RESPIRATORY DISTRESS
SIGNS OF INCREASED WORK OF BREATHING

• Tachypnea
• Chest retractions (SC / IC / SS)
• Stridor / Wheeze / Grunt
• Flaring of Ala nasi
• Head bobbing
• Abdominal breathing
RELATIONSHIP OF COMPLIANCE – RESISTANCE – ELASTICITY - RR
RESPIRATORY DISTRESS – PULMONARY CAUSES

Airway obstruction

• Ext. thoracic (Upper airway)
  E.g.. ALTB / Epiglottitis / R.P. Abscess / L.Diphth

• Int. Thoracic (Lower airway)
  Extra Pulm. (LAW) – E.g.. Vasc. ring / Med.Mass / FBA
  Intra Pulm. (SAW) – Broncholitis / Asthma

Parenchymal diseases
E.g.. Pneumonia

Pleural diseases
Empyema / Pneumothorax
STEP WISE APPROACH TO RESPIRATORY DISTRESS

1. Is it respiratory distress?
2. If so - respiratory / Non respiratory
3. What is the anatomical level?
4. What are the useful investigations?
5. Are there features of respiratory failure?
<table>
<thead>
<tr>
<th>Age</th>
<th>Breaths per minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2 months</td>
<td>60 or more</td>
</tr>
<tr>
<td>2 months to 12 months</td>
<td>50 or more</td>
</tr>
<tr>
<td>12 months to 5 years</td>
<td>40 or more</td>
</tr>
</tbody>
</table>

TACHYPNOEA IN DIFFERENT AGE GROUPS
NON RESPIRATORY CONDITIONS WHICH MIMIC RESPIRATORY EMERGENCIES

• Cardiac failure
• Shock
• AGE with dehydration
• Metabolic acidosis (DKA, RTA)
• Salicylate poisoning
• Acute encephalitis
<table>
<thead>
<tr>
<th>Acidotic Breathing</th>
<th>Respiratory Distress</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR</td>
<td>↑↑↑</td>
</tr>
<tr>
<td>ICR</td>
<td>-</td>
</tr>
<tr>
<td>CVS</td>
<td>Normal</td>
</tr>
<tr>
<td>RS</td>
<td>Normal</td>
</tr>
<tr>
<td>CXR</td>
<td>Hyperventilation</td>
</tr>
<tr>
<td></td>
<td>Pneumonia</td>
</tr>
<tr>
<td></td>
<td>Empyema</td>
</tr>
<tr>
<td></td>
<td>Cardiomegaly</td>
</tr>
</tbody>
</table>
# AN APPROACH TO A CHILD WITH INCREASED RESPIRATORY RATE

<table>
<thead>
<tr>
<th></th>
<th>Respiratory</th>
<th>Cardiac</th>
<th>Metabolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tachypnea</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Chest retraction</td>
<td>Marked</td>
<td>Minimal</td>
<td>Nil</td>
</tr>
</tbody>
</table>
# RESPIRATORY NOISES

<table>
<thead>
<tr>
<th>Noises</th>
<th>Phases Of Respiration</th>
<th>Localization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snoring</td>
<td>Insp. / Exp.</td>
<td>Oro-pharynx</td>
</tr>
<tr>
<td>Stridor</td>
<td>Inspiration</td>
<td>Larynx</td>
</tr>
<tr>
<td>Wheeze</td>
<td>Expiration</td>
<td>Small AW</td>
</tr>
<tr>
<td>Grunt</td>
<td>Expiration</td>
<td>Alveoli</td>
</tr>
</tbody>
</table>
## INTERPRETATION OF SIGNS

<table>
<thead>
<tr>
<th>Airway obstruction</th>
<th>Parenchymal Dis.</th>
<th>Pleural Dis.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upper</td>
<td>Lower</td>
</tr>
<tr>
<td>Tachypnea</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Chest Indrawing</td>
<td>+++</td>
<td>-</td>
</tr>
<tr>
<td>Stridor</td>
<td>+++</td>
<td>-</td>
</tr>
<tr>
<td>Wheeze</td>
<td>-</td>
<td>+++</td>
</tr>
<tr>
<td>Grunting</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
DESCRIPTION OF RESPIRATION

- Rate
- Rhythm
- Depth
- Ease of breathing
RATE OF RESPIRATION
NORMAL

PERIODIC BREATHING

APNOA < 10 Secs.

APNOEIC SPELLS

APNOA > 20 Secs.

CHEYNE STOKES

CRESCEndo & DECRESCENDO & PERIODS OF APNOEA

BIOT'S BREATHING

VARYING DEPTH & RATE & PERIODS OF APNOEA
NORMAL

SLOW & DEEP

RAPID & SHALLOW
## EVALUATION – RESPIRATORY DISTRESS

<table>
<thead>
<tr>
<th>Respiratory pattern</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid, Shallow, Grunt</td>
<td>Pleural, Parenchymal Disease</td>
</tr>
<tr>
<td>Rapid, Prolonged Inspiration with Stridor</td>
<td>Croup Syndrome</td>
</tr>
<tr>
<td>Rapid, Prolonged Expiration with Wheeze</td>
<td>Smaller Airway Diseases – Asthma</td>
</tr>
<tr>
<td>Increased Respiratory Rate &amp; Depth (Quiet Tachypnea)</td>
<td>Non-respiratory - Metabolic Acidosis</td>
</tr>
</tbody>
</table>
EVALUATION – RESPIRATORY DISTRESS

Respiratory pattern

• Paradoxical Breathing
• Tachypnea with minimal I.C.R. with tachycardia
• Irregular Rate, Depth & Rhythm (Biots Breathing)
• Slow / Shallow / Drowsiness

Diseases

• C.C.F
• Diaphragmatic Paralysis
• Brain Stem Injury
• Barbiturate Poisoning
CHOICE OF INVESTIGATIONS

• X-ray chest – Respiratory / CVS
• CBC / CRP / Blood culture
• Culture of sputum / Nasopharyngeal secretions / Tracheal aspiration
• Assessment of hypoxia – Pulse oximetry / ABG
ADDITIONAL INVESTIGATIONS

• X-ray neck lateral – Upper airway obstruction
• Barium swallow – To R/O Tracheal compression
• CT Chest – Extra luminal causes
• FFBS – Intraluminal obstructions
• Echo – Cardiac evaluation
• US Chest – To R/O pleural fluid
INCREASED RESPIRATORY WORK

Respiratory Failure

- Lung Failure
  - Interstitial Disease
  - Alveolar Disease

- Non-Respiratory “Shock”

- Pump Failure
  - Central & Peripheral

- Gas Exchange Failure
  - Hypoxemia

- Respiratory work
  - Fatigue

- Ventilatory Failure
  - Hypercapnia
ASSESSMENT OF RESPIRATORY DYSFUNCTION

Clinical

• Hypoxia (irritability, agitation, mental confusion, drowsiness, hypotonia)
• Hypercarbia (generalised vasodilation, flushing)
• Muscle fatigue (sea-saw respiration)

Biochemical

• \( \text{PaO}_2 < 60 \text{ mm Hg} \)
• \( \text{PaCO}_2 > 50 \text{ mm Hg} \)
• \( \text{pH} < 7.3 \)
## STAGE OF RESP. DISEASE - ABG

<table>
<thead>
<tr>
<th></th>
<th>pH</th>
<th>PCO₂</th>
<th>HCO₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO₂</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### i. Resp. Alkalosis
- pH: \(\uparrow\)
- PCO₂: \(\downarrow\)
- HCO₃: N

### ii. Transitional
- pH: N
- PCO₂: \(\downarrow\)
- HCO₃: \(\downarrow\)

### iii. Resp. Acidosis
- pH: \(\downarrow\)
- PCO₂: N/\(\uparrow\)
- HCO₃: N/\(\downarrow\)

### iv. Combined Acidosis
- pH: \(\uparrow\uparrow\)
- PCO₂: \(\downarrow\)
- HCO₃: \(\downarrow\downarrow\downarrow\downarrow\)

IAP UG Teaching slides 2015-16
RESPIRATORY DISTRESS - ABG

PO2

PCO2       pH

• **Resp. Distress without Resp. Diseases**
  (Hyper ventilation)
  E.g.. - CNS Stimulation       N       ↓       ↑
  - Metabolic Diseases         N       ↓       ↓

• **Severe RF Without Obvious Resp. Signs**
  (Hypo ventilation)
  E.g.. - CNS Depr / Neuro Musc ↓ ↑ ↓
Inability to drink  
Severe dyspnea  
Diminished air entry  
Stridor at rest  
Audible wheeze  
Expiratory grunt  
Cyanosis  
Apnea  
Gasping
CONCLUSION

- Respiratory distress is not a disease – Symptom / sign
- A good history and thorough physical examination - Clue To Diagnosis
- RR, ICR, Resp. Noises – Pin point the diagnosis
- X-ray chest – conforms
- ABG – Specify / Quantify
- ↓RR – Ominous sign
- Early identification and prompt treatment – rewarding

**RR IS THE SIMPLEST PFT – DAY TO DAY PRACTICE**
THANK YOU