

# Respiratory Neonatal Distress

## Confirmation of Resp Distress

## Guidelines for Referral & Ventilatory support/NICU

### Resp features of normal neonate:

RR: 35-45 (60 = Max)

No Recession (Sternum/Intercostal)

No grunting (should be quiet)

No cyanosis (No Blue)

No Stridor (Upper tract issue)

No Apnoea (cessation of breathing)

No Nasal flare (movement of Nasal Alae)

HR:  $\pm$  120 BPM

= Chest Barely Moves

↳ Abdomen move

- Clinical signs
- History
- Physical Examination
- Special investigations
- CXR
- CRP (N = < 10mg/L)
- FBC  $\uparrow$  Both indicate infection
- Blood culture (must be sterile)

- Severe Grunting despite NCPAP
- Severe Recession despite NCPAP
- Apnoea nasal cannula (if) airway pressure
- $PaCO_2 > 7.5$  kPa
- pH < 7.25 (Resp acidosis)
- Central cyanosis pH  $\times$   $\frac{PaO_2}{PaCO_2}$

Hyperoxia test (Resp vs cardiac issue)

Resp:  $\uparrow$  O<sub>2</sub> sat with O<sub>2</sub> supply  
cardiac:  $\uparrow$  O<sub>2</sub>  $\neq$  with O<sub>2</sub> supply

### Oxygen Therapy Hazards

too little = Hypoxia NB = Death

too much = ROP = RPD Retinal detachment

Diaphragm = main mech. of breathing

NB neonates = obligate nasal breathers

NB

Blood gases

O<sub>2</sub> Sat

NB muscle parents to empower them

ROP: Retinopathy of Prematurity

Prematurity (< 35w)

O<sub>2</sub> therapy

Hypertension fibrosis in Retina

Pathogenesis: too much O<sub>2</sub>

= vasoconstriction of Retina

Vasculature tissue

(prevents excessive O<sub>2</sub> to Retina)

normal Retinal vascularization usually occurs at 40 weeks

NB to do direct Retina exam

4-6 weeks postnatal NB

↳ can heal on own or will need laser surgery

### Respiratory Distress in neonate features:

(At least 2 present)

(Severe = ALL 4)

RR > 60/min

Recession (Sternum/Costal)

Grunting (Expiratory sound)

Cyanosis

### Management of Resp distress

↳ Prematurity

correct suctioning (MAS)

Maternal infections

Perinatal asphyxia lock O<sub>2</sub> neuro issues

NB Antenatal maternal Glucocorticoids

↳ mother - placenta - Baby

=  $\uparrow$  surfactant production

NB

= NB for premature Babies

$\therefore$   $\downarrow$  degree of RDS

### Active Management

- O<sub>2</sub> (not all)

- Every 30 min HC check

- Nil per Mouth

- RR - (grunting / Stridor)

- IV fluid

- HR - (flare (nasal))

- Incubator

- color if not improve = re-ventilate!

- Blood (Glucose + Acid/Base)

- ABC (pneumonia)

- observations + specific modalities

BPD: Bronchopulmonary Dysplasia

Dysplasia

cellular + interstitial injury

Interstitial fibrosis

cellular hyperplasia

airway muscularisation

airway hyperreactivity

CXR  $\rightarrow$  Hazy

$\rightarrow$  fibrosis (intubated)

$\rightarrow$  cystic formation

Risk factors:

Immaturity

Oxygen toxicity ( $\uparrow$  T<sub>CO2</sub>)

Bero + Udukama

Infection

PDA

ROP

BPD

### Aetiologies of Respiratory Distress

#### Pulmonary:

RDS (Resp Distress Syndrome)

MAS (Meconium Aspiration Syndrome)

TTN (transient tachypnoea of newborn)

Pneumonia

Pneumothorax (bleeding in perithorax)

Pulmonary Haemorrhage

Congenital Lung Abnormalities

#### Extra-pulmonary:

Cerebral Abnormalities / Sepsis + others

↳ Resp centres - Swelling

- meningitis

- Haemorrhage

#### Choanal Atresia

↳ failed opening of nose

- Baby breath through mouth

= clue

NB

#### Micrognathia

↳ small jaw = tongue pushed back

= obstruction

#### T-O fistula

tracheo-oesophageal fistula

food into trachea etc. = obstruction

#### Cardiac Abnormalities

↳ usually blue (Resp also) = similar

Diaphragmatic Hernia (Abnormal contents in Thorax =  $\downarrow$  chest volume) NB

### Ways of delivering O<sub>2</sub>:

Headbox

most used.

Free flow nasal cannula O<sub>2</sub> (low flow)

O<sub>2</sub> blender & Humidifier

O<sub>2</sub> meter (unpractical)

[O<sub>2</sub>]

Immaturity

Oxygen toxicity ( $\uparrow$  T<sub>CO2</sub>)

Bero + Udukama

Infection

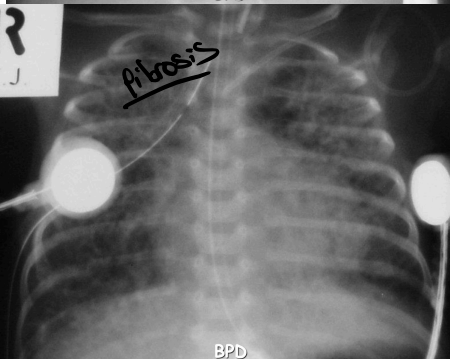
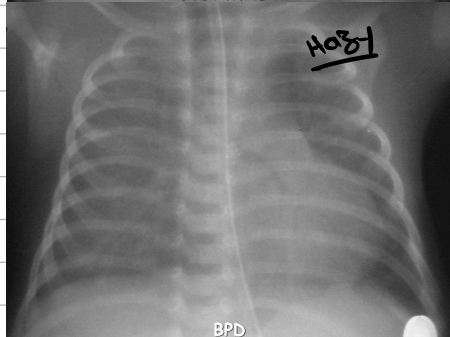
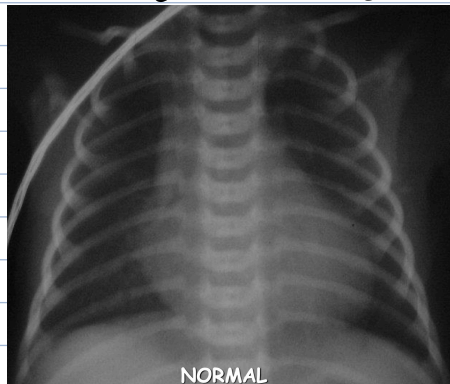
PDA

ROP

BPD

# BPD management → Long Hospitalization

- Supplemental O<sub>2</sub>
- Short course steroids
- Nutrition + calories
- Avoid cigarette smoke
- consider fluid restriction
- Diuretics
- Bronchodilators

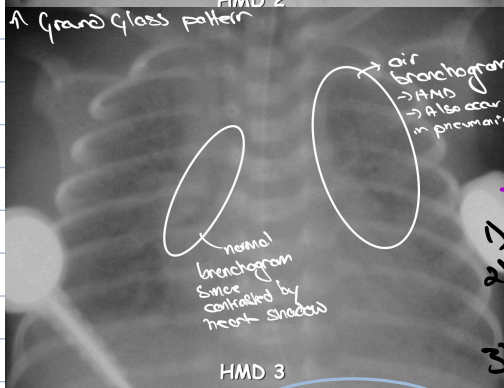
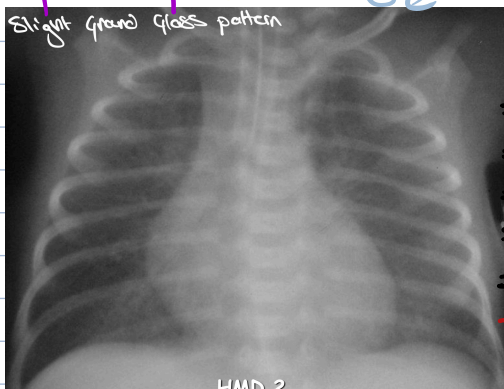


## HMD management

Exogenous surfactant  
↳ Spirt directly into lungs  
via endotracheal tube

## HMD Radiology

- Air Bronchograms
- Ground Glass



- Severe HMD: "progress to white out"
- NO ↓ shadow
  - Severe ground glass
  - loss of Diaphragm shadow
  - loss of separated lung shadow

## MAS Pathophysiology

if meconium passed before / during labor = Baby Asphyxia = chemical pneumonia  
↓ surfactant act.  
+ very thick sub.

[→ More incidental in term babies]  
→ stronger inspiration

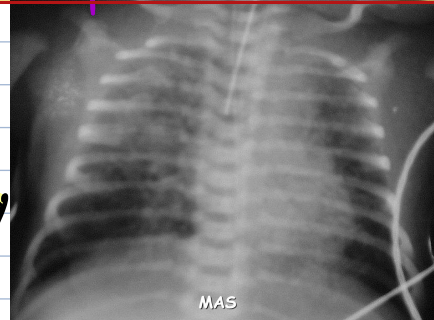
Trapped meconium = meconium plug = can't expirch (ball valve effect)  
= Atelectasis  
= pneumothorax / mediastinum  
= Hypoxia & Hypercapnia → lung = ↑ pressure  
= persistent pulmonary hypertension  
= Chemical pneumonia  
= Surfactant inactivation  
- MAS = major cause of mortality

## Management of MAS Baby:

- Baby born green = meconium  
↳ Just Green ≠ MAS  
Green + Resp Distress = Dx MAS  
→ if Baby green ≠ send home for alk
- 1) No Routine suction at delivery
  - 2) If distension (MAS Dx) = superficial & deep suction
  - 3) observe for resp distress (NB)

## MAS Radiology

course patchy consolidation  
NB ET tubes must always be at level of medial clavicle heads



## Most common causes for Resp Distress:

- TTN (Transient tachypnea of Newborn)
- MAS (Meconium Aspiration syndrome)
- Neonatal pneumonia
- HMD (Hyaline membrane disease)

## MAS (meconium)

First stool passing of baby  
= Slimy / Sticky + Green  
= normal = meconium

(inner gut mucosa)  
(Amniotic fluid)  
(Hb Patel?)

(if not come = GIT obstruction)

If Mom has broken & is green  
= foetal distress (indicates foetal distress)  
⇒ ↓ O<sub>2</sub> = ↓ supply for gut  
= constrict gut vessels  
= peristalsis = meconium

can cause persistent pulmonary hypertension  
pneumothorax = a complication

## TII pneumocyte = make surfactant from 36t Hyaline Membrane Disease (HMD)

- Preterm (typical) (26-36 week)
- Asphyxia (term/preterm) (if not controlled)
- IDM (infant of Diabetic mother)

⇒ Pathogenesis = surfactant deficiency  
= collapse of Alveoli = damage (TII pneumocyte)  
= Hyaline membrane formation

Antenatal steroids = beneficial - preterm

↳ steroids stimulate surfactant production

⇒ CLD (Chronic Lung Disease) (BPD is one of them)

↳ See in all baby skin folds = Evident!



# Transient Tachypnoea of Newborn

↳ also known as a "wet lung"

## Clinical presentation

- Term baby (can still occur in pre-term)
- Elective caesarean (most common case)
- Resp distress = mild/moderate
- Asymptomatic 12-24h (72h)

## Pathophysiology (Short term Resp Distress)

- Fetal lungs = fluid
- Production stops when labour is initiated
- Fetal chest compression } liquid gone
- Pulmonary lymphatics absorption } liquid gone

→ if plan delivery this normal process does not occur

∴ lung still producing fluid & lymphatics not clearing

→ NB Baby must be at least 39 weeks

→ Delay in fluid drainage/absorption = wet lung.

## TTN Dx

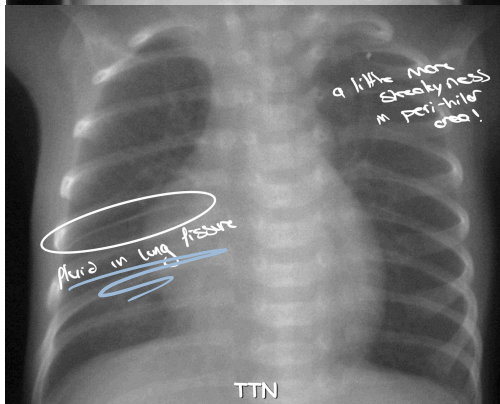
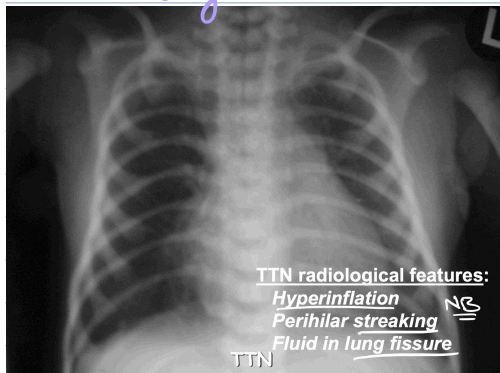
History

Screen for infection

CXR: Perihilar streaking

Fluid in fissures

↑ lung volumes



Neonatal pneumonia  
cong. → transplacenta

→ Mom = Syphilis, Histoplasmosis } cross placenta into baby.

Intrauterine. → Amniotic fluid swallow

Early onset: → after delivery } Both after birth

Late onset: → Nosocomial > 48h

## Clinical presentation:

Age of onset

Resp distress symp

Infection features — Fibrile

Lethargy

Apnoea

Abdominal distention

Other.

## Organisms:

Group B β Haemolytic Strep (Streptococci)

E. coli (gram -)

Klebsiella (gram -)

Chlamydia (gram -)

Mycoplasma / Ureaplasma

C. trachomatis } mother's vagina

Viral

T - Toxoplasmosis

O - other

(TORCHS)

R - Rubella / RSV

C - Cytomegalovirus (CMV)

H - Herpes / HIV

S - Syphilis → always think of Syphilis (NB are)

## Special investigations:

CXR → ID to HMD → ground glass

Blood culture → Air Bronchograms

CRP > 10 mg/L

FBC

## Pneumonia tx

As per Resp Distress → O<sub>2</sub> etc.

AB

S-7 days

Stop ASAP

Penicillin (gram+) + Aminoglycoside (gram-)

Erythromycin (macrolide)

→ for mycoplasma / chlamydia

dotatic = dotagran

HMD → Ground Glass  
→ Air Bronchograms

NAS → patchy consolidation.

TTN → fluid in lung pressures  
→ ↑ lung volumes  
→ peri & hilar speckling

BPD → patchy fibrosis  
→ cystic fibrosis  
→ Hazy.