

NATIONAL GUIDELINES FOR NEWBORN CARE

VOLUME III

- Neonatal seizures
- Post-resuscitation management of an asphyxiated neonate
- Anaemia and bleeding in neonates
- Neonatal shock
- Communication in newborn care
- Emergency triage assessment and treatment (ETAT)
- Neonatal transport
- Newborn care in the field setting

MINISTRY OF HEALTH
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Family Health Bureau



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Family Health Bureau



World Health
Organization



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Statement of Intent

The main purpose of these guidelines is to improve the quality of clinical care provided by the health care providers at all levels. These parameters of practice should be considered recommendations only. The ultimate judgment regarding a particular clinical procedure or a treatment plan must be made by the clinician in light of the clinical data gathered from the patient and the diagnosis and treatment options available.

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Preface

As the year 2015 is around the corner, we are focusing our attention on reaching targets beyond the Millennium Development Goals and the goals set by the Every Newborn Action Plan of 2014. This national guideline on neonatal care is very well timed as a greater emphasis is being given for improving the quality of neonatal care services for further reduction of neonatal morbidity and mortality in Sri Lanka. Some of the guidelines are adopted from SAARC Development Fund Facility Based Care of the Sick Newborn training guidelines and some sections include newly developed guidelines. This is an attempt to improve the quality and uniformity of clinical care with efficiency, cost effectiveness and accountability.

I highly appreciate the contribution made by the Consultant Paediatricians and Consultant Neonatologists from the Sri Lanka College of Paediatricians and Consultant Community Physicians of the Family Health Bureau in adopting and developing these guidelines. Further these guidelines have been developed considering the national policy, strategies and standards as well as facilities and resources available in the country. As such this set of guidelines are national guidelines for the conditions described.

Dr P.G. Mahipala

Director General of Health Services,
Ministry of Health,
Sri Lanka.

Message from the President of Sri Lanka College of Paediatricians

Sri Lanka emerged from a 30 year old war in 2009 and five years have elapsed since then. It is not late even today to plan for long term development of the health sector like roads and townships. The health service also has improved but not clearly in a planned manner.

Our Neonatal Mortality Rate has declined to be around 5.9/1000 live births. Yet it accounts for over 70% of under 5 mortality of our children. Global average contribution of neonatal mortality to under 5 mortality is 45%. Therefore it is appropriate that we focus on improving neonatal care. Care of the preterm remains a serious challenge. 12% still die of perinatal asphyxia. 20% of deaths are due to congenital abnormalities. Sepsis remain a serious threat to even healthy term low risk babies discharged from the hospital. This is despite a lot of effort put into training of human resources and improving infrastructure. Focusing on the neonate specifically in these areas is a priority which cannot be postponed.

Simple interventions like preconception folic acid, antenatal corticosteroids for preterm delivery, preventing inadvertent oxygen administration and using a pulse oxymeter for neonatal resuscitation, delayed cord clamping, delivery onto abdomen of the mother, using plastic bags for preterm babies, preventing hypothermia, simple inflation and ventilation breaths by the midwife or nurse in unexpected situations, passive head cooling for asphyxia, promotion of exclusive breast feeding on demand could be practiced in low resource settings. Truth is these simple interventions will reduce our NMR further if the coverage could be improved to over 90%.

A team of Consultant Paediatricians, Consultant Neonatologists and Consultant Community Physicians have been working on these newborn care guidelines for several months. These guidelines for newborn care will go a long way to bring uniformity in standards of

neonatal care across the country. The health care providers in different parts of this country should be able to care for newborns in the same way using the best standards of care where ever they are. These newborn care guidelines will help them in doing so. It is not difficult, especially to provide basic care and reduce morbidity and mortality using these guidelines even in a low resource setting.

I express my sincere gratitude towards all who worked hard to publish this and congratulate the FHB and the team for their achievement. I am certain that, this booklet will go a long way to reduce mortality and both short and long term morbidity of newborns in Sri Lanka.

Prof Sujeewa Amarasena

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Content Page

	Page
Preface	iii
Message from the President of Sri Lanka College of Paediatricians	iv
Guideline development committee	vi
List of abbreviations	xi
List of tables and figures	xiii
Disclaimer	xiv
Introduction	xv
Chapter 10	
Neonatal Seizures	3
10.1 Introduction	3
10.2 Common types of neonatal seizures	3
10.3 Diagnostic approach	5
10.4 Stepwise treatment of a neonate with seizures	5
10.5 When to discontinue anti-convulsant drugs	7
Chapter 11	
Post-resuscitation management of the asphyxiated neonate	13
11.1 Introduction	13
11.2 Definition of asphyxia	13
11.3 Grading of severity of hypoxic ischaemic encephalopathy	14
11.4 Clinical presentation	15
11.5 Initial stabilization and management	16
11.6 Therapeutic hypothermia	18
11.7 Monitoring	19

11.8	Poor prognostic factors	20
11.9	Post discharge & follow up advice	20
Chapter 12		
Anaemia and Bleeding in Neonates		25
12.1	Introduction	25
12.2	Neonatal Anaemia	25
12.3	Anaemia of prematurity	26
12.4	Causes of anaemia	26
12.5	Approach to a baby with anaemia	27
12.6	Management of anaemia	27
12.7	Bleeding neonate	31
Chapter 13		
Neonatal Shock		35
13.1	Introduction	35
13.2	Identification of Shock	35
13.3	Classification of shock based on aetiology	37
13.4	Management	38
13.5	Therapeutic end points	41
13.6	Unresponsive shock	41
13.7	When to refer	42
Chapter 14		
Communication in Newborn Care		45
14.1	Introduction	45
14.2	Principles and forms of communication	45
14.3	Types of information to be provided in a Neonatal Unit	45
14.4	Principles of communication	46
14.5	Levels of Communication in Neonatal Care	47

14.5.1	Communication antenatally	47
14.5.2	Communication at the time of admission to the Neonatal Unit	48
14.5.3	Communication during the course of stay	49
14.5.4	Communication in case of death	50
14.5.5.	Communication on discharge	51
14.5.6	Communication at the time of referral to a higher centre	51
Chapter 15		
Emergency Triage Assessment and Treatment (ETAT)		55
15.1	Introduction	55
15.2	Process & steps of management of sick neonates	55
15.3	How to Triage	58
15.4	Assessment of state of consciousness	60
15.5	Post triage and stabilization	60
Chapter 16		
Neonatal Transport		63
16.1	Introduction	63
16.2	Types of transfer	63
16.3	Identify babies who need referral	63
16.4	Preparation & organization of transport	64
16.5	Counselling and support to the family	65
16.6	Pre referral stabilization and enroute care	66
16.7	Documentation and handover	69
16.8	Neonatal transport in Sri Lanka	69

Chapter 17

Newborn Care in the Field Setting 73

17.1	Introduction	73
17.2	Postnatal care model in Sri Lanka	74
17.3	Responsibilities of the public health midwife (towards newborn)	75
17.3.1	At the first and second home visits within first 10 days post-partum	75
17.3.2	At third home visit within day 11-21 postpartum	79
17.3.3	At the home visit around 42 days of the newborn	81
17.4	Field postnatal clinic	81

List of Abbreviations

ACD	– Anti convulsant drugs
APLS	– Advanced Paediatric Life Support
BCG	– Bacillus Calmette Guerin
CHDR	– Child health and development record
CNS	– Central nervous system
CPAP	– Continuous positive airway pressure
CRP	– C-reactive protein
CRT	– Capillary refilling time
CSF	– Cerebro spinal fluid
DAT	– Direct antibody test
DBA	– Diamond-Blackfan Anaemia
DCT	– Direct Coomb’s test
DIC	– Disseminated intravascular coagulation
EBM	– Expressed breast milk
EEG	– Electroencephalogram
ETAT	– Emergency triage assessment and treatment
G6PD	– Glucose-6-phosphate dehydrogenase
GI	– Gastrointestinal
Hb	– Haemoglobin
HDN	– Haemolytic disease of newborn
HIE	– Hypoxic ischemic encephalopathy
HPP	– Hereditary pyropoikilocytosis
HR	– Heart rate
HS	– Hereditary spherocytosis
IEM	– In-Born errors of metabolism
IM	– Intramuscular

IV	– Intravenous
IVH	– Intraventricular haemorrhage
KMC	– Kangaroo mother care
LR	– Labour room
MAP	– Mean arterial pressure
MCH	– Mean corpuscular haemoglobin
MCV	– Mean corpuscular volume
MOH	– Medical Officer of Health
MRI	– Magnetic resonance imaging
NIBP	– Non- invasive blood pressure
NICU	– neonatal intensive care unit
OT	– Operation theatre
PCV	– Packed cell volume
PDA	– Patent ductus arteriosus
PHM	– Public Health Midwife
RBC	– Red blood cell
RR	– Reception and resuscitation
RR	– Respiratory rate
SCBU	– Special care baby unit
TABC	– Temperature, airway, breathing, circulation
TABCD	– Temperature, airway, breathing, circulation, coma, convulsion, dehydration
TOPS	– Temperature, oxygenation, perfusion, sugar
VLBW	– Very low birth weight
WHO	– World Health Organization

List of Tables

Table10.1 : How to discontinue ACD

Table11.1 : Modified grading of severity of hypoxic ischaemic encephalopathy

Table 12.1 : Haemoglobin nadir in babies in the first year of life¹

Table 13.1 : Normal blood pressure by day of life in a group of term new borns

Table 15.1 : Signs for triage

List of Figures

Figure 12.1: Approach to a neonate with anaemia²

Figure12.2 : Approach to a neonate with bleeding

Figure 13.1: Blood pressure according to gestational age.

Figure 15.1 : Triage

Figure16.1 : Flow Diagram for Neonatal Transport

Disclaimer

These guidelines are based on current best available evidence and consensus opinion of the Consultants involved in the development of Guidelines. They are neither intended to replace the process of critical evaluation of every case and nor is it intended to dictate an exclusive course of management or treatment. It must be interpreted with reference to individual patient needs, available resources and limitations unique to the institution and variations in local populations.

This guideline on Neonatal Care has been developed based on the best available evidence at the time of preparation. It is the responsibility of the users of the guideline to keep updated with the latest evidence relevant to the management of patients under their care.

Introduction

Clinical guidelines are systematically developed statements which assist clinicians in making decisions about appropriate treatment for specific conditions based on the best scientific evidence at the time of development. Guidelines are not intended to limit the clinical freedom. However, clinicians are expected to follow these recommendations as the basis for their decision making. Availability of resources, the existing situations and the expectations of individual families under their care need to be considered by the clinicians.

These guidelines are developed by the group of consultants in the guidelines development committee. The sources of information that were used as references in preparing the guidelines included the UK NICE (National Institute for Clinical Excellence) guidelines, American Academy of Pediatrics guidelines, SDF Facility Based Care for the Sick Newborn manual, Roberton's Text book of Neonatology, and relevant research papers from peer reviewed journals. The information from these sources were combined with our local expert opinion and knowledge of available technical facilities in the country when formulating the guidelines. The latest available scientific evidence based recommendations have been made as far as possible. The draft guidelines were presented to the wider forum of paediatricians and neonatologists, in order to obtain feedback after which a consensus was arrived at. The guidelines were then presented to the Technical Advisory Committee on Newborn and Child Health of the Ministry of Health and consensus was arrived at with the participation of a multi-disciplinary team including medical administrators, provincial health authorities, representatives of the Sri Lanka College of Paediatricians and other relevant professional colleges and national programme managers and senior nursing officers.

Scope

The guidelines are intended to assist all health care professionals at all levels of institutions where newborn care is being provided, in the clinical management of normal and sick newborns.

NEONATAL SEIZURES

Chapter 10

NEONATAL SEIZURES

10.1 Introduction

A seizure in the neonatal period is an emergency. A seizure is a sudden alteration in neurologic function of a neonate i.e. motor, behaviour and/or automatic function. Seizures can occur due to problems like asphyxia (commonest cause), birth injuries, meningitis, intracranial bleeding or due to metabolic problems like hypoglycaemia, hypocalcaemia and hypo or hypernatremia. Inborn errors of metabolism and epileptic syndromes are rare causes of neonatal seizures.

10.2 Common types of neonatal seizures

Neonatal seizures are classified based on the involved part of the body or nature of the movements.

Classification according to part of the body involved:

- Focal : localised part of the body
- Multifocal : multiple parts of the body
- Generalised : whole body

Classification according to nature of movements

- Subtle: these are the commonest and include,
 - Repetitive blinking, eye deviation, or staring
 - Repetitive movements of mouth or tongue (chewing, sucking, lip smacking)
 - Purposeless movements of the limbs, as if cycling, swimming or rowing
 - Systemic – apnoea, tachycardia, blood pressure fluctuations
- Clonic (repetitive rhythmic jerking, 1-4 times/second)

usually involving one limb or one side of the body with consciousness usually preserved)

- Tonic (sustained posturing of the limbs / trunk / deviation of the head.
- Myoclonic (rapid isolated jerking of muscles which may be focal or multifocal)
- Jitteriness, sleep myoclonus and spasms due to tetanus should be differentiated from seizures. The latter is rare in Sri Lanka due to the maternal tetanus immunization programme.

Jitteriness	Benign neonatal sleep myoclonus	Spasms due to tetanus
Symmetrical rapid movements of hands and feet	Bilateral or unilateral jerking during sleep	Appears after 48 hours
Provoked by a stimulus	Occurs during active sleep	Involuntary contraction of muscles
Abolished by restraining	Not stimulus sensitive	Fists are persistently and tightly clenched
Not associated with autonomic changes (increased heart rate, blood pressure) or eye movements	Often involve upper>lower trunk	Trismus, opisthotonus
Examination is normal between episodes	Stops if baby is woken up	Triggered by touch, light or sound
EEG is always normal		Baby is conscious throughout; often crying in pain

Excessive jitteriness can be associated with, metabolic derangements (hypoglycaemia-fine jitteriness) or hypoxic ischaemic encephalopathy, intracranial haemorrhage or drug withdrawal (coarse jitteriness).

Where available, all clinical seizures in the neonatal period should be confirmed by electroencephalogram (EEG). EEG should not be done for sole purpose of determining the aetiology.

10.3 Diagnostic approach

A detailed history should be taken and examination should be done after initial acute management of the seizure to determine the underlying cause as neonatal seizures are rarely idiopathic. The identification of a cause will help in management and prognostication.

The first line tests that need to be done are;

- Blood glucose
- Ionised calcium,
- Serum sodium and

Sepsis screen including lumbar puncture (for CSF analysis - microscopy, protein, glucose and culture), blood culture, CRP, full blood count and blood picture (in sick babies). Lumbar puncture should be done only in the absence of any contraindications for same.

If the cause is not found from the above, some of the following investigations will need to be done: Cranial ultrasonography / CT scan brain / MRI brain, CSF studies for metabolic disorders, and blood / urine investigations for inborn errors of metabolism (IEM). Advice of a Neurologist should be sought.

10.4 Stepwise treatment of a neonate with seizures

1. **First Step:** Resuscitate if needed: place in thermoneutral environment and ensure a patent airway, effective breathing and adequate circulation (TABC). Oxygen should be started if required and intravenous (IV) access should be secured and blood samples drawn for complete blood count, blood sugar, serum calcium and electrolytes.
2. **Second Step:** If blood sugar is less than 45 mg/dl (in a baby with convulsions), correct hypoglycemia by a bolus of 3ml/kg 10% dextrose followed by a maintenance infusion of dextrose at 6-8 mg/kg/min.

3. **Third Step:** Estimate the calcium levels (collect the samples). Consider giving 10% calcium gluconate 2mL/kg IV over 5-20 minutes (in case calcium levels are not available OR the serum calcium is less than 7mg/dl).

IV 10% calcium gluconate is diluted with equal volume of 5% dextrose or 0.9%NaCl and administered slowly under cardiac monitoring preferably by an infusion pump. Withhold infusion if HR<100/min). Do not add calcium to maintenance IV fluid instead give it as slow bolus preferably using syringe infusion pump via a central vein eg. umbilical vein.

4. **Fourth Step :** Anti convulsant drugs (ACD); ACD should be given if seizures persist even after correction of hypoglycaemia and hypocalcaemia.
- Injection phenobarbitone 20 mg/kg IV over 20 minutes. If there are no further seizures do not start maintenance.
 - If seizures persist after 15 minutes consider further boluses of 5mg/kg every 10 minutes up to a total (including initial bolus) of 40 mg/kg. Assess seizure control at the end of the boluses.
 - If seizures persist - injection Phenytoin or Fosphenytoin 20mg/kg IV infused over 20minutes. Assess the seizure control after 30 minutes. Give phenytoin slowly with cardiac monitoring as it is arrhythmogenic.
 - A midazolam loading dose of 0.15mg/kg over 5 minutes followed by an infusion of 60-400µg/kg/hr can be commenced if further seizures occur.
 - If the seizures are controlled, a maintenance dose of phenobarbitone (2.5mg/kg 12 hourly, 24 hours after the loading dose) and / or phenytoin (4-5mg/kg/dose 12 hourly, 12 hours after loading dose)

Both the phenobarbitone and phenytoin are administered at a maximum rate of 1mg/kg/min. Phenytoin should only be mixed with saline and not with dextrose as it precipitates in dextrose.

5. If seizures are not controlled with phenobarbitone and phenytoin and NICU facilities are not available, refer the baby to a centre with NICU facilities

Continue supportive treatment and management of underlying cause eg. meningitis

10.5 When to discontinue anti – convulsant drugs

The optimal duration of the ACD should be based on the neurological examination after seizures and associated specialized investigations like the EEG. Putting a baby on long term ACD when not required will produce potential long term adverse effects of the drugs.

Table 10.1: How to discontinue ACD

	Condition	ACD Plan
A	Neonate with transient metabolic problem as the cause e.g. hypoglycemia, hypocalcaemia, hypo/hypernatraemia	Treat the cause; stop the ACD immediately if started initially
B	Neonatal seizures that needed only one ACD with normal neurological examination and/or normal EEG	Stop the ACD once seizure free for >72hrs. Tapering not required.
C	Neonatal seizures that are difficult to control (Need of multiple ACD)	If normal neurological examination and/or normal EEG, and seizure free for >72 hrs, stop the drugs one by one with phenobarbitone being the last to be withdrawn. Will need tapering. Try to stop few drugs prior to discharge. If neurological status is not normal discharge on Phenobarbitone; repeat neurological examination at one month (observe for development and tone). If normal, then taper and stop phenobarbitone over 2 weeks.
D	If seizures recur during withdrawal of ACDs	Reinstate the drug and refer to Neurologist.
E	If neurological examination abnormal at 1 month follow up (abnormal tone, seizure)	Refer to the neurologist + for specialized investigations like EEG, neuro imaging and metabolic testing. If normal then taper and stop phenobarbitone over 2 weeks, but follow up regularly and refer if necessary.

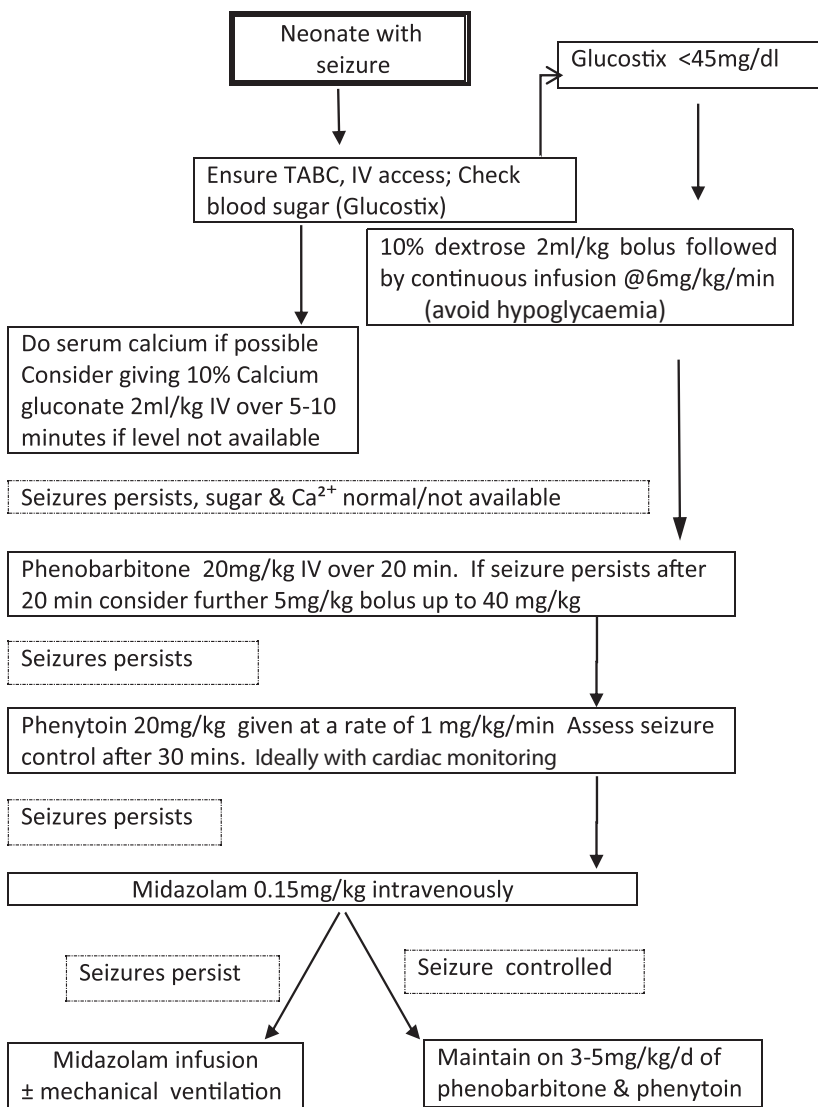
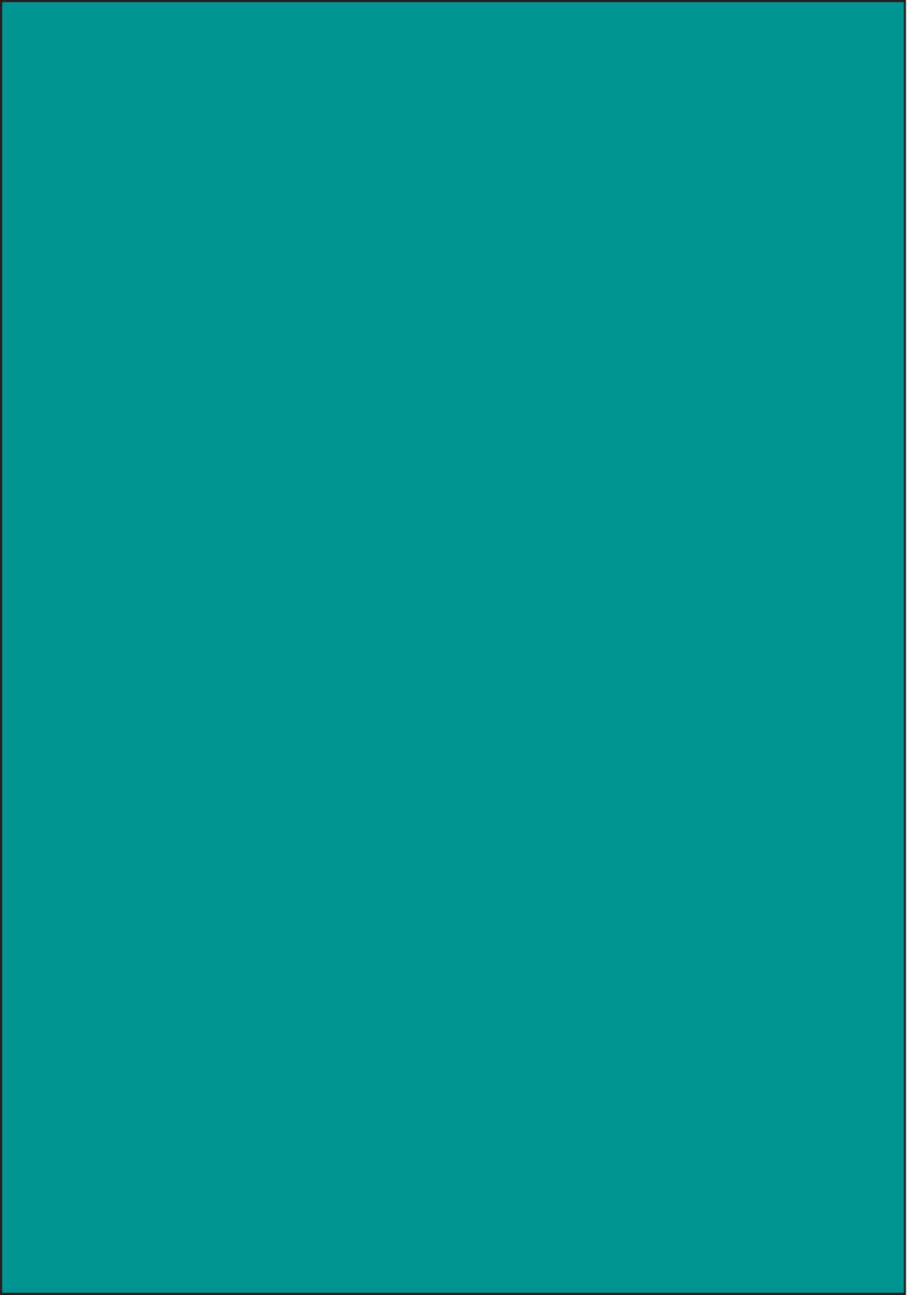


Figure 10.1: Flow Chart for management of acute neonatal seizures
TABC – Temperature, airway, breathing, circulation

References

Dr. Giorgio Ed. Guideline on Neonatal seizures, Geneva: World Health Organization;2011

**POST-RESUSCITATION
MANAGEMENT OF THE
ASPHYXIATED NEONATE**



Chapter 11

POST-RESUSCITATION MANAGEMENT OF THE ASPHYXIATED NEONATE

11.1 Introduction

Perinatal asphyxia is a common neonatal problem and contributes significantly to neonatal morbidity and mortality. It contributes to approximately quarter of neonatal deaths worldwide. Perinatal asphyxia is an insult to the fetus or the newborn around the time of birth due to the lack of oxygen (hypoxia) and perfusion (ischaemia) to various organs.

11.2 Definition of asphyxia

The definition of birth asphyxia has no current international consensus. Two currently used classifications are given below.

The International Classification of Diseases – 10 (2008) classifies birth asphyxia as follows:

Birth Asphyxia

P21.0 Severe birth asphyxia (White asphyxia)

Pulse less than 100 per minute at birth and falling or steady, respiration absent or gasping, colour poor, tone absent.

Asphyxia with 1-minute Apgar score 0-3

P21.1 Mild and moderate birth asphyxia (Blue asphyxia)

Normal respiration not established within one minute, but heart rate 100 or above, some muscle tone present, some response to stimulation.

Asphyxia with 1-minute Apgar score 4-7

With the introduction of therapeutic hypothermia in the management of hypoxic ischaemic encephalopathy (HIE), criteria for commencement

of such therapy is now becoming the basis of identifying moderate to severe perinatal asphyxial events.

The criteria for identifying moderate to severe HIE which warrants commencement of therapeutic hypothermia are (UK TOBY Cooling Register ; Clinician's handbook, 2010):

- One of the following:
 - o Apgar of 5 or less at 10 minutes, OR
 - o Mechanical ventilation or need for continued resuscitation at 10 minutes OR
 - o Acidosis within 60 minutes of birth (umbilical cord, arterial or capillary pH<7.00) OR
 - o Base deficit > 16mmol/ L in umbilical cord or any blood sample (arterial, venous, capillary) within 60 minutes of birth
- AND
- Clinical evidence of encephalopathy
 - o Frank seizures and / or
 - o Moderate to severe encephalopathy (See Table 9.1), i.e. altered state of consciousness, abnormal tone, abnormal primitive reflexes

11.3 Grading of severity of hypoxic ischaemic encephalopathy

The classification of the severity of neonatal encephalopathy is primarily based on the system introduced by Sarnat and Sarnat in 1976². An updated version has been used by the National Institute of Child Health and Human Development Neonatal Research Network³ to identify newborns who may be eligible for neuro-protective treatment (Table 11.1).

Table 11.1 : Modified grading of severity of hypoxic ischaemic encephalopathy [Based on Sarnat and Sarnat (1976), Shankaran et al. (2005) and Hahn JS (2009)⁴]

Features	Severity of encephalopathy		
	Mild	Moderate	Severe
Level of consciousness	Alert or hyperalert	Lethargy	Stupor or coma
Spontaneous activity	May be normal	Decreased activity	No activity
Posture	May be normal	Distal flexion, complete extension	Decerebrate
Tone	Normal / hypertonia	Hypotonia	Flaccidity
Primitive reflexes			
Suck	Weak	Weak	Absent
Moro	Exaggerated	Incomplete	Absent
Autonomic function			
Pupils	Dilated	Constricted	Deviated, dilated or non-reactive to light
Heart rate	Tachycardia	Bradycardia	Variable
Respiration	Normal	Periodic breathing	Apnoea
Other features			
Others	Irritability, jitteriness	Brainstem dysfunction	±elevated intracranial pressure
Seizures	Absent	±	Frequent; often refractory
EEG background	Normal	Low-voltage, periodic or paroxysmal	Periodic or isoelectric
Outcome	Normal	20-40% abnormal	Death or 100% abnormal

Courtesy: Robertson Textbook of Neonatology 5th Edition, 2013

11.4 Clinical Presentation

- Perinatal asphyxia may result in adverse effects on all major body systems including the kidney, brain, heart and lungs. The clinical features in asphyxiated babies range from mild to severe impairment.

- The extent of multi-organ dysfunction determines the early outcome of an asphyxiated neonate.
- The most severely affected babies may manifest with stupor or coma, periodic breathing or irregular respiration, hypotonia and loss of neonatal reflexes like Moro's and sucking.
- About 50 % of the moderate to severely asphyxiated babies may have seizures.
- Severely affected babies may have progressive deterioration of the CNS function in terms of decreasing tone, increasing degree of coma and prolonged apnoeas over the next 48 hours. These neonates would eventually die or have permanent neurologic sequelae.

11.5 Initial stabilization and management

The management consists of supportive care to maintain temperature, perfusion, ventilation and 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:** The temperature should be maintained in the normal range of 36.5 – 37.5°C initially and continued so unless until a decision is taken to institute therapeutic hypothermia if facilities are available. **Uncontrolled hypothermia and hyperthermia are detrimental and should be avoided.**
- **Airway & breathing:** Patent airway should be maintained by appropriate positioning and any secretions should be cleared. The breathing should be monitored and supported as required.
- **Oxygenation** should be kept in the normal range by monitoring oxygen saturation by pulse oximetry if facilities exist. Hypoxia should be treated with oxygen supplementation and if it does not improve baby may need CPAP or mechanical ventilation.

- **Hyperoxia should always be avoided.**
- IV fluids & enteral feeding: Fluid administration in the first 24 hours should be at 40ml/kg/day (until urine output is established) provided normoglycaemia and perfusion is maintained. However, after 24 hours, body weight, blood chemistry, urine output and other clinical indicators of adequate hydration should guide fluid administration. Advancement of fluid administration should be guarded. Feeds which should be breast milk should not be commenced until cardiorespiratory status has normalised in view of the risk of necrotising enterocolitis. Start enteral feeds with expressed breast milk (EBM) at 30ml/kg/day and increase daily by 20-30 ml/kg/day or more as the baby tolerates. In those feeding directly at the breast allow feeding on demand.
- **Blood glucose:** Blood glucose should be monitored for at least the first 48 hrs. If the baby is hypoglycaemic, treat appropriately (Refer Chapter 6).
- **Calcium: Hypocalcaemia is a common metabolic alteration in the neonatal post asphyxial syndrome. A subnormal serum Ca^{++} level may compromise cardiac contractility and may cause seizures.** Therefore add calcium 1mmol/kg/day to maintenance IV Fluid from day one to maintain calcium level in the normal range **9-11 mg/dl.(2.2-2.7mmol/l)**. If a neonate has jitteriness or seizures check serum calcium and manage hypocalcemia if indicated. (Refer Chapter 10).
- Vitamin K 1mg IM must be administered to all those babies who have not received Vitamin K at birth.
- **Blood Pressure:** In an asphyxiated neonate cerebral blood flow depends on systemic blood pressure. Hence, maintain systemic mean arterial BP at 40 mmHg for term infants. The mean BP for preterm neonates should be maintained equal to gestational age in weeks as mmHg. If the neonate is in shock manage as per Chapter 13. Volume expansion and inotropes may be required. In

the presence of persistent pulmonary hypertension / meconium aspiration syndrome higher systemic blood pressures may be required.

- **Metabolic acidosis:** This should be confirmed with an arterial blood gas within the first hour of birth. If this does not improve with adequate ventilation, and perfusion is inadequate a normal saline bolus should be given. Inotropes may be required to achieve adequate perfusion. If there has been an antepartum haemorrhage etc. volume replacement may be required by blood transfusion. Subsequent management of acidosis including use of sodium bicarbonate in severe metabolic acidosis should be based on further assessment.
- **Seizures:** For management of seizures (Refer Chapter 10).

Steroids, mannitol, frusemide & sodium bicarbonate have no role in management of a majority of babies with asphyxia

- **Early intervention and developmental care**
In babies with neurological deficits it is important to commence early intervention including limb physiotherapy and oropharyngeal exercises for feeding difficulties, as early as possible while on the neonatal unit.
Developmental care including use of appropriate toys, multi-coloured objects, drawings, music, mirrors etc maximise the neurodevelopmental potential of these babies.

11.6 Therapeutic hypothermia

- Therapeutic hypothermia is now an established mode of management in newborns with hypoxic ischaemia encephalopathy in developed countries. When using this therapy it is vital to have frequent monitoring of the baby in all clinical parameters including rectal temperature in order to avoid complications of this intervention.

- There is evidence from the 11 randomised controlled trials included in the 2013 Cochrane systematic review⁵ (n = 1505 infants) that therapeutic hypothermia is beneficial in term and late preterm newborns with hypoxic ischaemic encephalopathy. Cooling reduces mortality without increasing major disability in survivors. The benefits of cooling on survival and neurodevelopment outweigh the short-term adverse effects. Hypothermia should be instituted in term and late preterm infants with moderate-to-severe hypoxic ischaemic encephalopathy if identified before six hours of age, once facilities and protocols for Sri Lanka have been formulated.

11.7 Monitoring

Clinical monitoring

All neonates who have suffered asphyxia must be closely monitored clinically as well as by performing certain bedside tests.

- The neurological status should be monitored by using the modified Sarnat score given in Table 11.1, every 8 hrs, which has been found to be useful to detect improvement or further deterioration
- The respiratory status must be monitored by meticulously recording the respiratory score (Downe's score) every 2-3 hours (hourly if ventilated)
- The cardiovascular status assessment should include heart rate, colour, CRT, peripheral pulses, pulse oximetry and blood pressure (NIBP).
- Gut ischaemia should be suspected and enteral feeds should be withheld if there is abdominal distension, tenderness or guarding or feed intolerance.
- The hourly urine output should be calculated based on the urine output over a 6-hour period. It should normally be > 1ml/kg/hr after the first 24 hrs of life.

- If it remains < 1mL/kg/hr check serum electrolytes, blood urea and serum creatinine every 24 hours.
- Blood sugar should be monitored 6-8 hourly in first 24 hrs and then as required.

11.8 Poor prognostic factors

The presence of one or more of the following features may point towards poor neurodevelopmental outcome in the long term. These are:

1. Need for positive pressure ventilation for 5 days or longer
2. Onset of seizures within 12 hours
3. Refractory seizures (uncontrolled with phenobarbitone and phenytoin)
4. Severe HIE (See Table 11.1)
5. Inability to establish direct oral feeds by 1 week

Investigations

EEG, amplitude integrated EEG and MRI brain are extremely useful in prognostication.

11.9 Post discharge & follow up advice

- All neonates discharged with a diagnosis of Hypoxic ischaemic encephalopathy must attend the follow up clinic for monitoring of growth and development, vision, hearing screening, assessment for possible cerebral palsy and need for early intervention, seizure control and family psychological status.

Summary

- Hypoxic ischaemic encephalopathy is a significant cause of morbidity and mortality in neonates.
- A consensus definition accepted worldwide is not yet available.
- Post asphyxia management aims to minimise further insult to the brain and other organ systems,
- Multi system problems are seen in the acute stage which may require intensive care management. and neurodevelopmental impact is the most significant long term manifestation.
- Therapeutic hypothermia is a recognised form of therapy that minimises post asphyxial brain insult with improvements in neurodevelopmental outcome and reduction in mortality.

References

1. Committee on Fetus and Newborn, American Academy of Pediatrics and Committee on Obstetric Practice, American College of Obstetricians and Gynecologists. Use and Abuse of the Apgar Score. Pediatrics. 1996; 98(1):141-2
2. Sarnat HB, Sarnat MS. Neonatal encephalopathy following fetal distress. A clinical and electroencephalographic study. Arch Neurol. 1976 Oct;33(10):696-705.
3. Shankaran et al. Whole-body hypothermia for neonates with hypoxic–ischemic encephalopathy. N Engl J Med 2005; 353:1574-84.
4. Hahn J. Clinical manifestations of hypoxic ischaemic encephalopathy. In: Fetal and Neonatal Brain Injury. 4th ed. Cambridge. Cambridge University Press; 2009.

5. Jacobs SE, Berg M, Hunt R, Tarnow-Mordi WO, Inder TE, Davis PG. Cooling for newborns with hypoxic ischaemic encephalopathy. Cochrane Database of Systematic Reviews 2013, Issue 1.Art.No.:CD003311.

DOI: 10.1002/14651858.CD003311.pub3.

ANAEMIA AND BLEEDING IN NEONATES

Chapter 12

ANAEMIA AND BLEEDING IN NEONATES

12.1 Introduction

Anaemia is a common finding in preterm babies and is seen less commonly in term babies. Timely diagnosis and appropriate management are essential for optimal growth and development of these young infants. Bleeding in the neonate is an emergency. A variety of disease processes and disorders can exacerbate the physiological haemostatic immaturity present in a newborn and can lead to significant haemorrhage at times.

12.2 Neonatal anaemia

Definition

In the newborn period, the haemoglobin concentration undergoes constant physiological changes. At term, cord haemoglobin ranges between 14-20 gm/dl. Hb level in VLBW infants is 1-2 g/dl below those at term. In the first two weeks of life, anaemia is generally defined as venous haemoglobin less than **13 g/dl** in a term baby and less than **12g/dl** in a premature baby less than 28 weeks gestation.

Table 12.1. Haemoglobin nadir in babies in the first year of life¹

Maturity	Hb level at nadir	Time of nadir (wks)
Term	9.5 – 11	6 – 12
Preterm (1.2-2.5 kg)	8.0 – 10.0	5 – 10
Small (< 1.2kg) Preterm	6.5 – 9.0	4 – 8

12.3 Anaemia of prematurity

In preterm infants physiological anaemia occurs earlier, is more severe and prolonged. Anaemia in a preterm is multifactorial - immature erythropoiesis, decreased erythropoietin, illness and repeated blood sampling are some of the contributory factors.

12.4 Causes of anaemia

Anaemia in a newborn is broadly due to three causes

- a) Blood loss
- b) Haemolysis
- c) Diminished RBC production (rare)

a) Blood loss

- Obstetric causes – Ante partum haemorrhage, umbilical cord rupture.
- Occult blood loss – Feto-placental bleeding, feto-maternal bleeding, twin to twin transfusion.
- Neonatal bleeding – Sub-galeal bleed, intracranial bleed, bleeding from umbilicus, gastrointestinal bleeding, , adrenal haemorrhage and ruptured liver or spleen.
- Iatrogenic – Excessive blood sampling.(commonest cause)

b) Haemolysis

Rh or ABO incompatibility, G6PD deficiency, hereditary spherocytosis (HS), haemoglobinopathies, sepsis, disseminated Intravascular haemolysis, malaria (rarely)

c) Decreased production

Infections, drugs, congenital leukaemia and pure red cell aplasia.

12.5 Approach to a baby with anaemia

If the cause of anaemia is not apparent, identify the underlying cause. (haemolytic or acute blood loss) by taking a detailed history.

Laboratory tests

1. Complete blood count, reticulocyte count and peripheral smear
2. Coombs test (DCT)
3. Bilirubin level
4. Ultrasound of the abdomen and head is usually diagnostic in suspected cases of retroperitoneal, adrenal or intracranial haemorrhage

Importance of reticulocyte count. Once anaemia is detected, the reticulocyte count provides a further clue to diagnosis. Normal reticulocyte count is about 1% of the total RBC count.

High reticulocyte count points towards a haemolytic cause like hereditary spherocytosis, blood group incompatibility or G6PD deficiency.

Low reticulocyte count indicates decreased RBC production or hypoplastic anaemia.

A normal reticulocyte count warrants a peripheral smear for type of anaemia. A normocytic picture on smear suggests an acute blood loss or infections, whereas a microcytic picture indicates a chronic loss or an iatrogenic cause.

12.6 Management of anaemia

Anaemia of prematurity

- Adequate amount of vitamin E, vitamin B12, folic acid and iron are important

- Iron supplements are prophylactically used for preterm infants (<37 weeks gestation) from the age of 2 weeks if on full feeds.
- Iron supplementation is contraindicated for babies having sepsis and GI bleeding.
- Expect decline in Hb levels in premature infants.
- Periodic measurement of Hb levels and reticulocyte count.

Supplementation

Supplements	Doses	Preparations	
Iron (Orofer / Mumfer or Iberol drops)	2-4mg/kg/day for prophylaxis 6mg/ kg/day for treat- ment	Elemental iron: Orofer / Mumfer: 1ml=50mg Iberol : 1ml = 25mg	Orofer / Mumfer: 1 drop≈1.7mg (1ml=30drops) Iberol 1 drop = 0.8mg
Folic Acid	50mcg/day	1mg tablet	
Vit E	5 mg/kg /day	200 mg , 400 mg Caps	1 drop≈20mg
Vit B12	0.4mcg/day		

The management of the newborn with anaemia depends on the severity of anaemia and the clinical presentation. The priority should be initial stabilisation in the form of airway maintenance and management of shock. Intravenous access should be obtained and oxygen therapy as required should be provided. The definitive therapy involves transfusion of packed red blood cells.

Transfusion therapy

Indications for packed RBC transfusion/ blood transfusion.

- PCV < 40% or Hb < 12 gm /dl if baby is hypotensive or needs mechanical ventilation.
- PCV < 30% or Hb < 10 gm/dl if baby sick but hemodynamically stable or weight gain < 10g/kg/day.
- PCV < 20% or Hb < 7 gm/dl if baby is asymptomatic.

Choosing the blood group for transfusion

- Rh incompatibility: the first choice is Rh-ve blood of the baby's ABO group. If this is not available, O-ve blood may be used.
- ABO incompatibility: first choice is O cells suspended in AB plasma or type O blood that is same Rh type of infant or O-ve blood.
- No known incompatibility: blood of newborn's ABO and Rh group
- In all cases (below three months), the blood to be transfused should be cross matched with maternal serum.

For anaemia, it is preferable to give packed RBC transfusion over whole blood transfusion except when there is acute blood loss.

Quantity to be transfused

Maximum transfusion should be 15-20 ml/kg and should be given at a rate of 3 – 4 ml/kg/hr and total period of transfusion should usually be 3 – 4 hours. 20 ml/kg transfusion raises the Hb level by 0.5 – 1 g/dl. Ensure safe transfusion . Prior to transfusion check.

- a) Blood bag number
- b) Date of donation – Blood should not be more than 7 days old
- c) Name on medical record (bed head ticket) / registration number of patient,
- d) Blood group of baby and mother

Monitor vital signs of the baby during transfusion

- Routine administration of diuretic e.g. Furosemide is not recommended. Furosemide 0.5 mg/kg IV can be given during transfusion in patients with impending heart failure.

- Baby's vitals should be monitored during and after blood transfusion (at least for 2 hours).
- If an untoward transfusion reaction like hemodynamic instability with tachycardia, desaturation, rash or shock is observed, the transfusion should be immediately stopped and baby managed accordingly. Send bag with blood set, post transfusion sample & completed reaction form to blood bank.

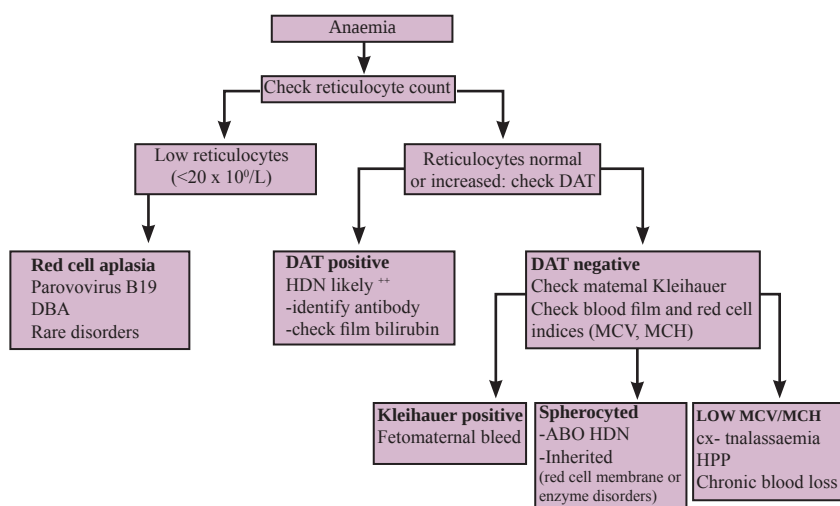


Figure 12.1 Approach to a neonate with anaemia²

12.7 Bleeding neonate

Management of a bleeding neonate is depicted in the ensuing flow chart.

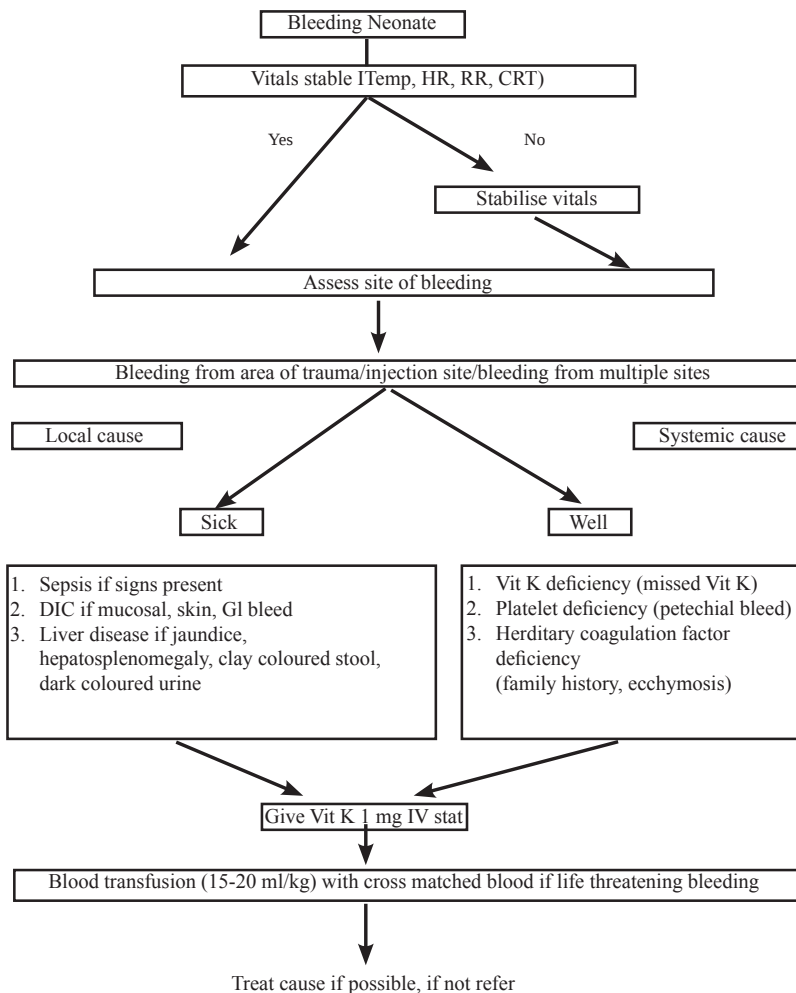


Figure 12.2 Approach to a neonate with bleeding

References

1. GladerB,Naiman JL. Erythrocyte disorders in infancy. In Taeusch HW, Ballard RA,AveryME, eds. Diseases of the Newborn. Philadelphia: WB Saunders; 1991.
2. Rennie JM editor. Rennie and Robertson's Textbook of Neonatology. 5th Ed. Churchill Livingstone Elsevier; 2012

NEONATAL SHOCK

The first part of the paper discusses the importance of understanding the cultural context of the research. It highlights the need for researchers to be sensitive to the values and beliefs of the communities they are studying. This is particularly important in the field of education, where cultural differences can significantly impact learning outcomes.

The second part of the paper focuses on the methodology used in the study. It describes the qualitative approach adopted, which involves in-depth interviews and focus group discussions. The researchers aimed to explore the experiences and perceptions of the participants, rather than testing a specific hypothesis.

The third part of the paper presents the findings of the study. It discusses the themes that emerged from the data, such as the role of family in education and the influence of community norms. The researchers found that there were significant differences in the way that different cultural groups viewed education and the role of the teacher.

The fourth part of the paper discusses the implications of the findings for practice. It suggests that educators should be aware of the cultural context of their students and tailor their teaching accordingly. This might involve using different teaching methods or incorporating cultural knowledge into the curriculum.

The final part of the paper concludes the study and offers some thoughts for future research. It suggests that further exploration of the cultural context of education is needed, particularly in the area of teacher education and curriculum development.

Chapter 13

NEONATAL SHOCK

13.1 Introduction

A sick neonate may present with shock or it may appear during the course of the disease. The success of management depends on its early diagnosis and prompt and appropriate management.

Definition

The term shock denotes a clinical state of poor perfusion of the body tissues in which the body demands of oxygen and nutrients are not met. This can result in tissue hypoxia and metabolic acidosis causing irreversible tissue damage. **Shock and hypotension are not synonyms as hypotension is a late sign of shock.** Hypotension refers to a blood pressure that is lower than the expected reference range.

Average mean arterial pressure (MAP) is roughly equal to gestational age in preterm neonates.

13.2 Identification of shock

Tachycardia

Unexplained tachycardia (HR > 160/min) may be an early sign of shock

Capillary refilling time (CRT)

- This is the rate at which the capillaries refill following emptying of capillaries by pressure and indicates adequacy of tissue perfusion.
- **Technique:** CRT is checked on the central part of the body such as the chest (over the sternum) in a neonate. Gentle pressure is applied by the tip of finger for 5 seconds (e.g. by slowly counting from 1 to 5). This results in blanching

of the underlying surface. Observe how fast the blanched area refills and becomes pink after the tip of the finger is lifted from the skin surface. **Normal capillary refill time** is < 3 seconds. A prolonged CRT of more than 3 seconds indicates poor circulation and tissue perfusion. However, this may be falsely prolonged in hypothermic babies.

Other clinical features of shock

- Poor peripheral pulses
- Pallor
- Mottling of skin
- Cold extremities
- Decreased urine output
- Lethargy or obtundation
- Low blood pressure

Mottled skin and prolonged CRT can be seen in hypothermia, hence one must rule out hypothermia.

Low blood pressure is a late sign of shock

Table 13.1 Normal blood pressure by day of life in a group of term newborns

BP IN mmHg	DAY 1 (RANGE)	DAY 2 (RANGE)	DAY 3 (RANGE)	DAY 4 (RANGE)
Systolic	65 (46-94)	68 (46-91)	69.5 (51-93)	70 (60-88)
Mean	48 (31-63)	51 (37-68)	44.5 (26-61)	54 (41-65)
Diastolic	45 (24-57)	43 (27-58)	52 (36-70)	46 (34-57)

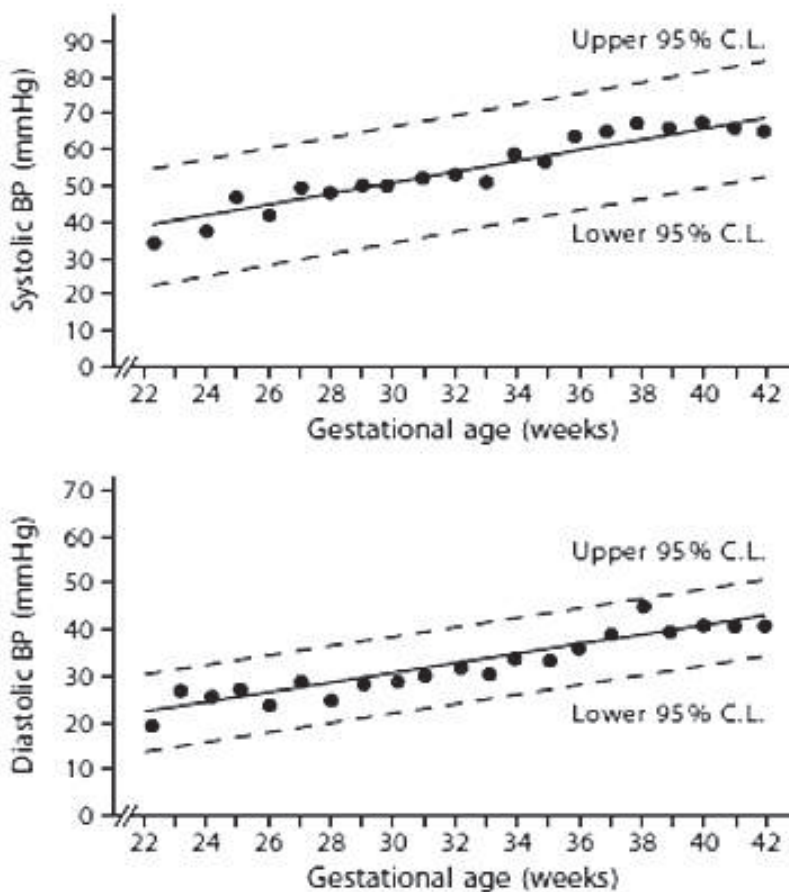


Figure 13.1 : Blood pressure according to gestational age. (Courtesy: Robertson Textbook of Neonatology 5th Edition, 2013.)

13.3 Classification of shock based on aetiology

- Hypovolemic shock secondary to
 - a. Blood loss due to feto-maternal or twin to twin transfusion, birth trauma or disseminated intravascular coagulation, pulmonary haemorrhage, intraventricular haemorrhage (IVH) or

- b. Fluid loss due to excessive insensible water loss (from skin, via ventilator), poor fluid intake, vomiting, diarrhoea, polyuria or pathologic renal losses.
- **Cardiogenic shock** due to low cardiac output as in birth asphyxia, patent ductus arteriosus, congenital heart disease, arrhythmias, hypoglycaemia, acidosis and sepsis.
- **Obstructive shock:** Aortic stenosis, coarctation of aorta, tension pneumothorax, pericardial tamponade.
- **Septic shock** has multiple aetiologies: hypovolaemia, distributive due to decreased afterload and cardiogenic due to myocardial depression and endotoxins
- **Distributive shock** due to anaphylaxis, neurologic (loss of sympathetic vascular tone) and drugs.

There could be multiple aetiologies of shock in sepsis and asphyxia

13.4 Management

- Maintain temperature, airway and breathing.
- Restoring perfusion is the cornerstone in shock management.
- Supportive care:
 - Hypoxia: Give oxygen to maintain appropriate oxygen saturations
 - Hypoglycaemia – Maintain normal blood glucose (>45 mg/dL)
 - Hypothermia – Maintain normothermia (36.5-37.5°C)

Fluid resuscitation

Infuse fluid bolus of 10 ml/kg of normal saline over 20-30 minutes.

As lack of intravascular volume may not be the only cause of poor perfusion and low blood pressure, if there is no clinical improvement (reduction in heart rate and increase in blood pressure) following a single 10ml/kg bolus, no further boluses should be given as it may be detrimental. If there is an improvement after the first bolus a second bolus of 10ml/kg should be administered. There is no advantage of colloids over crystalloids.

Assessment of improvement

- Improvement in CRT
- Decrease in heart rate by at least 10 beats per minute
- An increase in urine output over the next 4-6 hrs is a sign of improvement
- If the signs of poor perfusion persist despite 2 fluid boluses (or there was no improvement after the first bolus) inotropic support should be commenced.
- Supportive care should be continued along with inotropic support and underlying causes should be identified and treated.

Inotropes

- These are the drugs used to enhance myocardial contractility and consequently cardiac output. Some degree of myocardial depression is present in most types of shock.
- The ultimate aim of maintaining blood pressure is to ensure adequate systemic blood flow and organ perfusion. Increases in blood pressure values do not necessarily result in increased systemic blood flow.
- Most inotropes have a vasopressor effect in addition to its inotropic effect. This vasopressor effect can result in some inotropes decreasing the systemic blood flow.
- Therefore if using inotropes to increase blood pressure it is important to choose the one most appropriate for the specific clinical situation.

- Inotropes should be titrated to achieve the minimal acceptable blood pressure, while being prepared to wean if the blood pressure rises above this, as dramatic increases in blood pressure have been shown to increase the risk of intraventricular haemorrhage in preterm infants.

Dobutamine: Dobutamine improves myocardial contractility and decreases vascular resistance. At higher doses ($>10\mu\text{g/kg/min}$) improvement in systemic blood flow is greater with dobutamine rather than with dopamine.

Dose: Usual starting dose is $5-10\mu\text{g/kg/min}$. The dose can be increased by increments of $5\mu\text{g/kg/min}$ every 20 - 30 minutes to a maximum of $20\mu\text{g/kg/min}$.

Preparation: Always use a 1 ml syringe for drawing dobutamine out of the vial. One ml of dobutamine injection contains 50mg of dobutamine. 30mg/kg of dobutamine in 50ml of fluid (5% or 10% dextrose, 0.45% or 0.9% NaCl) will provide $10\mu\text{g/kg/min}$ of dobutamine when infused at 1ml/hour.

Dopamine increases myocardial contractility and peripheral resistance (afterload) which results in increased blood pressure. However at higher doses when the effect on increasing afterload is greater systemic blood flow can decrease even though blood pressure rises.

Dose and preparation are similar to the method for dobutamine. However Dopamine $1\text{ml}=40\text{mg}$)

Hydrocortisone may be considered in neonates who do not respond to maximal doses of both dopamine and dobutamine ($>20\mu\text{g/kg/min}$). It can be given 1mg/kg as the initial dose; then depending on the response it can be given 8-12 hourly at 1mg/kg/dose for 2-3 days.

Weaning from inotropes

Once hypotension improves (normal BP for 4-6 hours) and tissue perfusion improves, inotropes should be tapered @ $5\mu\text{g/kg/min}$ every 1-2 hours provided the neonate continues to maintain the therapeutic end points, listed below.

Treat specific cause

Identify the specific cause and initiate therapy as soon as possible. Empirical treatment can be commenced on suspicion of sepsis.

Persistent pulmonary hypertension causing reduced return of blood to the heart for systemic circulation or a large PDA with a left to right shunt reducing systemic flow, mainly in the first few days of life in very preterm babies, are other causes which will require more specific management.

13.5 Therapeutic end points

Treatment should be modified as per assessment and response, to achieve

- Capillary refill time <3 seconds,
- Normal heart rate
- Normal pulses,
- Warm extremities
- Normal blood pressure
- Urine output >1 ml/kg/hour

13.6 Unresponsive shock

- Neonates with shock may not respond to above treatment in the presence of hypoglycaemia, hypoxia, hypothermia, hyperkalemia, anaemia, severe sepsis, pneumothorax and cardiac tamponade etc.
- Consider blood transfusion if Hb <12g/dl.
- Consider referral after stabilization of temperature, oxygenation and blood glucose.

13.7 When to refer

If the neonate has unresponsive shock, refer urgently after stabilising.

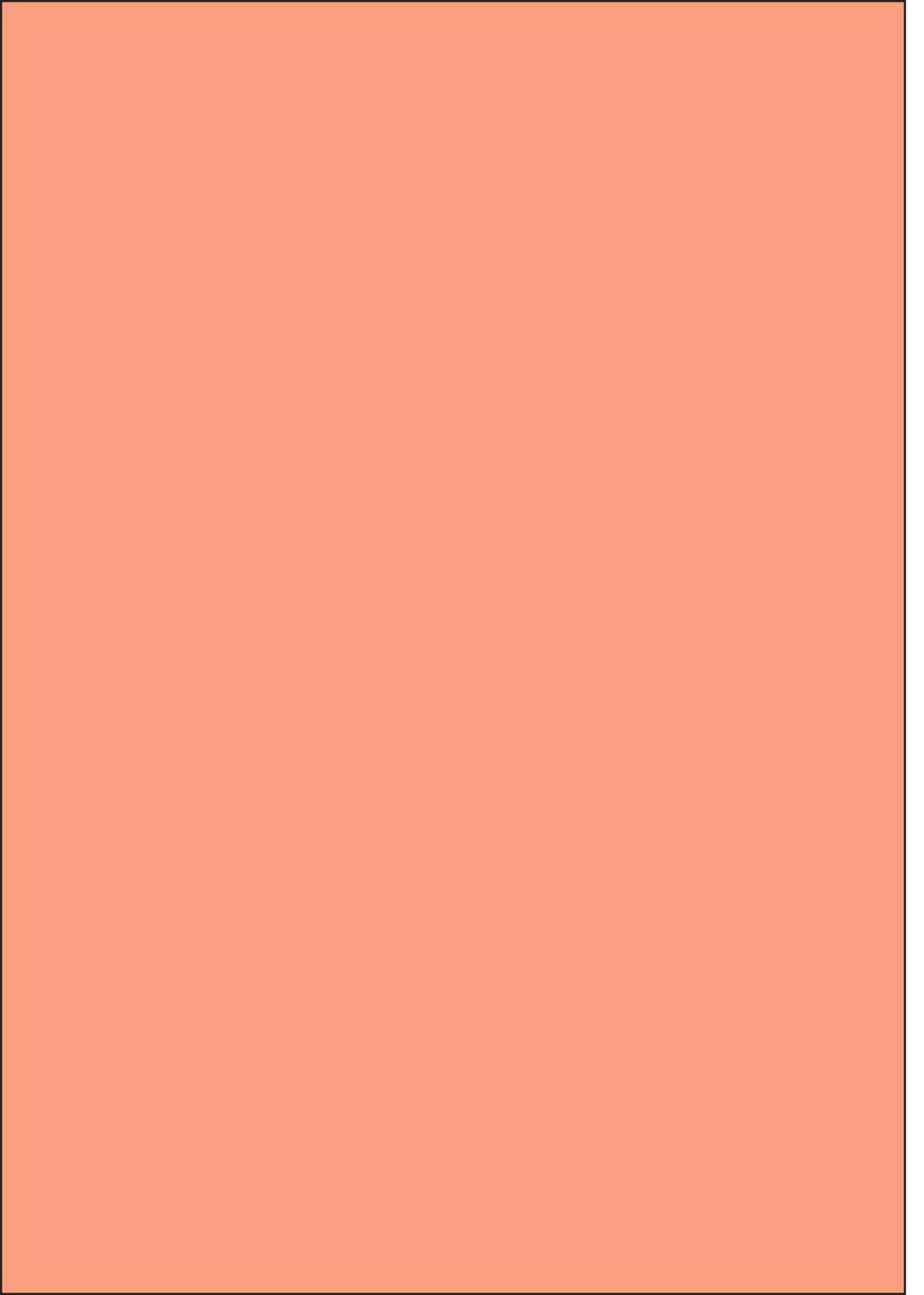
What to do if referral not possible

- Continue inotropes.
- Consider use of adrenaline if possible. Adrenaline and dopamine have similar effects. Adrenaline at doses upto $0.5\mu\text{g/kg/min}$ have similar effects on cerebral blood flow and blood pressure to dopamine $10\mu\text{g/kg/min}$. Adrenaline can be given via a peripheral vein if central access is not available compared to noradrenaline which should not be administered peripherally.
- Continue supportive care.

Summary

- Monitor all sick babies for early signs of shock
- Outcome of shock depends on early diagnosis and prompt management.
- Blood pressure and perfusion may be low due to a variety of reasons. Low circulatory volume, reduced contractility of the heart and peripheral vasodilation are the main causes.
- Start treatment immediately if shock appears
- Supportive care, fluid resuscitation and inotropes are mainstay of therapy

COMMUNICATION IN NEWBORN CARE



Chapter 14

COMMUNICATION IN NEWBORN CARE

14.1 Introduction

Good communication is an integral part of comprehensive patient care. It assumes special importance in neonatal care because of technical and physical complexities involved, rapid changes in the clinical course and associated stress of the parents.

Effective communication is crucial for

- Making informed decisions on behalf of the neonate, by the parents.
- Medico legal issues
- Maintaining a cordial relationship between the health care provider and the parents.

14.2 Principles and forms of communication

Information can be provided through two forms of communication:

- (i) Verbal: involves the exchange of information using words including spoken and written.
- (ii) Nonverbal communication: or body language involves transmission of information without words. It may be in the form of eye contact, touch, facial expressions, posture, gestures etc.

14.3 Types of information to be provided in a Neonatal Unit

Communication by the neonatal team begins in the antenatal period if the baby is expected to be at risk of being born prematurely or has a congenital anomaly requiring admission to the neonatal unit. In the case of an unexpected problem at birth or in the early neonatal period which prompts admission to the unit, communication with parents

would begin right at the time of admission of the neonate until the time of discharge or referral to a higher centre. The communication would progress through follow up visits too. Parents need to be informed at each step of the neonatal care which includes,

- Reason for admission to the neonatal unit
- Initial diagnosis of the neonate at the time admission
- An outline of medical management
- Initial/current prognosis
- Changes in clinical course/adverse event
- Information and consent regarding any intervention/procedure
- Reason for referral and care during transport in case of referral to a higher centre
- Finally, follow up information in case of discharge

14.4 Principles of communication

- Practical and in simple language easily understood by the parents/relatives.
 - Should be of immediate relevance.
 - Do not flood the parents with too much information at a single contact.
 - Avoid use of technical jargon.
 - Information provided may require repetition and reiteration for the parents to understand it.
 - Timing of providing the information is crucial: Fix up a specific time daily for the parent doctor interaction e.g. after the ward
-
- Discussion should be unhurried and relaxed.
 - Preferably provided bedside so that the parents are oriented to the current situation of the newborn.

- Any bad news/adverse event should be disclosed in a quiet and private setting.
- Documentation of the information provided to the parents is important. (explanation regarding poor prognosis/ adverse events etc.)
- Meet the parents and communicate directly as far as possible in person.
- In cases where this is not possible eg; father overseas, speak over the phone. Presence of extended family members have to be on the discretion of the parents.
- Procurements (medicines, reports), if any, to be provided by the parents should preferably be at single visit on a day to avoid inconvenience and repeated calls to the parents, unless urgent.

14.5 Levels of communication in neonatal care

Health personnel (Nursing staff/ Doctors) need to communicate at various stages while working in a neonatal unit, as personnel trained specifically for this task are generally not available.

1. Communication antenatally
2. Communication on admission to the Neonatal Unit
3. Communication during the course of stay
4. Communication in case of death of a baby admitted in the Unit
5. Communication at discharge of neonate from Neonatal Unit
6. Communication at the time of referral

14.5.1. Communication antenatally

- All attempts should be made to counsel prospective parents of preterm babies / infants with antenatally diagnosed problems that would require admission to

a neonatal unit prior to the delivery. The counselling should be both parents or if time does not permit (mother in labour and father not living in close proximity) at least very briefly with mother.

- Parents should be informed of what to expect at time of delivery (they will/will not get to see the baby, baby will be very small, may not cry, may need intubation etc.), will need admission to the neonatal unit and monitoring / IV fluids etc (lots of wires, tubes and machines), may need to stay in the neonatal unit for an extended period.
- Mother should also be informed that she may not be able to breastfeed initially, but it is essential that she commences expression of breast milk (store colostrum in freezer / fridge if it is impossible to give even very small quantities of feeds of the baby) preferably within 6 hours of birth with the assistance of postnatal ward staff. Visitation rules of the unit should also be mentioned.
- In the case of extremely preterm babies provide some idea of possible short and long term outcomes based on your own unit statistics (preferably) and national / international statistics within realistic expectations.

14.5.2.Communication at the time of admission to the Neonatal Unit

- It is crucial to talk to the parents and relatives at the time of admission of a neonate to the SCBU/NICU. This discussion should be done once the baby has been stabilized and a reasonable clinical diagnosis has been made.
- The discussion should be relaxed and unhurried.
- The first contact should preferably be made by the senior most person of the unit available at the time. He / She should also introduce the staff (junior doctors and staff nurses) who would be available round the clock during this contact.
- Honest opinions should be given and all aspects of the

illness should be explained in detail. Cost of care where relevant (eg; private sector) should be explained.

- In case of babies with congenital malformations, provide information about the consequences of the disorder/malformation, and ways to prevent or treat the disorder. This involves assisting the family in comprehending medical facts, including the diagnosis and the available management.
- Words should be carefully chosen as tactlessly uttered opinions may result in tremendous conflicts resulting in providing poor or no care for the baby. If the baby's father is not available, a responsible member of the immediate family should be identified and all the relevant information should be given to that person in the presence of the mother if possible.

14.5.3. Communication during the course of stay

- If the baby is admitted in the Unit, it is the duty of the health personnel to communicate with the parents about the condition every day and more frequently if required. The treatment plan should be appropriately communicated to the family and the changes informed timely.
- Health care provider must be available when the mother visits her baby for the first time in the Neonatal Unit. She should be encouraged to get involved totally in the care of her baby provided her baby is stable. Even if the baby is very sick, the mother should be encouraged to visit often, express breast milk, clean and touch the baby.
- Nursing staff should be very considerate and compassionate as mothers at this point are often sick themselves and worried about their babies.
- The doctor and the nursing staff should be able to explain the equipment surrounding the baby & give the right amount of information so that the family members can

make informed choices about any procedure that is to be performed.

- In case of critically ill babies, family should be informed and prepared in advance of possible poor outcomes.

14.5.4 *Communication in case of death*

- The death of an infant is a major loss for the entire family. The mother's separation from her new, sick infant leaves her emotionally and physically helpless. Events may occur too fast for the parents to comprehend. Dealing with the death of a newborn is traumatic for both families and caregivers. The most important goal is to be compassionate and humane.
- If the babies are critically ill, as explained earlier the family members should have been prepared for any eventuality. The exact cause of death should be informed to the parents in a simple language.
- As soon as possible, sit down with the parents (or another support person) to tell them about the condition of the baby. The role of the health personnel should be to support the parents by giving clear and honest information in a supportive and caring manner. Avoid using phrases and sentences that may make the family members feel uncomfortable like, "it was for the best" or "it was meant to be".
- Avoid negative comments regarding the parents, referring doctor or the obstetrician (such as, you came too late, baby was sent when very sick, delivery was not conducted well). Offer to bring the baby to the mother and father to hold. Baby should be cleaned and wrapped well soon after being declared dead and should not be lying dead with intravenous lines and other monitoring equipment. All queries should be answered with utmost sincerity and genuine concern for the bereaved parents.
- If an autopsy is required, the parents' consent and the

formalities should be completed as soon as possible, so that the parents are free to take care of other things. All the formalities with the other departments should be completed quickly and the body handed over to relatives as early as possible. Parents can be called a month later to explain the findings of the autopsy & if required discuss the possibility of the problem occurring in the next baby and also be offered support.

14.5.5 *Communication on discharge*

- The families should be informed well in advance regarding discharge. They may require a lot of information related to home care of the neonate e.g. about breastfeeding, keeping babies warm, how to prevent infection, explain danger signs for which the parents need to come to the health facility immediately.
- Standardized information should be provided to ensure that every family member receives uniform information.
- The family may be counseled regarding care, nutrition, immunization and follow up.
- Parents should be encouraged to contact the unit for any queries. Write the contact number of the SCBU/NICU on the discharge sheet.
- Information should address well baby clinics, high risk clinics, developmental issues, information regarding ROP and hearing, other screening tests etc. and infection prevention.

14.5.6 *Communication at the time of referral to a higher centre*

- Some of the critically ill neonates may require referral to a higher centre for tertiary care. One of the most important and often very difficult aspects of transport is the need for emotional support of the parents and family. The need for transport of a newborn can precipitate a crisis for the entire family. Address the concerns of the family.

Accepting emotional outbursts calmly and reassuring the parent that their newborn is being cared for can reduce parental anxiety.

- Allow parents to see and touch their child prior to transport and encourage them to accompany the baby.
- Explain thoroughly the clinical problems and anticipated care during transport.
- Explain where to go and indicate whom to contact.
- Ensure communication with the referral facility and request for feedback
- Consider maternal transfer with her medical records whenever possible.

Summary

- Each neonate in SCBU/NICU requires individualized assessment and nursing care.
- A family centred approach in the SCBU/NICU can make a tremendous difference to parents, providing the basis of systematic support. Ensuring that parents have good information on which to base their decisions requires intense effort from staff using innovative communication strategies.
- Equipping staff to undertake this communication should be a mandatory component of their training and assessment; its practice should be a compulsory component of care.
- Good communication with family brings confidence and faith in health care providers and avoids emotional harassment and unnecessary litigations.
- It is good to arrange a special private place for communication in the neonatal unit.

EMERGENCY TRIAGE ASSESSMENT AND TREATMENT (ETAT)

The first part of the paper discusses the importance of understanding the local context in which a project is implemented. This includes a thorough analysis of the social, economic, and cultural factors that may influence the success or failure of the intervention. It is essential to engage with local stakeholders from the outset to ensure that the project is relevant and responsive to their needs.

The second part of the paper explores the challenges of implementing a project in a resource-poor environment. Limited access to funding, skilled personnel, and infrastructure can significantly hinder progress. However, these challenges can be mitigated through creative problem-solving and the utilization of local resources and expertise.

The third part of the paper focuses on the importance of monitoring and evaluation (M&E) in assessing the impact of the project. A robust M&E system should be established from the beginning to track progress, identify bottlenecks, and make necessary adjustments. This involves setting clear, measurable objectives and using a variety of data collection methods to gather reliable information.

The fourth part of the paper discusses the role of community participation in the project. Active involvement of the community not only enhances the project's relevance but also fosters a sense of ownership and commitment. This can be achieved through regular meetings, training sessions, and the formation of local committees.

The fifth part of the paper addresses the issue of sustainability. A project that is not designed to be self-sustaining is likely to fail once external support is withdrawn. Therefore, it is crucial to build local capacity and establish mechanisms for ongoing support and funding.

The final part of the paper provides a conclusion and offers recommendations for future projects. It emphasizes the need for a holistic approach that considers all aspects of the project, from planning to implementation and evaluation.

Chapter 15

EMERGENCY TRIAGE ASSESSMENT AND TREATMENT (ETAT)

15.1 Introduction

Many neonatal deaths in hospitals occur within 24 hours of admission due to treatable conditions when waiting in the queue for their turn. This can be prevented by 'Triaging' or rapid screening of neonates who require immediate attention for life threatening conditions. The word 'triage' means sorting. A sequential process for managing sick neonates as soon as they arrive in the health facility (NICU/SCBU) is described in this chapter.

15.2 Process & steps of management of sick neonates

(Refer figure15.1)

- Triage should be the first step in assessing neonates referred to a health facility. This helps to ascertain the group a referred neonate belongs to. Sick newborns are triaged into the following categories:

E Emergency

P Priority

N Non-urgent

Triage Categories

Action required

Emergency

Need immediate management

Priority

Need assessment and rapid action

Non-urgent

Need assessment and counselling

- Once emergency signs are identified; prompt emergency treatment needs to be given to stabilize the condition of the neonate.
- After the neonate with emergency signs is stabilized, a detailed history should be taken and relevant examination performed.
- Relevant laboratory investigations should be performed.
- A list of possible diagnoses should be made. A sick neonate often has more than one diagnosis or clinical problem requiring treatment.
- After deciding the main diagnosis and any secondary diagnoses or problems, treatment should be commenced (specific and supportive).
- Once the diagnosis is made and treatment given, the neonates should be closely monitored for response to treatment.
- Decision should be made to admit to the ward/SCBU/NICU.
- At discharge, educate the mother on treatment that need to be carried out at home and advise her on when she should return to the health facility.

ETAT guidelines are adapted from the Advanced Paediatric Life Support (APLS) guidelines.

Assessing Triage Signs (Refer Table 15.1)

- First assess every neonate for emergency signs. Those with emergency signs require emergency treatment.
- If emergency signs are not present, look for priority signs. Those with priority signs should alert you to a neonate who is seriously ill and needs immediate assessment and treatment. Neonates with no emergency or priority signs are treated as non-urgent cases.

Table 15.1: Signs for triage

Emergency signs	Priority signs	Non urgent signs
Hypothermia(Temp <35.50C) Apnea or gasping respiration Respiratory rate> 60 with retractions Central cyanosis Grunting Shock (cold periphery, CRT >3secs, rapid thready pulse) Convulsions Difficulty in arousal Coma Neonates with emergency signs are at high risk and require t immediate intervention / resuscitation. These neonates should always be admitted (SCBU/NICU) after stabilisation	Neonate <1800gms Temp 36.40C - 35.50C Tachypnea (rate>60, no retractions) Irritable/restless/jittery Refusal to feed Bilious or projectile vomiting Abdominal distension Severe jaundice (appears<24 hours /stains palms and soles/lasts>2 weeks) Severe pallor Bleeding from any site Major congenital malformations (Tracheo esophageal fistula, Menigomyelocele, Anorectal malformation Large baby >3.8 kg Action Neonates with priority signs are sick and would need immediate/ urgent assessment. They should be attended to on a priority basis. These babies need to be admitted to SCBU/ NICU	Jaundice Transitions stools Developmental peculiarities Minor birth trauma Possetting (vomiting milk) Superficial infections Minor malformations All cases not categorized as Emergency/ Priority In neonates with no emergency or priority signs, proceed with assessment and further treatment according to neonate's requirement

15.3 How to Triage

- All neonates should receive priority in the A & E / Preliminary Care Unit.
- To carry out the process of triage, the reception and resuscitation (RR) area or the casualty of the hospital managing sick neonates should be earmarked as the triaging area. The site at the facility where a neonate is first brought should be the triaging area.
- All the staff involved in the initial management of a child should be trained in the triaging process.
- The most experienced doctor present who is trained in neonatal care should undertake the responsibility of emergency treatment and management of the neonate keeping in mind the TABCD steps: Temperature, Airway, Breathing, Circulation, Coma, Convulsion, and Dehydration.
- Make sure that the neonate is warm at all times.
- Also ensure that blood sugar is normal.

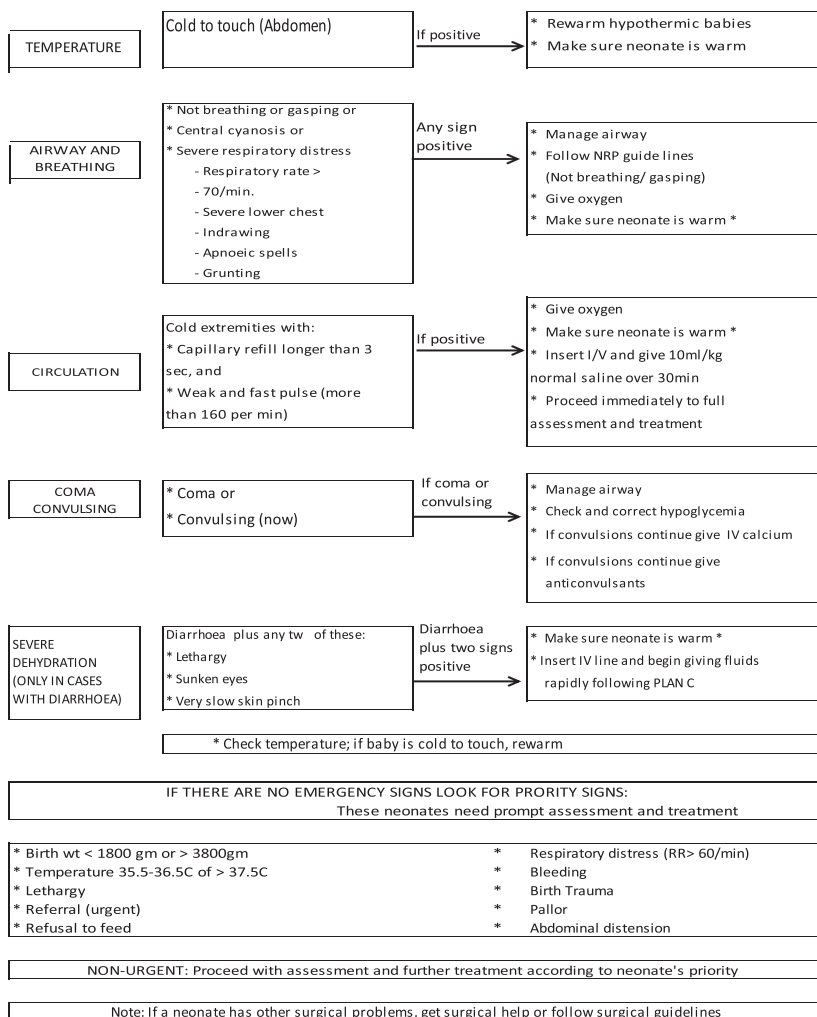


Figure 15.1 - Triage

15.4 Assessment of state of consciousness

A baby's conscious state can be classified according to the following categories:

Alert

Responding to Stimulation

Responding to Pain

Unresponsive

- A neonate who is not alert, but responds to stimulation is lethargic. An unconscious neonate may or may not respond to pain. A neonate who is unresponsive or responding only to pain will receive treatment for coma.
- Ensure TABCD.

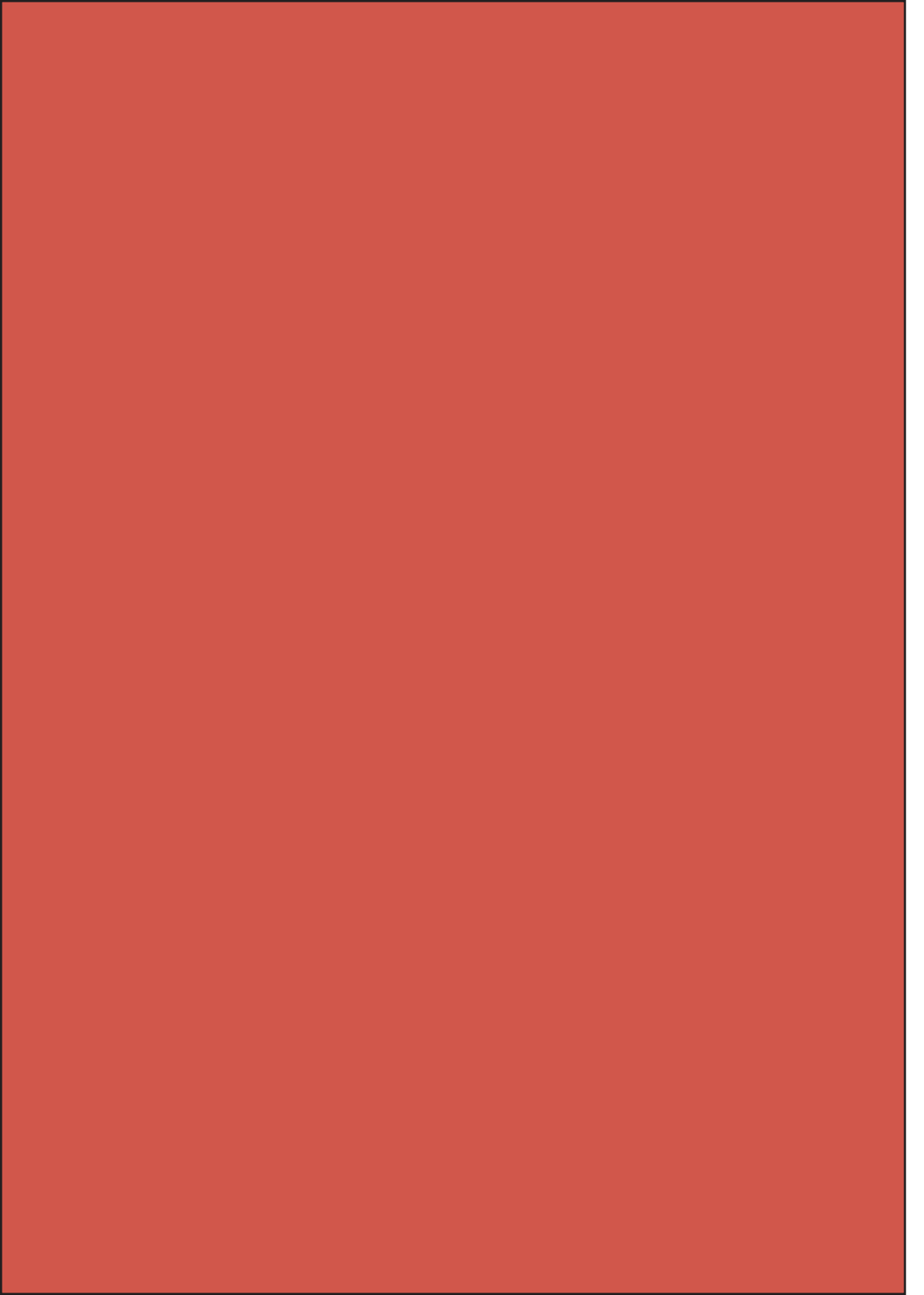
15.5 Post triage and stabilisation

- Once the baby is triaged and stabilized, the next step is to decide whether the baby requires admission to SCBU or NICU or referral.
- The team which will be taken over the care of the baby needs a detailed hand over in order to ensure appropriate continuation of care.

Summary

- Triaging is the process of identification of sick neonates requiring urgent attention.
- Carry out Emergency Triage, Assessment and Treatment (ETAT) of all sick neonates when they arrive at a health facility.
- Remember the TABCD steps: Temperature, Airway, Breathing, Circulation, Coma, Convulsion, and Dehydration.
- Never forget sugar

NEONATAL TRANSPORT



Chapter 16

NEONATAL TRANSPORT

16.1 Introduction

During the course of treatment a neonate may need to be transferred for further management to a higher centre equipped with better facilities. It is important to ensure a safe and timely transfer. It is also important to prepare the baby for transfer, communicate with the receiving or sending facility, and provide care during transfer.

If delivery of a high risk baby is expected and adequate facilities are not available at the primary centre, it is always **best to transfer in utero**.

The elements of safe transport include anticipation, preparation, stabilization, transport and handover.

16.2 Types of transfer

The need for transport of a neonate can be from home or smaller hospital to a SCBU or higher referral centre.

- From home or smaller hospital to a hospital with SCBU
- Intra hospital transport (LR/OT/Radiology)
- Inter facility transport (SCBU to a NICU or tertiary care facility)
- Reverse transport after treatment.

16.3 Identify babies who need referral

From community to a hospital with SCBU

Any neonate who has,

- Lethargy
- Refusal of feeds

- Hypothermia
- Tachypnoea, grunting, gasping, apnoea
- Seizures
- Abdominal distension
- Bleeding
- Deep jaundice over palms & soles and
- VLBW or premature should be transferred from the community to the SCBU.

From SCBU to a tertiary centre

- Need for mechanical ventilation
- Unresponsive shock
- Jaundice needing exchange transfusion if facilities not available
- Refractory seizures
- Refractory hypoglycaemia
- Need for surgical intervention

16.4 Preparation & organisation of transport

Communication with family/accepting hospital

- Explain the condition, prognosis and the reasons for transfer of the baby
- Explain where to go and whom to contact.
- Inform the referral facility beforehand.

Personnel

- A doctor / nurse/ midwife should accompany the baby (as appropriate to the baby's condition) in the vehicle to provide care en route and to facilitate transfer.

- Mother or any other relative should accompany the baby and transport team.

Vehicle

- The ambulance used for neonatal transport should have the following requirements:
 1. Secure fixation for the transport incubator.
 2. Secure fastening of other equipment (e.g. Oxygen and air tanks, monitoring equipment)
 3. Independent power source to supplement equipment batteries. This will ensure uninterrupted operation of the equipment. Necessary adapters to access the ambulance power source should be readily available.

Equipment & drugs

- Equipment needed for thermal control, maintaining the airway, resuscitation, oxygen therapy, CPAP/ mechanical ventilation, administration of IV fluids and monitoring should be available and be in working order.
- Availability of all essential medicines should be ensured.

16.5 Counselling and support to the family

- One of the most important and often difficult aspects of transport is the need for providing emotional support to the parents and family. Hospitalization and the need for transport of a newborn can precipitate a crisis for the entire family. Accepting emotional outbursts calmly and reassuring the parents that their child is being cared for can reduce parental anxiety. Interventions to reduce the stress and to support the grief response must be incorporated into the transport process.

1. Allow parents to see and touch their child prior to transport.
2. Thoroughly explain the clinical problem/s in simple language and the anticipated care during transport and at referral centre.
3. Inform about the receiving hospital including location, visiting policies and transport.
 4. General NICU facts should be provided.
5. Consider maternal transfer whenever possible.
6. Obtain consent for transfer and specifically for surgeries / procedures etc if anticipated..

16.6 Pre referral stabilisation and enroute care

Once a decision for transport is taken it is important to carry out the following;

Assessment

Make careful assessment of the baby by thorough examination. Make sure there is a genuine indication for referral.

Stabilisation

It is advisable to stabilise the baby while waiting for the ambulance rather than transferring the neonate by an unorganised transport with inadequate stabilisation as transport itself is a risk factor for destabilisation.

Stabilise with respect to temperature, airway, breathing, circulation and blood sugar. (TOPS: Temperature, Oxygenation, Perfusion, Sugar)

Temperature

- Ensure maintenance of the ‘warm chain’ during transport
- Use one of the following approaches to keep the baby warm during transportation:
 - Skin to skin care

This is probably the most effective, safe and convenient method provided baby is respiratory and haemodynamically stable for this. The skin to skin contact can be

provided by the mother. If she is not accompanying KMC can be provided by another willing person.

- Cover the baby

Cover the baby fully with clothes including the head and the limbs. Nurse the baby next to the mother or another adult during transport.

- Transport incubator

This is the ideal mode of transport and should be made available.

- Hot water bottle

This is **not a recommended** method unless there is absolutely no other option. If hot water bottles have to be used, utmost care has to be taken to prevent burns. The hot water bottle has to be wrapped with a piece of cloth and it should not be placed in direct contact with baby's skin.

Oxygenation : Airway and breathing

- Assess by checking the position of neck and look for presence of secretions. Check the respiratory rate and assess for respiratory distress, central cyanosis and watch out for gasping respiration or apnoea.
- Maintain the airway by keeping the head of a sick baby in slightly extended (neutral) position. This helps the baby to breathe better.
- Clear the mouth and nose of any secretions with the help of a mucus aspirator. In case baby develops apnoea give gentle tactile stimulation. If the baby remains apnoeic give positive pressure ventilation.

- If respiratory distress is mild to moderate give CPAP and oxygen as necessary. If baby has severe respiratory distress or gasping respiration or apnoea, intubate and provide positive pressure ventilation.
- If healthcare provider does not have intubation skills effective positive pressure ventilation can be provided by bag and mask even for extended periods if proper positioning of the baby and the mask are used along with an oral airway if necessary.
- Use pulse oximeter to monitor oxygenation.

Perfusion

- Check heart rate, capillary refill time, peripheral warmth and blood pressure (if feasible).
- If perfusion is compromised secure a venous access (preferably two) in a very sick baby. Give fluid bolus and inotropes as per guidelines for shock management

Sugar

- Check sugar with glucometer. Ensure adequate blood glucose levels. If glucose levels are low appropriate measures have to be taken (Refer Chapter 6).

Pre transport medication

Give first dose of antibiotics as intravenous penicillin and gentamicin generally.

Give Vitamin K if not administered earlier.

Enroute care

Feeds

- It is best not to attempt feeding sick babies with abnormal sensorium or severe respiratory distress before or during transfer.

- A well-baby at risk of hypoglycemia may be fed. If baby can suck give direct breast feeds. If unable to suck give expressed breast milk (EBM) with spoon or cup. If EBM is not available give any available milk.

Monitoring

- Constant vigilance (maintain TOPS) is required during the journey because neonates can deteriorate suddenly and without much warning.
- The deterioration could occur due to the neonate's clinical condition or equipment failure. Prompt action is needed to handle this.

16.7 Documentation and handover

- Write a precise note for the providers at the referral facility providing details of baby's condition on assessment, reasons for referral and treatment given to the baby.

Remember to send 5ml of mother's blood in a plain bottle if she is not accompanying the baby

16.8 Neonatal transport in Sri Lanka

- Safe transportation of a Neonate to a centre with expertise and facilities for provision of optimal neonatal care has shown definite improvement in neonatal outcome. Hence we should strive to provide optimal transport for these sick neonates.
- When a neonate needs to be transferred it is best done by a trained retrieval team. At present neonatal retrieval is carried out for non-ventilated babies during working hours in the Western Province by a retrieval team from the Lady Ridgeway Hospital. Eventually this facility will be expanded to the whole country along with a bed manager system.

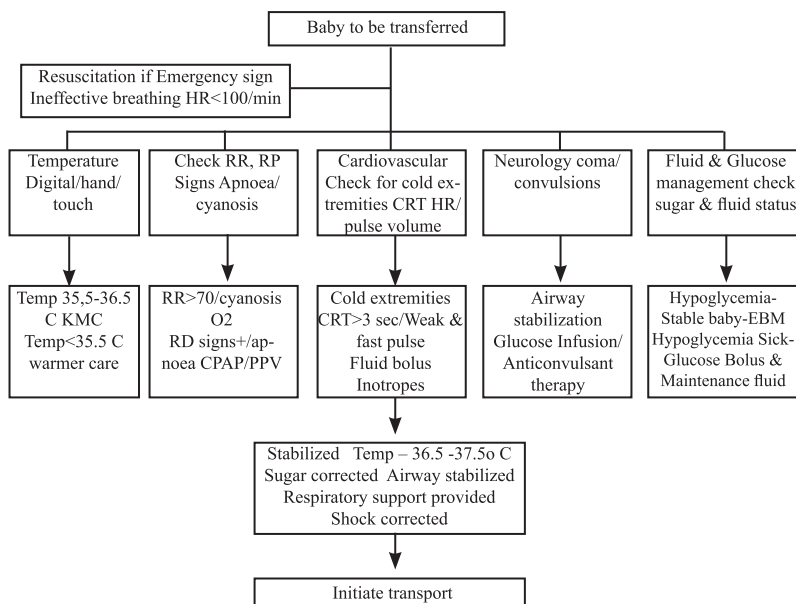


Figure 16.1: Flow diagram for Neonatal Transport

Summary

- Inutero transfer is the best method if adequate time is available.
- Neonatal transport is an important component of newborn care at a National level.
- Transport by trained, dedicated staff of a retrieval system is the ideal situation to ensure best outcome for the baby.
- Identify which babies need referral to which unit.
- Prepare organise transport
- Counsel and support family
- Provide pre-referral stabilization enroute care – TOPS
- Document the details and handover

NEWBORN CARE IN THE FIELD SETTING

Guideline 17

NEWBORN CARE IN THE FIELD SETTING

17.1 Introduction

The mother and baby discharged from the hospital come under professional postnatal care through home visits by the Public Health Midwife (PHM) and care in the postnatal clinics from the Medical Officers of Health (MOH). Care provided by the family and the circle of support to the postpartum mother and new born is also extremely important for the well-being of both of them. Hence it is the duty of the health staff to ensure that home care practices for the mother and newborn are in keeping with the evidence based best practices. Health care personnel should impart knowledge and skills to the family and the close community to support women and newborns in this most vulnerable time in life.

Following are the WHO recommended evidence based interventions for improving newborn health care at the home and community level;

Home/Family	Community and Work Place
Exclusive breastfeeding	Promotion, protection and support for breastfeeding
Hygiene (cord care, washing and cloths)	Keeping mother with the baby
Avoiding contact with sick family members	Supporting the mother during maternal absence
Clean, warm and quiet place, tobacco and fire smoke free	Support for referral care for sick new born
Extra care for small babies (pre term, low birth weight) including Kangaroo mother care	
Support for routine and follow up visits	

Motivation for home treatment of minor problems	
Recognition of danger signs	
Safe disposal of baby stool	
Care seeking at health facility or hospital	

These evidence based interventions are incorporated in to the postnatal care model in Sri Lanka.

17.2 Postnatal Care model in Sri Lanka

In the postnatal care model in Sri Lanka the domiciliary care and the field clinic care are provided by the MOH and his staff. The area PHM is responsible for the postnatal home visits while hospital or field clinic manned by a qualified Medical Officer is responsible for clinic care.

Following is the schedule for postnatal care in the field setting;

Following a Normal Vaginal Delivery;

- 02 home visits during the first 10 days after delivery (first visit within first 5 days)
- 01 home visit during 14 – 21 days (around 15th day) after delivery
- Postnatal clinic visit at 4 -5 weeks
- 01 home visit around 42 days (6-7 weeks) after delivery

In the rare event following a Home Delivery

- 03 visits during first 10 days after delivery
- 01 visit 14 – 21 days (around 15th day) after delivery
- Postnatal clinic visit at 4-5 weeks
- 01 visit around 42 days of delivery

In the following instances more home visits and clinic visits are mandatory;

- For women with postnatal complications
- When there are complications in the newborn
- For women who had still births and infant deaths also home visiting and if needed clinic visits have to be made

A locally adopted system is implemented to inform the PHM regarding the child birth as soon as the mother and baby are discharged from the hospital eg; telephone call, sending a messenger, or using a specially designed card etc are used.

The PHM should identify all the postpartum mothers in her area including those coming from other areas temporarily. She has to identify and take necessary action to the problems in the mother and baby. In this document only the activities conducted in relation to the newborns are mentioned.

17.3 Responsibilities of the Public Health Midwife (towards newborn)

17.3.1 At the first and second home visits within first 10 days post-partum

Observe the general condition of the mother and baby;

- Cleanliness and order in the house and place where newborn and mother live (including ventilation, light, safety, warmth, humidity, smoke exposure etc)
- Mother and baby are within easy reach (rooming-in or bedding-in)
- Personnel hygiene of the mother
- Behaviour and mood of the mother (whether sad or happy)

- Support and general attitude of other family members towards mother and baby

Baby;

- Check the entries in the CHDR and in a Neonatal Diagnosis card if any.
- Ensure that BCG immunization and Vitamin K have been given
- Identify the presence of any high risk conditions that need special attention

PHM should ensure the practice of essential newborn care for the newborn;

- Ensure that the baby is kept warm
- Ensure that the mother and baby are together in the same room or in same bed or within easy reach of one another
- Reiterate and facilitate exclusive breastfeeding for 6 months
- Ensure adherence to hygienic practices
- Look for and advice regarding danger signs in the baby

Ask from the mother;

- Mother's feelings and observations about the baby
- Feeding; on demand feeding, length of the feed, frequency of feeds (how many times the baby has fed in the last 24hrs), whether the baby is satisfied after the feed, whether the baby is exclusively breastfed, any concerns of the mother
- Excretions; Urine – frequency, Stools – colour and consistency
- Sleep
- Crying

- Any abnormalities observed – eye discharge, vaginal discharge, umbilicus, yellow discoloration etc
- Vomiting

Observe and examine;

Before examining the Newborn always wash hands with soap and water. Choose a place with good light for the examination of the newborn.

- General appearance: weight, colour, any other external abnormalities
- Look at the presenting part: swelling or bruises
- Movements: normal/abnormal
- Observe the cry
- Hygiene of the bay
- Breathing: Normal/grunting/ and count breaths (30 – 60/ minute)
- Feel for warmth. If cold or very warm measure the temperature
- Tone: Normal/abnormal
- Colour; tip of the nose, eyes, skin (cyanosis, jaundice)
- Condition of the umbilicus
- Observe a breast feed and ensure that - the mother is confident about breastfeeding
 - Posture of the mother
 - Positioning and attachment of the baby
 - Putting the baby to the breast
 - Suckling
 - How the baby ends a breastfeed
- Inquire about mothers knowledge on hunger cues, on

demand feeding, breastfeeding the baby at night, how to ensure that the baby is getting adequate breast milk etc.

- Presence of any danger signs given in the box below;

Danger signs in the new born

- Fast breathing (> 60 breaths / minute)
- Slow breathing (<30 breaths/minute)
- Severe chest in-drawing
- Grunting
- Convulsions
- Floppy or stiff
- Bluish discolouration of the body
- Fever (temperature >38°C)
- Cold body (temperature < 35°C) or not rising after rewarming
- Bleeding from umbilical stump
- Yellow discolouration of the body
- Pallor
- Diarrhoea
- Vomiting after every feed
- If a baby who was breast feeding well refuses two consecutive feeds
- Umbilicus draining pus or umbilical redness extending to skin (periumbilical redness)
- Swelling in one or more limbs
- Weakness in any one of the limbs
- Weak cry
- More than 10 skin pustules or bullae or swelling, redness, hardness of skin

If any danger sign is detected refer the baby immediately to the MOH clinic or to the closest hospital for care. If any other problem is detected refer accordingly.

Give information to the mother

- Educate and support the mother on routine care of the newborn – how to clean the baby when soiled, proper disposal of stools, bathing the baby, keeping the baby warm etc.
- Activities that should be done for psychosocial development of the baby – kissing the baby, touching, singing to the baby etc.
- How to keep the home environment safe and clean (without dust, cold, smoke)
- Advice on methods of infection control – importance of limiting the visitors, limiting the number of visitors and hand washing
- Inquire about myths and support the mother – giving ratha kalkaya, gammiris pimbura
- Inquire and solve the problems regarding BCG immunization
- Register the baby and maintain record.
- Decide on the date of next visit according to the problem identified

17.3.2 At third home visit within day 11-21 postpartum

Observe the general condition of the mother and the home as described earlier

Ask;

Mother's feelings or observations about the baby

- Feeding: on demand feeding, frequency of feeds, any

concerns of the mother

- Excretion; urine- frequency/stools – colour and consistency
- Sleep
- Crying
- Any abnormalities observed – eye discharge, vaginal discharge, umbilicus, yellow discoloration, etc
- Vomiting

Examine;

- Colour; cyanosis, icterus
- Umbilicus; fallen or not, discharge, peri-umbilical redness
- BCG scar
- Excretion (stool/urine; frequency, colour)
- Infections; pustules, discharges
- Feeding – correct positioning of the baby to breast, adequacy of breast milk, solve problems during breast feeding

Intervene;

- Educate the family on duties of mother/father for psycho social development of baby
- Early childhood care practices
- Safety of the baby – from animals, physical environment, older children
- Refer to postnatal clinic by 4 weeks
- Maintain records
- Revisit if needed

17.3.3 At the home visit around 42 days of the newborn

- Support the mother to maintain nutrition, cleanliness and psychosocial development of the baby
- Check whether mother is maintaining the records of psycho social developmental activities of the baby according to the age
- Refer baby for immunization
- Explain importance of weighing baby monthly to assess growth until one year of age
- Discuss about breast feeding and address any issues identified, build the mother's confidence to breastfeed exclusively for the first six months
- Ensure continued family support to the mother

17.4 Field postnatal clinic

- Area PHM should refer all postnatal mothers to the postnatal clinics in 4-6 weeks postpartum. Postnatal clinic should be a component of a poly clinic.
- Two postnatal clinics should be held in a MOH area per month. A date for the postnatal clinic should be given to all mothers during the home visits and it should be mentioned in H 512 and the CHDR.
- The attendance of mothers for postnatal clinics should be entered in the clinic attendance register as well as the clinic summary. The number of mothers attended, mothers found with postpartum complications and mothers referred for specialized care should be entered in the quarterly clinic record (H – 527).

Objectives of the postnatal clinic –

- Complete examination of the newborn and attend to any deviations detected
- Assess breast feeding, identify and solve problems regarding breastfeeding

- Assess the growth and development of the child

On admission to the clinic;

- Register the mother and baby
- Measure head circumference and the weight of the baby

Tasks

Ask

- Check the diagnosis card if any
- About breastfeeding
- Urine output/bowel opening
- Sleeping habits
- Eye to eye contact (mile stones)
- Any worries for the mother

Examine

- General appearance
- Fill the neonatal examination format/check list. CHDR
- BCG scar
- Check the neonatal diagnosis card if available
- Check the CHDR
- Supervise breastfeeding technique (if weight gain is not adequate)
- Check for exclusive breastfeeding
- Do investigations if needed
- Take necessary actions

A separate time should be given for mothers who had still births and infant deaths.

IMPORTANT CIRCULARS

General Circular letter no: 02/117/2013

24 /07/2013

Ministry of Health,

‘‘Suwasiripaya’’, 385,

Rev Baddegama Wimalawansa Thero Mawatha,

Colombo 10.

All Deputy Director Generals,

Provincial Directors of Health Services,

Regional Directors of Health Services,

All Heads of Institutions,

All Medical Officers of Health

Lactation Management Centres (LMC)

Breastfeeding is the most effective evidence based intervention that has the highest impact in reducing neonatal morbidity and mortality. In addition, the importance of exclusive breastfeeding for six months, in promoting the nutritional status and physical and mental development of infants and protecting them from infections has clearly been demonstrated. It is scientifically proven that skilled assistance mothers get in establishing lactation during early postpartum period is crucial for successful establishment and continuation of breastfeeding. Early establishment of breastfeeding in neonates ensures proper weight gain and contributes to reduction of child malnutrition. Mothers need practical support in initiation and establishing breastfeeding. Especially when a mother encounters breastfeeding problems, she has to be supported early and appropriately. Breastfeeding according to the national recommendations (Nutrition Policy, 2010) has short and long term, health as well as economic benefits to the individual, family and the society.

Lactation Management Centres (LMC) where feeding problems of infants are attended to, play a vital role in achieving these objectives.

According to the manual on '*Building and Other Guidelines for Neonatal Intensive Care Units, Special Care Baby Units and Mother Baby Centres*' published by the Ministry of Health in 2007, Mother Baby Centres (Mother Baby Units + Lactation Management Centres) have to be set up in all the specialist institutions providing maternal and neonatal care services (Teaching Hospitals, Provincial General Hospitals, District General Hospitals, Base Hospitals and the Children's Hospitals Lady Ridgeway Hospital and the Sirimavo Bandaranayake Children's Hospital). This circular guideline is issued further to the above mentioned manual.

The Ministry of Health has decided to instruct Heads of All the Specialist Institutions (Teaching Hospitals, Provincial General Hospitals, District General Hospitals, Base Hospitals and the Children's Hospitals Lady Ridgeway Hospital and the Sirimavo Bandaranayake Children's Hospital) to set up Lactation Management Centres at their respective institutions, before the 31st December 2013 if they are not already established. It should be noted that Heads of Institutions should make every effort to establish Mother Baby Centres (MBC) alongside the LMCs in their respective institutions in due course. It is calculated that admitting mothers and babies to the MBC when possible is extremely cost effective than admitting such babies to the Special Care Baby Unit.

The Heads of Institutions should take steps to establish the LMCs according to the guideline given in the annexed document. Progress of

the activities conducted at the LMC has to be reviewed at the monthly Perinatal Surveillance meeting as an agenda item. LMC Monthly Return has to be sent before the 15th of the following month to the

Family Health Bureau in the annexed format. Resource mobilization if required has to be done in keeping with the Sri Lanka code for promotion, protection and support of breastfeeding and marketing of designated products (2002).

Signed by Dr P G Mahipala,
Director General Health Services

Cc:
Director/MCH
Director/HEB
Director/NIHS
Director Nutrition
Director Nutrition Division
Chief Medical Officer of Health - CMC

Annex I

Standard Guidelines to set up a Lactation Management Centre

Functions;

1. To anticipate, identify and attend to mothers and babies who develop or are likely to develop lactation problems eg: primies, multiple pregnancies, diabetes, preterm deliveries, babies born by LSCS etc.
2. To attend to feeding problems of babies referred from maternity units and other referrals including those of public health staff, GPs, self-referrals
3. To provide day facilities for mothers and babies who are referred from within and outside the hospital with feeding problems
4. To organise and coordinate breastfeeding promotion activities along with the Health Education Unit of the hospital within the institution and the support the catchment area MOOHs in such activities
5. To ensure in coordination with Health Education Unit of the institution that mothers who receive antenatal care from the hospital are knowledgeable and confident about newborn care with special emphasis on breastfeeding.
6. To assist the in-service training programmes on Breastfeeding Counselling, Baby Friendly Hospital Initiative and Infant and Young Child Feeding
7. If the LMC is functioning alongside a MBC, it can provide indoor facilities as well.
8. To maintain statistics in the unit

Criteria for Registration at the LMC;

- Mothers along with babies with feeding problems
- Mothers who need their skills developed on breastfeeding

Exclusion criteria;

- Acutely ill neonates should not be admitted to the LMC

Responsibility;

The unit need to function as a part of the Neonatal Intensive Care Unit (NICU)/Special Care Baby Unit (SCBU)/Mother Baby Centre (MBC). Technical responsibility for the unit is with the Consultant Neonatologist or Consultant Paediatrician as the case may be.

Location;

LMC should ideally be located in close proximity to the MBC and the NICU/SCBU. It should be in close proximity to the postnatal ward preferably in the ground floor. Clients coming from outside should also have easy access to the LMC. Efforts should be made to create a homely environment in the LMC. It should be away from common toilets and garbage collections.

The LMCs as Lady Ridgeway Hospital and SirimavoBandaranayake Children's Hospitals should be located as close as possible to the Out Patient Department.

Space;

Space should be 20m² and should accommodate 3 cots, 1 bed, 5 low wooden arm chairs, the duty station and the utility area; There should be wall lockers for mothers to keep their utensils; There should be a

foldable nappy changing area; Should have an attached toilet to the LMC for the mothers.

Water supply;

Maintaining 24hr water supply is mandatory.

Hand washing facilities

There should be a sink with an elbow operated tap with isolated valve; Soap racks to keep pieces of soap for hand washing and towel dispensers should be available; Pictorial hand washing instructions should be provided above all sinks.

Ventilation

There should be ceiling fans and cross ventilation. Ceiling fans should be cleaned regularly; There should be one or more rows of windows with an aluminium frame at above 5 feet level (easy cleaning and sustainability should be considered). It should be fixed in a way to promote cross ventilation; in places with low ambient temperature provision of warmers should be considered for LMC.

Ceiling;

Ceiling should be washable /wet moppable; Asbestos free cement sheet should be used.

Wall;

The wall should be tiled up to 5 feet upwards from the floor level. An anti-bacterial grout should be used to fill the grooves between edges to prevent dust collection.

Floor;

The floor has to be tiled. Large tiles (2 ft by 2 ft) with a matt surface are preferred as there will be fewer borders. Correct fixation and proper apposition of edges is important to minimize grooves. An anti-bacterial grout should be used to fill the grooves between tiles.

Lighting;

Natural sunlight through windows is preferred; Light fixed to the ceiling directly or indirectly are better than lights fixed to a stand on the floor.

Staff;

Technical Responsibility – Consultant Neonatologist /Consultant Paediatrician; Medical Officers in the NICU/SCBU should oversee problems referred under the guidance of the Consultant Neonatologist /Consultant Paediatrician; Nursing Officers and Mid Wives should be assigned to the LMC and should be under the supervision of the Nursing Officer in-charge of the LMC;

Minimum number of staff for the LMC of a hospital with 300 deliveries should be 2 officers (2 nurses **or** 1 nurse and 1 midwife). For the LMC at Lady Ridgeway Hospital and SirimavoBandaranayake Children's Hospitals 3 nurses should be assigned.

All the Medical Officers, Nursing Officers and Mid Wives working in the LMC should have undergone training in the 40hr Breastfeeding Counselling Course.

Duty hours;

When only the LMC is functioning the duty hours are from 7am – 4pm.

Type of staff	Morning (7am – 4pm)
Officers (2 Nursing Officers or 1 Nursing Officer and 1 Mid wife)	02
Minor Staff	01

When the LMC is functioning alongside the MBC it can function in a 24 hr basis.

Equipment and Utensils;

• Steriliser for sterilising the feeding cups and utensils • A television set /DVD or VCD for health education • Computer • Digital Infant weighing scale (0-10Kg) • Neonatal stethoscope x 1 • Digital thermometer – low reading • Small stainless steel feeding cups with lids x 20 • Rectangular trays with slots to keep feeding cups x 4	• Waste bins (colour code system should be practiced) • Pedal bin for soiled nappies • Adult low bed • 3 Stainless steel baby cots with lower half to keep baby items • Wooden feeding chairs to breastfeed – with low arm rest x 5 • Shoe rack • Linen cupboard • A book rack • Pantry cupboard • Chairs and table for the duty station
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• Kidney trays x 2 • Wall clock x 1 • Water filter x 1 • Torch • Tape • Portable sucker	• Computer table and chair • Doll • Artificial breast • Teaching Material • Ambo Bag with neonatal mask
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Telephone facilities;

Incoming only direct line and intercom lines should be available.

Registers;

Admissions register for the LMC has to be maintained

Records;

Discharge and Screening Card for LMC

Returns;

LMC monthly return has to be sent to the FHB and to the Medical Statistics Unit before the 15th of the following month.

General Circular No; 02-27/2014

All Deputy Director Generals,
Provincial /Regional Directors of Health Services,
Directors of Teaching Hospitals/ Provincial General Hospitals
Medical Superintendents of District General Hospitals/Base Hospitals

Guidelines for Screening of Retinopathy of Prematurity

The Ministry of Health with the technical collaboration of the Family Health Bureau, Sri Lanka, College of Paediatricians, Sri Lanka College of Ophthalmologists, The Association of Vitreo Retinal Specialists of Sri Lanka and the Perinatal Society of Sri Lanka has revised the Guidelines for Screening of Retinopathy of Prematurity. Make arrangements to inform the contents of this guideline to all the relevant staff in your institution and ensure adherence to the Guidelines for Screening of Retinopathy of Prematurity.

Signed by Dr P G Mahipala,
Director General Health Services

Guidelines for screening of Retinopathy of Prematurity

1. Indications;

Babies with – POG less than 34 weeks
Birth weight less than 1500 g
Any sick or preterm neonate based on clinical judgement
Any baby with cyanotic congenital heart disease

One criterion is adequate for referral

2. Timing of screening;

All the pre term babies and high risk neonates to be screen at postnatal age of between 3-4 weeks

3. Place of screening;

Screening would be conducted inside the NICU/SCBU until the baby is discharged.

Facilities for screening, staff to assist should be made available in the neonatal unit Out patients to be followed up at eye units by prior appointment

4. Procedures prior to screening

Maintain sterility - use gloves

- Use individual bottles of topical medication
- Topical medication to be instilled by the mother for out patients under the supervision of the nursing officer

5. Dilatation of the pupil

Start eye drops ½ hr before the scheduled examination

One drop of Tropicamide 0.4%

Phenylephrine 2.5% combination

Wipe the excess with a cotton swab

Drops could be repeated twice, 10 minutes apart

6. Method of examination

With topical anaesthetic drops

Use paediatric eye speculum

Use a cotton tip applicator or irrigating vectis as an indenter

Binocular indirect ophthalmoscope and 20 D lens and 28 D lens

7. Recording the findings

Record in the standardized format (to be retained in the eye unit) and in the summary form (to be attached to the inner page of the CHDR)

Record in; Zone 1,2,3

 Grade 1,2,3,4,5

 Presence of plus disease

Zone 1 ROP or any evidence of plus disease refer to the treatment centre

8. Counseling

Parents to be counseled regarding

- the disease

- Importance of follow up

- possibility of requiring treatment

For inpatients - Group counseling is possible

Responsibility of counseling – In patients; Neonatal unit staff under the neonatologist
- Out patients; Eye unit by trained staff.

9. Review

Depend on the presence or absence of ROP
No ROP – Follow up every 2 weeks
In the presence of ROP follow instructions on referrals

10. Referrals

Preliminary referral; Neonatologist/Paediatrician to request the ophthalmologist in the closest eye unit for screening.

For treatment; the Eye Surgeon should refer to the designated center for the respective hospital.

Following are the available centers as at April 2014;

National Eye Hospital Colombo

Lady Ridgeway Hospital for Children Colombo

Teaching Hospital Kandy

Teaching Hospital Karapitiya

Teaching Hospital Jaffna

District General Hospital Ampara

Sri Jayewardenepura Hospital-

11. Discharge from examination

No ROP at 42 weeks

Regressed ROP (treated or spontaneous)

12. Special remarks

Prevention of spread of conjunctivitis

Preferably the mother of each child should instil the drops, with own vial of drugs, with gloved hands. Examiner should be gloved and change with each examination.

To prevent drop outs from follow up mother should be given written instructions with a date, time, place specified

General Circular No; 01-19/2011

All Provincial Directors of Health Services,
All Deputy Provincial Directors of Health Services,
Directors of Teaching Hospitals,
MOi/c, MoH Institutions,
MOi/c MoH Institutions of Line Ministries,
President Sri Lanka College of Paediatricians,
President Perinatal Society of Sri Lanka,
President Sri Lanka College of Obstetricians and Gynaecologists,
Head of the Department of Pharmacology, University of Colombo.

Guidelines for Surfactant Use

This replace the previous circular No; P-14/30/2008

Surfactant is a life saving drug in a condition called surfactant deficiency distress syndrome (SDDS) occurring in newborn babies.

The Ministry has realised the importance of the surfactant availability at Government Hospitals and has taken steps to make available this drug in the hospitals through medical supplies division.

Since the unit cost of surfactant is very high and the Ministry of Health has a limited budget for medical supplies, only a limited number of surfactant will be made available at the initial stage

Therefore guidelines were formulated to ensure its optimum usage and avoid misuse.

Guidelines

1. Surfactant should be used in the **Neonatal Intensive Care Units** for the treatment of radiologically proven Hyaline Membrane Disease (HMD).
2. Surfactant should be requested and received only by the hospitals with ventilator support minimum CPAP facilities in the neonatal units.

3. It should be used for neonates,
 - a) With a birth weight >900g
 - b) With a maturity >27 weeks gestation
 - c) In the absence of major congenital abnormalities
 - d) In the absence of asphyxia
 - e) Any special circumstances Paediatricians/Neonatologists will decide to use
4. In meconium aspiration syndrome cases Paediatrician should take the decision.
5. Surfactant should not be used for prophylaxis
6. It should be handled by trained persons. Consultant Paediatrician or a Medical Officers adequately trained to administer surfactant should use it.
7. It should be only single dose treatment.
8. The outcomes should be reported to the Family Health Bureau in the attached format and copy should be sent to the Medical Supplies Division.
9. Any adverse drug reaction reported due to surfactant should be reported to ADR monitoring centre, Department of Pharmacology, University of Colombo (in the attached ADR form)
10. When required Surfactant should be administered as early as possible.

Signed by Dr Ajith Mendis,
Director General Health Services

CC; DDG MS
DDG PHS II
Director MCH
Director MSD

All DDGs Ministry of Health,
All Directors of Ministry of Health,
All Provincial Directors of Health Services,
All Directors of Teaching Hospitals,
All Regional Directors of Health Services,
All Heads of Institutions,
All Medical Officers of Health.

Formats on Newborn Care

This circular replaces the previous general circular No; 01-10/2007. Ministry of Health has decided to introduce a standard set of formats on newborn care to all the maternity and newborn care institutions in the country in order to facilitate improvement of services. Standard formats would strengthen the maintenance and flow of information on newborn care at different levels.

The set of formats to be introduced include neonatal examination format, NICU/SCBU admission register, NICU/SCBU History Record Sheet, Neonatal Diagnosis Card, Neonatal Transfer Form, Neonatal Admission Sheet and Neonatal Monthly Return. These formats were developed by the Family Health Bureau of the Ministry of Health with representatives from the Perinatal Society of Sri Lanka, Sri Lanka College of Obstetricians and Gynaecologists and Sri Lanka College of Paediatricians.

Heads of Institutions should make arrangements to create awareness among staff attached to maternity/neonatal care units and OPD regarding these formats and ensure its usage appropriately. Sisters in charge of following units should keep adequate stocks of formats indicated for each unit and ensure that they are appropriately utilised.

Labour Room; Neonatal Examination Format – H 1162
NICU/SCBU History Record Sheet – H 1164
Neonatal Transfer Form – H 1166
Neonatal Intensive Care Unit/Special Care Baby Unit (NICU/SCBU)
NICU/SCBU Admission Register
Neonatal Diagnosis Card – H 1165
Neonatal Transfer Form – H 1166
Neonatal Monthly Return – H 1168
Postnatal Ward
NICU/SCBU History Record Sheet – H 1164
Neonatal Diagnosis Card – H 1165
Neonatal Transfer Form – H 1166
OPD
Neonatal Admission Sheet – H 1167

All officers concerned should comply with the above instructions and make every effort to successfully use these formats in all the maternal and neonatal care units in the country.

Signed; Dr Ajith Mendis
Director General Health Services /Ministry of Health

CC;
Secretary, Ministry of Health
Additional Secretary/ Medical Services
All Provincial Secretaries of Health Services
President Sri Lanka College of Medical Administrators
President Sri Lanka College of Paediatricians
President College of Community Physicians of Sri Lanka
President, Sri Lanka College of Obstetricians and Gynaecologists
President Perinatal Society of Sri Lanka
President Government Medical Officers Association.

