Respiratory distress in a newborn baby
Respiratory distress

• Cause of significant morbidity and mortality
• Incidence 4 to 6% of live births
• Many are preventable
• Early recognition, timely referral, appropriate treatment essential
Respiratory distress

- RR > 60/ min*
- Retractions
- Grunt
- ± Cyanosis

* Tachypnea
Causes of respiratory distress

- Pulmonary
- Cardiac- Congenital heart disease
- CNS- Asphyxia, IC bleed
- Metabolic- Hypoglycemia, acidosis
Causes of respiratory distress - Medical

- Respiratory distress syndrome (RDS)
- Meconium aspiration syndrome (MAS)
- Transient tachypnoea of newborn (TTNB)
- Asphyxial lung disease
- Pneumonia- Congenital, aspiration, nosocomial
- Persistent pulmonary hypertension (PPHN)
Surgical causes of respiratory distress

- Tracheo-esophageal fistula
- Diaphragmatic hernia
- Lobar emphysema
- Pierre -Robin syndrome
- Choanal atresia
Approach to respiratory distress

History

• Onset of distress
• Gestation
• Antenatal steroids
• Predisposing factors- PROM, fever
• Meconium stained amniotic fluid
• Asphyxia
Approach to respiratory distress

**Examination**

- Severity of respiratory distress
- Neurological status
- Blood pressure, CFT
- Hepatomegaly
- Cyanosis
- Features of sepsis
- Look for malformations
# Assessment of respiratory distress

<table>
<thead>
<tr>
<th>Score *</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Resp. rate</td>
<td>&lt;60</td>
<td>60-80</td>
<td>&gt;80</td>
</tr>
<tr>
<td>2. Central cyanosis</td>
<td>None</td>
<td>None with 40% FiO₂</td>
<td>Needs &gt;40% FiO₂</td>
</tr>
<tr>
<td>3. Retractions</td>
<td>None</td>
<td>Mild</td>
<td>Severe</td>
</tr>
<tr>
<td>4. Grunting</td>
<td>None</td>
<td>Minimal</td>
<td>Obvious</td>
</tr>
<tr>
<td>5. Air entry</td>
<td>Good</td>
<td>Decreased</td>
<td>Very poor</td>
</tr>
</tbody>
</table>

* Score > 6 indicates severe distress
Approach to respiratory distress

Chest examination

- Air entry
- Mediastinal shift
- Adventitious sounds
- Hyperinflation
- Heart sounds
Preterm - Possible etiology

Early progressive - Respiratory distress syndrome or hyaline membrane disease (HMD)

Early transient - Asphyxia, metabolic causes, hypothermia

Anytime - Pneumonia
<table>
<thead>
<tr>
<th>Early well looking</th>
<th>- TTNB, polycythemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early severe distress</td>
<td>- MAS, asphyxia, malformations</td>
</tr>
<tr>
<td>Late sick with</td>
<td>Cardiac</td>
</tr>
<tr>
<td>hepatomegaly</td>
<td></td>
</tr>
<tr>
<td>Late sick with shock</td>
<td>- Acidosis</td>
</tr>
<tr>
<td>Anytime</td>
<td>- Pneumonia</td>
</tr>
</tbody>
</table>
Suspect surgical cause

- Obvious malformation
- Scaphoid abdomen
- Frothing
- History of aspiration
Investigations

- Gastric aspirate
- Polymorph count
- Sepsis screen
- Chest X-ray
- Blood gas analysis
Shake test

- Take a test tube
- Mix 0.5 ml gastric aspirate + 0.5 ml absolute alcohol
- Shake for 15 seconds
- Allow to stand 15 minutes for interpretation of result
Respiratory distress - Management

- Monitoring
- Supportive
  - IV fluid
  - Maintain vital signs
  - Oxygen therapy
  - Respiratory support
- Specific
Oxygen therapy*

Indications

• All babies with distress
• Cyanosis
• Pulse oximetry SaO₂ < 90%

Method

• Flow rate 2-5 L/ min
• Humidified oxygen by hood or nasal prongs

* Cautious administration in pre-term
Pulse oximetry

- Effective non invasive monitoring of oxygen therapy
- Ideally must for all sick neonates and those requiring oxygen therapy
- Maintain $\text{SaO}_2$ between 90 – 93 %
Respiratory distress syndrome (RDS)

- Pre-term baby
- Early onset within 6 hours
- Supportive evidence: Negative shake test
- Radiological evidence
Pathogenesis of RDS

- Decreased or abnormal surfactant
- Alveolar collapse
- Impaired gas exchange
- Respiratory failure
RDS - Predisposing factors

- Prematurity
- Cesarean born
- Asphyxia
- Maternal diabetes

RDS - Protective factors

- PROM
- IUGR
- Steroids
Antenatal corticosteroid

- Simple therapy that saves neonatal lives

• Preterm labor 24-34 weeks of gestation irrespective of PROM, hypertension and diabetes

• Dose:
  Inj Betamethasone 12mg IM every 24 hrs X 2 doses; or Inj Dexamethasone 6 mg IM every 12 hrs X 4 doses

• Multiple doses not beneficial
Surfactant therapy - Issues

- Should be used only if facilities for ventilation available
- Cost
- Prophylactic Vs rescue
Surfactant therapy - Issues

Prophylactic therapy

Extremely preterm <28 wks <1000 gm
Not routine in India

Rescue therapy

Any neonate diagnosed to have RDS

Dose 100mg/kg phospholipid Intra tracheal
Meconium aspiration syndrome (MAS)

- Meconium staining
  - Antepartum, intrapartum
- Thin
  - Chemical pneumonitis
- Thick
  - Atelectasis, airway blockage, air leak syndrome
Meconium aspiration syndrome

- Post term/SFD
- Meconium staining – cord, nails, skin
- Onset within 4 to 6 hours
- Hyperinflated chest
X-ray - MAS
MAS - Prevention

- Oropharyngeal suction before delivery of shoulder for all neonates born through MSAF
- Endotracheal suction for non vigorous* neonates born through MSAF

*Avoid bag & mask ventilation till trachea is cleared
Transient tachypnoea of newborn (TTNB)

- Cesarean born, term baby
- Delayed clearance of lung fluid
- Diagnosis by exclusion
- Management: supportive
- Prognosis - good
X-ray - TTNB
Congenital pneumonia

Predisposing factors
PROM >24 hours, foul smelling liquor, Peripartal fever, unclean or multiple per vaginal

Treatment
Thermoneutral environment, NPO, IV fluids, Oxygen, antibiotics-(Amp+Gentamicin)
X-ray – Congenital pneumonia
Nosocomial pneumonia

Risk Factor: Ventilated neonates
: Preterm neonates

Prevention: Handwash
: Use of disposables
: Infection control measures

Antibiotics: Usually require higher antibiotics
Respiratory distress in a neonate with asphyxia

- Myocardial dysfunction
- Cerebral edema
- Asphyxial lung injury
- Metabolic acidosis
- Persistent pulmonary hypertension
Pneumothorax

**Etiology**
- Spontaneous, MAS, Positive pressure ventilation (PPV)

**Clinical features**
- Sudden distress, indistinct heart sounds

**Management**
- Needle aspiration, chest tube

*Teaching Aids: NNF*
X-ray - Pneumothorax
Persistent pulmonary hypertension (PPHN)

**Causes**
- Primary
- Secondary: MAS, asphyxia, sepsis

**Management**
- Severe respiratory distress needing ventilatory support, pulmonary vasodilators
- Poor prognosis
Respiratory distress (needing referral)

- RDS (HMD)
- MAS
- Surgical or cardiac cause
- PPHN
- Severe or worsening distress