Assessment and Management of High Risk Newborns

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Outlines of Talk

• Introduction to High Risk Newborns

• Risk Factors to Define High Risk Newborns

• Clinical Manifestations of Diseases in Newborn Period

• Basic Principles of Stabilisation & Transport of Sick Neonates
High Risk Newborns

• Refers to who?
  • *Neonates who are at an increased risk morbidity and mortality due to various risk factors*

• 9-10% of all newborns require special medical & nursing care
  • 1-3% require NICU care

• Include premature newborn <34 weeks & ill newborn infants
High Risk Newborns

• Requires **early** identification & close observation by experienced doctors & nurses

• Early referral is important to reduce neonatal mortality
Which Newborns are at High Risk?

- Demographic social factors
- Maternal PMH
- Previous pregnancy
- Present pregnancy
- Labour & delivery
- Neonate factors
1) Demographic Social Factors

• Maternal age <16 or >40yr

• Illicit drug, alcohol, cigarette use

• Poverty

• Unmarried

• Emotional or physical stress
2) Past Medical History of Mother

- Genetic disorders
- DM
- HPT
- Asymptomatic bacteriuria
- Rheumatologic conditions (SLE)
- Long term medications
3) Previous Pregnancy

- IUD
- Neonatal death
- IUGR
- Congenital malformation
- Prematurity, cervical incompetence
- Blood group sensitisation, NNJ
- Neonatal thrombocytopenia
- Hydrops, IEM
5) Labour & Delivery

- Gestation
- AFD
- Immature L:S ratio
- Breech presentation
- Meconium stained liquor
- Nuchal cord
- Caesarean section
- Forceps delivery
- Poor Apgar score
6) Neonate Factors

• Born too early/ born too late
• Born too small/ born too big
• Born with symptoms & signs of sepsis
• Born with congenital malformations
Born Too Early - Premature Newborns

• Definition of prematurity by WHO: birth <37 weeks gestation

• At higher risk of complications following birth
Complications of Prematurity

Early complications:

• Hypothermia
• Respiratory – RDS, apnoea
• GI – feeding intolerance, NEC
• Infection
• IVH
• Susceptible to hypovolaemic effects of blood loss
Complications of Prematurity

Later complications:

• Respiratory: BPD
• Cognitive: Developmental delay and learning disabilities
• Movement: Cerebral palsy
• Eyes: Retinopathy of prematurity
• Behavioural/ psychological problems
• Failure to thrive, feeding issues
Infants who are born >42 weeks gestation

Having appearance & behaviour of infant of 1-3 weeks of age
Post Term Infants

• Significantly increased risk of mortality when delivery is delayed >=3 weeks beyond term

• Improved obstetric management has markedly reduced mortality

• Problems of post term infants:
  • Intrauterine Asphyxia
  • Meconium Aspiration
Born Too Small - IUGR (SGA) Newborns

• Small for gestational age (SGA):
  • when plotted on intrauterine growth chart, they lie below 10th percentile.
IUGR (SGA) Newborns

LBW < 2500g, can be due to prematurity, or IUGR, or both

IUGR – a/w medical conditions that cause placental insufficiency, or general maternal health & nutrition
IUGR (SGA) Newborns

Associated problems:

- IUD
- Perinatal asphyxia
- Hypoglycaemia
- Polycythemia – hyperviscosity
- Hypothermia
- Dysmorphism
Large for gestational age (LGA): When plotted on intrauterine growth chart, they lie above 90th percentile.
Large for Gestational Age

• Also known as macrosomia, BW>4kg

• Neonatal mortality rates decreases with increasing birthweight until ~4kg, after which mortality increases
Large for Gestational Age

Why are they born LGA:

- Post term infants
- Maternal diabetes during pregnancy
- Fetal disorder of transposition of the great vessels
- Genetic factors
- Obesity
- Multiparous mother
Complications of LGA Newborns

- Risk for birth injuries (e.g., clavicle fracture, brachial plexus injury, cephalohaematomas)
  - May need caesarean birth
- Hypoglycemia
- Polycythemia (HCT>65%)
- RDS
- Congenital defects (congenital heart defects, tracheoesophageal fistula & CNS anomalies)
Congenital Malformations

- Small mouth, small jaw, short neck
- Shield chest, or short and prominent sternum; and wide-set nipples
- Occiput, or back part of the skull, is prominent
- Dysplastic, or malformed ears
- Clenched hands with overlapping fingers
- Flexed big toe; prominent heels
- Small head, absent eyebrows
- Cleft lip and/or palate
- Dysplastic, or malformed ears
- Clenched hands and polydactyly, or extra fingers
- Undescended or abnormal testes
- Widely separated first and second toes and increased skin creases
- Flattened nose and face, upward slanting eyes
Diseases that affect the newborn may originate:
- in utero
- during birth, or
- in the immediate postnatal period

Recognition of diseases in newborn infants depends on
- knowledge of the diseases
- evaluation of a limited number of non-specific clinical signs & symptoms
Signs & Symptoms in Sick Newborns

- Respiratory insufficiency
- Apnoea
- Cyanosis
- Pallor
Signs & Symptoms in Sick Newborns

- Feeding difficulties
- Vomiting
- Abdominal distension
- Diarrhoea
Signs & Symptoms in Sick Newborns

Fever or Hypothermia
Principles of Initial Stabilisation of the Sick Neonate

- Airway
- Breathing
- Circulation, Communication
- Drugs, Documentation
- Environment, Equipment
- Fluids – electrolytes, glucose
- Gastric decompression
Transport of the Sick Newborn

• **Aim:**
  • To ensure the sick newborn arrives in a stable state at the receiving hospital

• **Involves:**
  • Pre-transport resuscitation & stabilisation
  • Continuing intra-transport care

• **Important principles:**
  • Good communication and coordination is essential between the referring hospital & receiving hospital
  • Rarely a need for haste
Mode of Transport
Airway

Establish a patent airway

Evaluate the need for oxygen, frequent suction (oesophageal atresia) or artificial airway (potential splitting of diaphragm)

Secure airway

CXR – check ETT position
Breathing

• Assess the need for intra-transport ventilation

• Does the infant have:

  • Requirement of FiO₂ ≥ 60%
  • ABG – paCO₂ > 60mmHg
  • Tachypnoea & expected respiratory fatigue
  • Recurrent apnoeic episodes
  • Expected increased abdominal/bowel distension during air transport
Breathing

Consider elective intubation and ventilation before transport

— NB: check ETT position!

Special condition in which it may be preferable not to ventilate:

  e.g. tracheo-oesophageal fistula with distal obstruction

  Consult the surgeon/ paediatrician if in doubt
Circulation

- Assess circulatory status (include hydration):
  - HR
  - Urine output
  - Current weight (compare to birth weight)
  - BP

- Ensure reliable intravenous access before transport (& well secured)*
Good communication aids proper pre-transfer stabilization, coordination, timing of transfer, & preparedness of receiving hospital

Involves teamwork:
  - referring doctor, escorting team, neonatologist/paediatrician +/- paediatric surgeon, ED staff of receiving hospital

Provide detailed info about patient & relevant transfer details
Drugs (as required)

- Antibiotics – needed in most sick neonates
- Analgesia or sedation (if intubated, has peritonitis)
- Inotropes
- Vitamin K
Documentation

History
Previous & current management
Previous operative & histopathology notes (if any)
Input/ output charts
Investigation results, X-rays
Consent*
Parents contact details*
Mother’s blood for cross match*

* Esp if parents do not accompany child
environment

- Maintain a thermal neutral environment,
- Optimal temp for neonate (axilla): 36.5 – 37 °c
- Transport incubator – ideal
- Wrap limbs of the neonate (cotton, plastic, etc)
- Cotton-lined cap for head

- Remove all wet linens
- Care of exposed membranes (e.g. abdominal wall defects)
- Polyethylene bags for ELBW newborn infants**
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<th>Equipment</th>
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<td>Transport incubator (if available)</td>
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<td>Airway and intubation equipment</td>
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<td>are all available and working</td>
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<td>(ET tubes of appropriate size,</td>
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<td>laryngoscope, Magill forceps)</td>
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<td>Batteries with spares</td>
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<td>Manual resuscitation (Ambu)</td>
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<td>bags, masks of appropriate size</td>
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<td>Suction apparatus</td>
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<td>Infusion pumps</td>
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<td>Intravenous cannulae of various</td>
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<td>Needles of different sizes</td>
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<td>Syringes and extension tubings</td>
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<td>Suture material</td>
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<td>Adhesive tape, scissors</td>
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<td>Gloves, gauze, swabs (alcohol</td>
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<td>Stethoscope, thermometer</td>
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<td>Nasogastric tube of different</td>
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<td>Pulse oximeter</td>
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<td>Cardiac monitor if indicated</td>
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<td>Portable Ventilator if indicated</td>
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Fluid therapy

• Resuscitation fluid
  • Isotonic fluid 10 – 20ml/kg over 1-2 hrs as per clinical status (normal saline or Hartmann)

• Correct ongoing losses
  • Losses could be measured (OGT) or from third space

• Maintenance fluid
  • Watch out for hyponatraemia & hypoglycaemia
Gastric decompression

- **Orogastric tube** is required in most surgical neonates

- 4 hourly aspiration & free flow of gastric contents

- E.g. intestinal obstruction, congenital diaphragmatic hernia, abdominal wall defects
THE WARM CHAIN

1. Warm delivery room
2. Immediate drying
3. Skin-to-skin contact
4. Breast-feeding
5. Bathing & weighing postponed
6. Appropriate clothing & bedding
7. Mother & baby together (‘Rooming-in’)
8. Warm transportation
9. Warm resuscitation
10. Training/awareness raising
Mechanisms of heat loss in newborns
Take Home Messages

- Early identification of high risk newborns is important to reduce morbidities & mortalities

- Clinical symptoms & signs of diseases in newborns may be non-specific

- Follow the initial principles of stabilisation of the sick neonates (A,B,C,D,E,F,G)

- Effective communication and preparation are the keys to successful transfer of a sick neonate
References


