as in fetal anaemia
 - ➔ fetal infection
 - ➔ IUGR.
- Impaired maternal oxygenation: as in maternal hypoxia due to pulmonary, cardiac or neurologic disease in the mother.
- Decreased blood flow from the mother to the placenta: as in maternal infection, shock, dehydration, hypotension and anaemia.

8.2 Post Resuscitation Management Of Asphyxiated Babies

8.2.1 Principles Of Management

The management consists of supportive care to maintain temperature, perfusion, ventilation and a normal metabolic state including glucose, calcium and acid-base balance. Early detection by clinical and biochemical monitoring and prompt management of complications must be done to prevent extension of cerebral injury.

- Temperature should be strictly maintained in the range of 36.5 – 37.0°C. Hypo- and Hyperthermia impose additional stress to the baby by increasing the metabolic needs.
- Oxygenation should be kept in the normal range by monitoring percent oxygen saturation (SO₂) by pulse oximetry. SpO₂ should be maintained between 90-93 %. Hypoxia should be treated with O₂. Hyperoxia should always be avoided.
- Blood glucose level should be kept within the normal range to provide adequate substrate for the brain. Hypoglycaemia should be managed as per guidelines.
- Monitor urine output if oliguric refer patient to next level if referral criteria is met.
- Check electrolytes at 24 hours; make sure that Potassium and Calcium are in the normal range. (If abnormal discuss with seniors) INFANTS

8.2.2 Common Problems After Birth

- Convulsions
- Apnoea: common after severe birth asphyxia; sometimes associated with convulsions. Resuscitate with bag and mask, and manage with oxygen by nasal prongs.
- Inability to suck or poor feeding: Feed with expressed breast milk via a nasogastric tube. Delayed emptying of the stomach, which may lead to regurgitation of feeds. It is necessary to monitor volume of gastric aspirates prior to every feeding.
- Poor motor tone: floppy or with limb stiffening (spasticity).

8.3 SARNAT Staging of Hypoxic Ischaemic Encephalopathy

	Grade I Mild	Grade II Moderate	Grade III Severe
Alertness	Hyperalert	Lethargy	Coma
Muscle tone	Normal or increased	Hypotonic	Flaccid
Seizures	None	Frequent	Uncommon
Pupils	Dilated, reactive	Small, reactive	Variable, fixed
Respiration	Regular	Periodic	Apnoea
Duration	< 24 Hours	2 - 14 Days	Weeks

8.4 Prognosis

Mild HIE, according to the scale, usually has a normal outcome, whereas in severe HIE the mortality rate is 75%, and most of the survivors have neurological sequelae.

8.5 Referral Criteria

Referral criteria on complex referrals (HIE - cooling) Severe Birth Asphyxia patients can be referred for cooling if they meet the following criteria:

- Gestational age more than 37 weeks
- Able to arrive in referral hospital within 6 hours post-delivery.
- Apgar below 5 in 10 minutes
- Signs of neurological damage

NB: Referral to be done always in consultation with referral hospital.



9. NEONATAL INFECTIONS

9.1 Management of Neonatal Sepsis

Definition

Systemic bacterial infection in the neonate.

Symptoms:

- Fever > 38°C
- Grunting respirations & Severe chest in-drawing
- Central Cyanosis
- Abdominal distension
- Floppy baby
- Convulsions
- Poor feeding
- Irritability
- Apnoeas
- Seizures
- Hypothermia
- Body stiffness
- Tachycardia
- Symptoms of respiratory distress.

NB: However, most symptoms are non-specific.

Management

- Do a rapid assessment (ABC).
- Take blood sample for Haemoglobin & Blood culture, FBC, blood glucose.
- Do a lumbar puncture when signs of meningitis are present.
- Treat with antibiotics immediately for at-least 7 days.
- Benzyl Pen 50,000-100,000 IU/ Kg iv 12 hourly and Gentamycin 5mg/Kg iv once daily.
- If not improving in 2-3 days:
 - ➔ Check culture results or consider changing antibiotics depending on the results.
 - ➔ Do blood culture if it was not done.
 - ➔ Switch to 2nd line antibiotics Ampicillin and Amikacin.
- Check blood glucose - If there is hypoglycaemia, manage according to the hypoglycaemia protocol.
- If there are signs of skin infection, (Staphylococcal infection), treat with cloxacillin 12.5 – 25mg /Kg IV 6 hourly for 7 days. Can be given orally if the baby is clinically stable.
- Monitor the baby every 15 minutes until the baby is stable, and thereafter every 30 minutes for 1 to 2 hours there after hourly. If the condition is still stable, monitor 4 hourly.

NB: For the district hospital, refer to next level if no improvement after 5 days.

9.2 Management of Neonatal Meningitis

Definition

Infection of the meninges of the brain. In neonates, the common causes are Group B Streptococcus and coliforms-E coli.

Signs and Symptoms

- Fever
- Convulsions
- Bulging fontanelle
- Lethargy
- Irritability
- High pitched cry
- Generalised signs of infection
- Apnoeas
- Poor feeding.

Diagnosis

Do lumbar puncture and CSF analysis for all babies suspected of having meningitis except if there is severe respiratory distress, the lumbar skin is infected, there is bleeding tendency, or hemodynamically unstable.

Management

- Start antibiotics immediately after doing a lumbar puncture.
- First line: Ceftriaxone 80mg/kg stat then 50mg/kg once daily plus Ampicillin 50mg/kg/ 6 hourly. Avoid fluid overload which will accelerate cerebral oedema. Give maintenance fluids (See the fluid guideline).
- If convulsing manage accordingly refer to page 13.
- Give oxygen if desaturating.
- For unconscious babies:
 - ➔ Maintain open airway.
 - ➔ Prevent pressure sores.
 - ➔ Maintain food intake by NGT if necessary.
 - ➔ Clean the mouth well with saline swab.
 - ➔ Prevent sensory over stimulation (noise, smell, light, etc).

Follow-up

- Babies who have had neonatal meningitis have a higher risk of developing neurological sequelae.
- 3 monthly follow-up in the first year of life where neurodevelopmental assessments are done.

9.3 Conjunctivitis

9.3.1 Sticky Eyes And Mild Conjunctivitis

- Treat as outpatient if child has no other serious problem.
- Show the mother how to wash the eyes with water or breast milk and how to put ointment into the eyes. The mother must wash her hands before and after doing so.
- Tell the mother to wash the eyes and put in tetracycline eye ointment four times a day for 5 days.
- Review 48 hours after starting treatment if the child is not improving treat as for severe conjunctivitis.

9.3.2 Ophthalmia Neonatarum

Definition

Infection and inflammation of the conjunctiva of the eye. The infection is acquired during delivery and most commonly due to gonococci. The eyes are swollen, red, eye lids are tender and have thick yellow pus.

Management

- Treat as in-patient
- Isolate and monitor the baby
- Wash the eyes with Normal saline 2 hourly until the discharge is eliminated
- Start antibiotics, give Ceftriaxone 50 mg/ Kg im stat then Erythromycin 12.5mg/kg orally 6 hourly for 7 days.
- Give 1% Tetracycline eye ointment (TEO) 6 hourly OR erythromycin eye ointment tds.

NB: At district level, refer baby for specialised care if baby not responding to treatment or complications arise.

9.4 Management of Congenital Syphilis at a Hospital

Definition

Syphilis infection acquired in-utero.

Commonly contributes to pre-term births and low birth weight.

Clinical Signs

- Asymptomatic
- Red rash, grey patches, blisters or skin peeling on palms and soles
- Snuffles: Rhinitis with nasal obstruction
- Abdominal distension
- Hepatosplenomegaly, Jaundice
- Anaemia
- Babies have signs of severe sepsis

Diagnosis

Do RPR test on mother and / or neonate if clinical suspicion, unexplained premature labour or IUGR.

Management

Asymptomatic neonates born from RPR positive mothers:

- Start Benzathine Penicillin 50,000 IU/ Kg IM stat.

Symptomatic neonates:

- Start Benzyl-Penicillin 50,000IU / Kg IV 12 hourly for the first 10days uninterrupted
- OR Erythromycin syrup 12.5mg /Kg 6 hourly for 30 days.

Treat the mother and partner/s with Benzathine-Penicillin 2.4 Mega units IM stat.

Check HIV and Hep B status for the parents.

9.5 Infection Of The Umbilicus

- The umbilicus usually separates one week after birth, and the wound heals within 15 days. Until the wound is healed, this is an important entry point for infection, which can quickly lead to sepsis.
- Early recognition and treatment of an infected umbilicus are essential to prevent sepsis.
- Observe strict infection prevention practices at all times to prevent spreading one baby's infection to other babies in the nursery.

9.5.1 Local Infection Of Umbilicus

- Wearing clean examination gloves:
 - ➔ Wash the umbilicus using soap and water.
 - ➔ Swab the umbilicus and the area around alcohol and leave it to dry.
 - ➔ If the area of redness and swelling extends more than 1 cm beyond the umbilicus, treat for severe infection.

9.5.2 Management Severe Infection Of Umbilicus

- The baby's umbilicus is swollen, draining pus, or foul smelling (infected).
- The skin around the umbilicus is red and hardened- extending more than 1cm beyond the umbilicus.
- Treat with IV/IM antibiotics or oral Augmentin.
- Provide general care as described for a local infection of the umbilicus.

9.6 Management Of Baby After Premature Rupture of Membranes (PROM), Maternal Pyrexia In Labour And Maternal Uterine Infection

- Take history to find out when membranes were ruptured.
- Thorough examination of the baby including vital signs to determine signs of infection.
- Any neonate with signs of infection, treat according to neonatal sepsis protocol.
- If drainage of liquor for more than 18 hours or foul smelling liquor, give the baby antibiotics (Benzyl penicillin and Gentamicin) for 7 days.

9.7 Management of Baby Born Following Offensive Vaginal Discharge

- Administer stat dose of chloramphenicol/tetracycline eye ointment both eyes.
- Suspect sexually transmitted infection.
- Take proper history of the mother.
- Can cause a severe conjunctivitis with thick yellow pus and eyelid oedema (ophthalmia neonatorum) and may lead to corneal perforation if not treated.
- Counsel parents and treat according to STI protocols.
- Ascertain exposure status to HIV, HEP B and syphilis.

9.8 Management of HIV Exposed Baby at All Levels of Care

(Refer to the PMTCT Guidelines)



10. COMMON NEONATAL CONDITIONS

10.1 BREATHING DIFFICULTIES

10.1.1 Common Causes:

- Primary lung problem:
 - ➔ Respiratory Distress Syndrome (RDS)
 - ➔ Meconium aspiration
 - ➔ Bacterial pneumonia
 - ➔ Transient tachypnoea of the newborn (TTN).
- Non-pulmonary:
 - ➔ Hypovolemia/hypotension
 - ➔ Congenital heart disease
 - ➔ Hypoxia, acidosis
 - ➔ Hypo- and hyperthermia,
 - ➔ Anaemia,
 - ➔ polycythaemia, pain.
- Obstructive/restrictive: mucous, choanal atresia, pneumothorax, diaphragmatic hernia.

10.1.2 Signs And Symptoms

- Fast breathing- respiratory rate of more than 60 breaths per minute
- The baby's respiratory rate is less than 30 breaths per minute
- Grunting
- Chest in drawing
- Nasal flaring
- Cyanosis
- Desaturation
- Apnoea
- Other breathing sounds.

10.1.3 Newborns At Risk Of Developing Breathing Problems

- Preterm babies
- Babies with birth asphyxia
- Babies of Diabetic Mothers
- Babies born by Caesarean Section
- Babies born to mothers with fever, Prolonged ROM, foul-smelling amniotic fluid
- Meconium aspiration.
- Congenital abnormalities.

10.1.4 Management

- Clear airway if necessary
- Give Oxygen via nasal cannula 0.5-1 litre per minute
- Give antibiotics (Benzyl Penicilin 50,000 IU/ Kg intravenous or intramuscular 12 hourly and Gentamycin 5mg/Kg once daily intravenous or intramuscular) if persistent respiratory distress after 6 hours of age
- Identify and treat underlying cause
- Monitor condition for improvement
- Feed via a NGT if the baby is in respiratory distress.

10.2 APNOEA

Definition

Cessation of breathing for longer than 20 seconds.

Babies at risk of Apnoea:

- Preterm
- Respiratory Distress
- Perinatal Compromise
- Infections
- Hypoglycaemic
- Hypothermia babies who are being warmed
- Central Nervous System disorders
- Low Blood volume or low Hematocrit
- Maternal drugs in labor (need to discuss with obstetricians on pain management during labor.)
- Neonatal drugs e.g. sedatives
- Metabolic Disorders

Treatment

- Resuscitate refer to the resuscitation algorithm

Determine cause and treat

- X-Ray
- Blood Sugar
- Body And Environmental Temperature
- Hematocrit
- Sepsis Work Up
- Electrolytes
- Clinical Cardiac Assessments
- Rule Out A Seizure
- Apnoea Of Prematurity
- Caffeine For Prevention Of Apnoeas

10.3. NEONATAL HYPOGLYCAEMIA

Definition

Blood glucose level which is below 2.8 mmol/L.

Signs and Symptoms

May not be obvious in newborn but common symptoms are:

- Restlessness
- Irritability
- Lethargy
- Convulsions
- Pale skin
- Apnoea
- Grunting
- Sweating
- Low body temperature
- Poor feeding
- Vomiting

Note: Admit to neonatal unit all babies with birth weight of over 4kg and those from diabetic mothers for closer monitoring and assessment of hypoglycaemia.

Chart 2: Management of a baby with blood glucose of 1- 2.8 mmol/l and NOT symptomatic

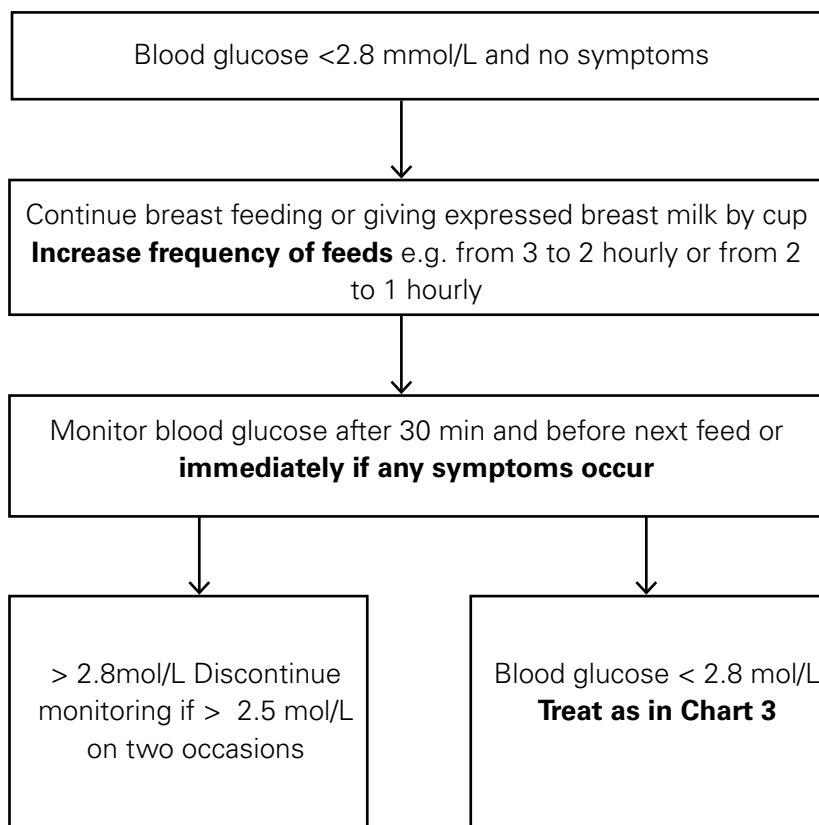
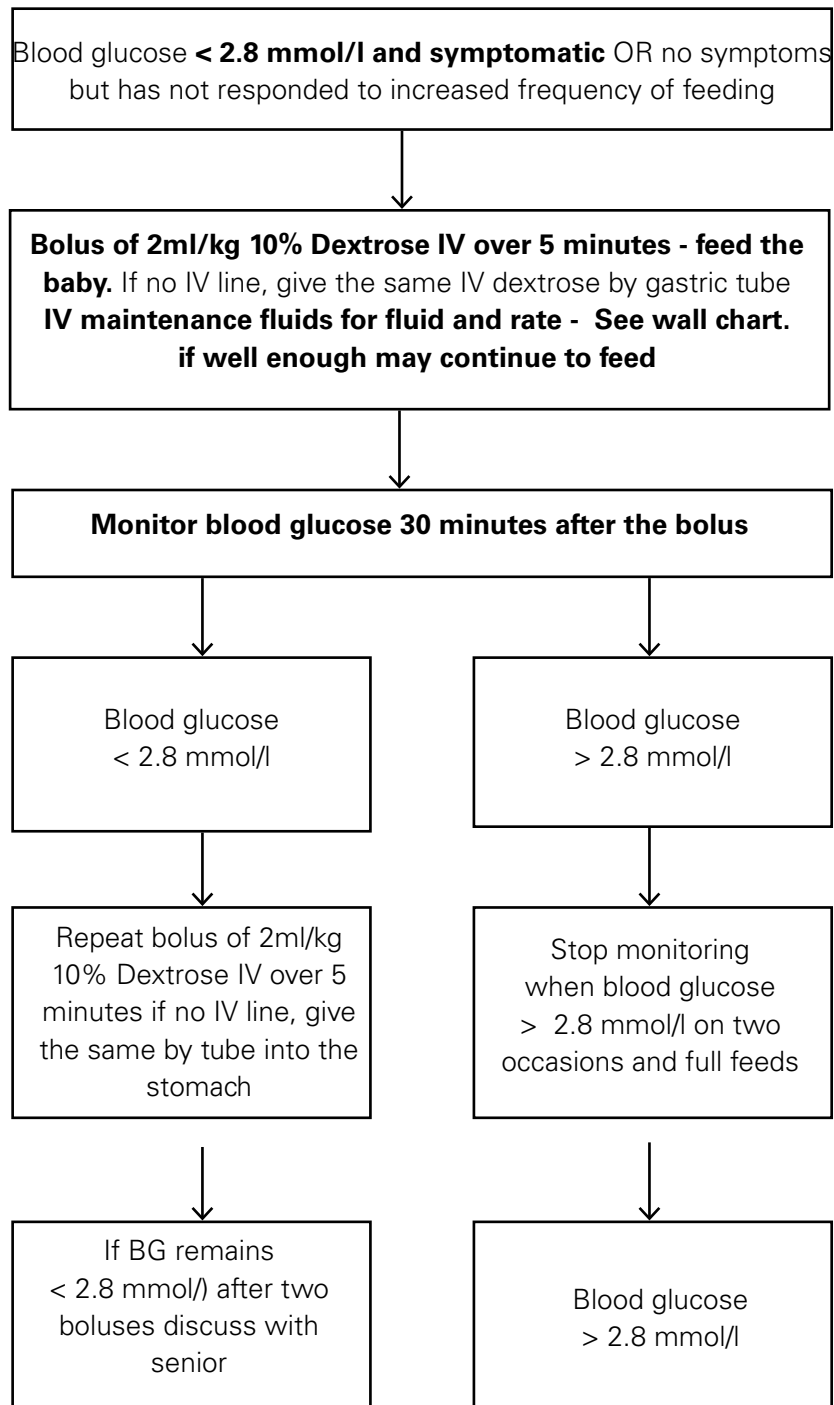


Chart 3: Management of a baby with blood glucose of less than < 2.8 mmol/l and symptomatic or Blood glucose of < 1 mmol/l



10.4 NEONATAL JAUNDICE

Definition

Yellow colouring of the skin and sclera (white part of the eyes).

- Occurs in 60% of term and 80% of preterm neonates

Babies that are at risk:

- LBW babies
- Preterm babies
- Presence of haemolysis
- Septic babies
- Babies poorly fed
- Babies with haematomas and extensive bruising
- Blood incompatibility.

Classification

- Divided into physiological and pathological jaundice.

10.4.1 Physiological (Normal)

Characteristics

- Appears after 24 hours
- Maximum intensity by 4th-5th day in term & 7th day in preterm.
- 97 % of babies with physiological jaundice will not need phototherapy.
- Serum level less than 220 micro mls for term and 255 for preterm babies.
- Clears within 10 days in a term baby, and 14 days in a preterm baby.
- No danger signs.

Management at home

- Can be managed at home.
- Should be followed up postnatally at 72 hours and day 6 of life.
- Encourage exclusive breastfeeding.
- Explain the condition of the neonate to the Mother (Guardian).
- Health education given to mother should include:
 - o To return if jaundice does not resolve by two weeks of age
 - o If condition worsens or danger sign(s) appear.

Note: Baby should however be watched for worsening/persistent jaundice.

10.4.2 Pathological (Abnormal)

- Appears within 24 hours of age
- Increase of bilirubin $> 87 \mu\text{mol/l}$ / day

- Serum bilirubin > 260 µmol /l
- Jaundice persisting after 14 days in term babies and 21 days in preterm babies
- Stool pale / white colored, urine dark coloured.

Management

- Take history on the following:
 - ➔ Onset of symptoms
 - ➔ Previous history of jaundiced baby
 - ➔ Blood group and Rhesus factor of mother
 - ➔ Maternal malaria
 - ➔ Maternal infections (TORCHES)- prolonged jaundice
- Carry out laboratory tests as below
- Encourage exclusive breast feeding or expressed breast milk by cup or through NGT
- Begin Phototherapy according to the table below.

Investigations for abnormal jaundice

The investigations depend on the probable diagnosis and what tests are available but may include:

- Haemoglobin or packed cell volume
- Full blood count and CRP to identify signs of serious bacterial infection
- Blood type of baby and mother and Coombs test if blood incompatibility is suspected
- Syphilis serology - RPR
- Thyroid function tests - in prolonged jaundice after day 7, liver function tests, liver ultrasound if biliary atresia is suspected.

Table 2: When to Start Phototherapy

Day of Life	Phototherapy		Referral for exchange transfusion	
	Healthy baby > 35 weeks gestation	Preterm <35 weeks/LBW/ sick	Healthy baby. > 35 weeks gestation	Preterm <35 weeks/LBW/ sick
Day 1	Treat any visible jaundice with phototherapy		260 µmol/l	220 µmol/l
Day 2	260 µmol/l	170 µmol/l	425 µmol/l	260 µmol/l
Day 3	310 µmol/l	260 µmol/l	425 µmol/l	340 µmol/l
Day 4 and thereafter	340 µmol/l	290 µmol/l	425 µmol/l	340 µmol/l

NB: Babies being referred for exchange transfusion should be put on triple phototherapy and this should be continued during transfer.

- ➔ Stop phototherapy when the bilirubin level is more than 50 µmol/l below the threshold shown in the above table.
- ➔ If jaundice is not managed effectively it can lead to kernicterus. This must be prevented at all cost.

Definition

Abnormal accumulation of bilirubin in the brain and other nerve tissues causing yellow staining and tissue damage.

Babies at Risk:

- Preterm, Septic Babies, Birth Asphyxia, Blood Incompatibility Babies.

Signs and Symptoms

These can further be divided into characteristic signs and symptoms that appear in the early stages (acute) and those that evolve over a prolonged period (chronic).

Acute Phase

This phase has 3 stages as follows:

- **Phase 1 (first few days of life):**
 - ➔ Decreased alertness
 - ➔ Hypotonia,
 - ➔ Poor feeding are the typical signs.

Obviously, these are quite nonspecific and could easily be indicative of a multitude of neonatal abnormalities. A high index of suspicion at this stage that leads to prompt intervention can halt the progression of the illness, significantly minimizing long-term sequelae.

- **Phase 2 (variable onset and duration):**
 - ➔ Hypertonia of the extensor muscles,
 - ➔ Retrocollis (backward arching of the neck),
 - ➔ Opisthotonus (backward arching of the back)
 - ➔ High pitched cry
 - ➔ Irritability
- **Phase 3 (infants aged >1 wk):**
 - ➔ Stupor or coma
 - ➔ No feeding
 - ➔ Shrill cry
 - ➔ Muscle rigidity, markedly arched back with neck hyperextended backwards
 - ➔ Seizures

Chronic bilirubin encephalopathy

- The clinical features of chronic bilirubin encephalopathy evolve slowly over the first several years of life in the affected infant.

- The clinical features can be divided into phases;
 - o First year: hypotonia, hyperreflexia, obligate tonic neck reflexes, delayed acquisition of motor skills
 - o After first year: movement disorders (choreoathetosis, ballismus, tremor), upward gaze, sensorineural hearing loss. Minor intellectual deficits

Management

- Continue or commence triple phototherapy
- If convulsing manage according to protocol
- Continue monitoring bilirubin levels and arrange for referral.
- Counsel the family about the condition of the neonate; prognosis and how to deal with the various conditions that may develop.
- Long term follow up once discharged

10.4.4 Prolonged jaundice

Jaundice lasting for more than 10 days in a term baby or two weeks in a preterm baby.

Management of Prolonged Jaundice

- Investigate for causes of prolonged jaundice.
- If the baby's stools are pale or the urine is dark, organize transfer and refer the baby to a tertiary hospital or specialized centre for further evaluation.
- If the mother tested positive for syphilis, treat for congenital syphilis

10.5. ABNORMAL BODY TEMPERATURE

- Low body temperature (hypothermia) may be caused by exposure to a cold environment (low ambient temperature, cold surface, or draught), or the baby may be wet or under-dressed for age and size.
- Elevated body temperature (hyperthermia) may be caused by exposure to a warm environment (e.g. high ambient temperature, sun exposure, or overheating by an incubator or radiant warmer). Hypothermia and hyperthermia may also be signs of illness, such as sepsis.

10.5.1 Hypothermia

- Hypothermia defined as a temperature below 36.5 degrees Celsius.
- Breathing difficulty
- Heart rate less than 100 beats per minute
- Poor or no feeding
- Lethargy
- Hardened skin
- Slow, shallow breathing

Management of Hypothermia

- Put the baby immediately skin to skin.
- Remove cold or wet clothing, if present. Dress the baby in warm clothes and a hat, and cover with a warm blanket.
- Treat for sepsis,
- Measure blood glucose. If the blood glucose is less than 2.6mmol/l, treat for hypoglycaemia.
- Assess the baby:
 - ➔ Look for emergency signs (i.e. respiratory rate less than 20 breaths per minute, gasping, not breathing, or shock).
 - ➔ Measure the baby's temperature every hour:
 - ➔ If the baby's temperature is increasing at least 0.5 °C per hour over the last three hours, rewarming is successful;
 - ➔ Continue measuring the baby's temperature hourly;
 - ➔ If the baby's temperature does not rise or is rising more slowly than 0.5 °C per hour, ensure that the temperature of the warming device is set correctly.
 - ➔ If the baby has signs of respiratory distress treat for breathing difficulty.
 - ➔ Assess readiness to feed until the baby's temperature is within the normal range.
 - ➔ If the baby shows signs of readiness to suckle, allow the baby to begin breastfeeding
 - ➔ If the baby cannot be breastfed, give expressed breast milk using an alternative feeding method.
 - ➔ If the baby is not able to feed at all, give expressed breast milk by gastric tube once the baby's temperature reaches 35 °C.
 - ➔ Once the baby's temperature is normal, measure the temperature every three hours for 24 hours.
- Advise the mother how to keep the baby warm

10.5.2 Hyperthermia

- Body temperature more than 37.5 °C
- Signs of dehydration (sunken eyes or fontanelle, loss of skin elasticity, or dry tongue and mucous membranes)
- Poor or no feeding
- Respiratory rate consistently more than 60 breaths per minute
- Heart rate more than 160 beats per minute
- Lethargy
- Irritability

Management of Hypothermia

- Do not give antipyretic drugs to reduce the baby's temperature.
- If the baby has signs of respiratory distress treat for breathing difficulty
- If the hyperthermia is due to overwarming under a radiant warmer or in an incubator:
 - ➔ Reduce the temperature setting of the warming device.
 - ➔ If the baby is in an incubator, open the incubator portholes until the temperature of the incubator is within the normal range.
- Undress the baby partially or fully for 10 minutes, then recheck the temperature.
- Observe for signs of sepsis (e.g. poor feeding, vomiting, breathing difficulty) and repeat when the baby's temperature is within the normal range.
- Measure the baby's temperature every hour.
- If the baby's temperature is more than 39 °C:
 - ➔ Sponge the baby or give the baby a bath for 10 to 15 minutes in water that is about 4 °C lower than the baby's current temperature.
 - ➔ Do not use cold water or water that is more than 4 °C lower than the baby's temperature;
- Measure the baby's temperature every hour.
- If the baby's temperature is still abnormal after two hours, treat for sepsis.

Ongoing Management of Hypothermia

- Ensure that the baby receives adequate food or fluid.
- Allow the baby to begin breastfeeding. If the baby cannot be breastfed, give expressed breast milk using an alternative feeding method.
- If there are signs of dehydration (sunken eyes or fontanelle, loss of skin elasticity, or dry tongue or mucous membranes) manage accordingly.
- Measure blood glucose. If the blood glucose is less than 45 mg/dl (2.8 mmol/l), treat for low blood glucose.
- Once the baby's temperature is within the normal range, measure the baby's temperature every three hours for 24 hours.
- If the baby's temperature remains within the normal range continue with routine monitoring.

10.6. VOMITING AND ABDOMINAL DISTENSION

- Spitting or regurgitation of small quantities of milk after a feed is common in a newborn baby, is usually transitory, and has no effect on growth.
- It is necessary to differentiate between vomit and regurgitation. Regurgitation is normal, but persistent and large regurgitation may indicate Gastro Oesophageal Reflux Disease.
- A single incidence of vomit is not necessarily pathological. Feeding should continue as normal under close supervision. Repeated vomiting must be referred and managed.
- Vomiting is problematic if it:
 - ➔ Is forceful
 - ➔ Occurs regardless of method of feeding
 - ➔ Involves vomiting entire feedings after every feed
 - ➔ Contains bile or blood.
 - ➔ Occurs in a baby who has abdominal distension
- Look for:
 - ➔ Abdominal tenderness (baby cries when abdomen is gently pressed)
 - ➔ Imperforate anus.

Table 3: Causes of Vomiting

History	Examination findings	Probable Diagnosis
- Time of onset day 1 or later - Maternal uterine infection - Maternal pyrexia fever in labour to 3 days after birth, - PPRM - Poor or no feeding after having fed well	• Baby looks ill • Vomiting • Abdominal distension • Breathing difficulty • Abnormal body temperature • Irritability or lethargy • Convulsions or unconsciousness	Suspected sepsis
- Has not passed meconium within 24 hours after birth - Baby coughing and choking at every feed since birth - Time of onset day 1 to 2	- Gastric tube does not pass or tip of tube returns • Increasing abdominal distension • Bile in vomitus • Dark or bloody stools	Suspected gastrointestinal malformation or obstruction
-Poor or no feeding -Asphyxia	• Floppiness or lethargy • Baby looks ill • Abdominal distension, tenderness • Preterm or LBW • Blood or bile in vomitus • Blood or mucus in stool • Diarrhoea • Pallor • Progressive signs of ill health (temperature instability and/or apnoea)	Suspected necrotizing enterocolitis
• If mother had a serologic test for syphilis during pregnancy, it was positive • Mother not treated or treated inadequately for syphilis • Time of onset- at birth	- Generalized oedema (body swelling) • Abdominal distension (from enlarged liver and/or spleen or from fluid in abdomen) • Blistering skin rash on palms and soles • Profuse nasal discharge ("snuffles")	Possible congenital syphilis
- Mother breastfeeding with cracked nipples (time of onset day 2 or later) - Maternal bleeding during labour or from episiotomy (time of onset day 1 or 2)	• Blood in vomitus • Dark stools • Baby looks otherwise well	Swallowed maternal blood

10.6.1 General management of babies with vomiting and abdominal distension

- Insert a naso-gastric tube
- Do an X-ray with the tube *in situ*
- If the gastric tube does not pass or the tip of the tube returns and the baby is choking and vomiting immediately after swallowing, the baby likely has esophageal atresia or tracheo-esophageal fistula, and urgent surgery is necessary. Urgently refer the baby to a tertiary hospital or specialized centre for surgery.
- If the gastric tube passes, confirm that the tube is properly positioned in the stomach, and aspirate the stomach contents.
- If the baby appears to be seriously ill (e.g. floppy and lethargic) or small (less than 2.5 kg at birth or born before 37 weeks gestation), establish an IV line, and give IV fluid at maintenance volume according to the baby's age.

10.6.2 Specific management for conditions causing vomiting and/or abdominal distension in a neonate

10.6.2.1 Necrotizing Enterocolitis

- Manage ABC
- Stop all feeds
- Establish an IV line and give only IV fluid with 10% dextrose refer to the fluid guideline
- Treat for sepsis with Benzyl-penicillin, gentamicin and metronidazole
- Insert a gastric tube and ensure free drainage
- Refer to a tertiary hospital.

10.6.2.2 Suspected Gastrointestinal Malformation Or Obstruction

- Manage ABC
- Stop all feeds
- Establish an IV line and give only IV fluid with 10% dextrose
- Insert NGT and ensure free drainage
- Organize transfer, and urgently refer the baby to a tertiary hospital.

10.6.2.3 Swallowed Maternal Blood/Meconium

- If vomiting is caused by blood swallowed during breastfeeding (cracked nipples):
 - ➔ Observe the mother while she breastfeeds. Assess her technique and suggest changes as necessary.
 - ➔ If breastfeeding is painful for the mother, encourage the mother to:
 - Express some breast milk to stimulate the milk let down reflex before putting the baby to her breast;
 - Begin to nurse on the side that is less sore until the let-down occurs, then switch the baby to the affected breast.
 - ➔ Express a little milk or colostrum onto her nipples after breastfeeding.
 - ➔ Expose her nipples to the air to prevent maceration and promote healing.
 - ➔ If cracking is severe on only one nipple, have the mother breastfeed on the other side exclusively for two or more days while the affected nipple heals. During this time she can express the breast milk of the affected breast and feed this to the baby using an alternative feeding method. In HIV positive mothers do not use expressed milk from the cracked nipple up until the nipple has healed.
 - ➔ If the baby is feeding well and there are no other problems requiring hospitalization, discharge the baby.

- If vomiting is caused by blood swallowed at the time of birth:
 - ➔ Attach a syringe to the gastric tube and aspirate the stomach contents; do a stomach wash out with normal saline.
 - ➔ Allow the baby to begin breastfeeding. If the baby cannot be breastfed, give expressed breast milk using an alternative feeding method.
 - ➔ Remove the gastric tube after two successful feeds.
 - ➔ If the baby is feeding well and there are no other problems requiring hospitalization, discharge the baby.



11. NEONATAL TETANUS

- Tetanus in the newborn infant (tetanus neonatorum) is caused by the bacterium, *Clostridium tetani*, which infects dead tissues such as the umbilical cord.
- *Clostridium tetani* usually occurs in soil and faeces, which is sometimes placed on the cord or other wounds as a traditional practice. It produces a powerful toxin that affects the nervous system. A newborn baby is infected when contaminated material is put on the umbilicus.

11.1 Clinical Features Of Tetanus

There may be a history of soil or powder having been placed on the cord as a traditional practice. The baby presents with:

- Inability to suckle and stiffness
- There is a typical appearance of the mouth during a spasm
- Increased muscle tone, especially of the jaw muscles and abdomen.
- The baby's back may arch backwards (oposthotonus) during a spasm.
- The generalised muscle spasms or "convulsions" are often precipitated by stimulation such as handling or loud noises.
- Respiratory failure and death in untreated infants, due to spasm of the respiratory muscles.

11.2 Management of neonatal tetanus

Prevention

- Good cord care
- Immunizing all pregnant women with tetanus toxoid vaccine (TTV).

The emergency treatment of tetanus consists of:

1. Keeping the airway clear and giving oxygen.
2. Not stimulating the infant.
3. Stop the spasms with diazepam 0.25-1 mg/kg 4 - 8 hourly intravenously or rectally, repeatedly until the spasms stop.
4. Benzyl penicillin 100 000 u / kg IV 12 hourly for 10 days.
5. Support nutrition consider NGT feed
6. Refer to a tertiary facilit
7. Notification is essential - contact the IDSR focal person.



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