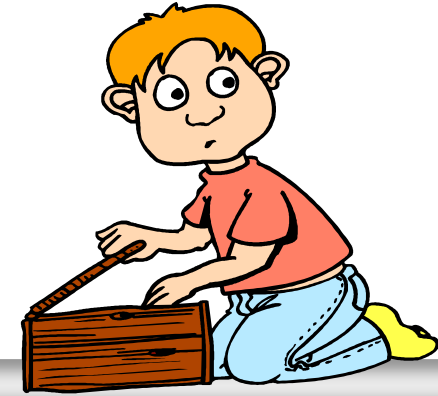


# **Pulmonary diseases in the newborn period**



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***Neonatologist***  
***Isfahan faculty of medicine***

# Introduction



## Ω Symptoms and signs

- **Tachypnea (frequency > 60 per min)**
- **Cyanosis in room air**
- **Flare of the nostrils**
- **Chest retractions**
- **Grunting**

# Common Pulmonary causes



- ⌚ **Respiratory Distress Syndrome (RDS)**
- ⌚ **Transient Tachypnea of newborn**
- ⌚ **Pneumonia/Infection**
- ⌚ **Meconium Aspiration**
- ⌚ **Air Leaks**
- ⌚ **Pulmonary hypertension**
- ⌚ **Chronic Lung Disease (CLD)**

# Rare Pulmonary causes



- ∩ **Lung hypoplasia**
- ∩ **Obstr upper airways**
- ∩ **Tumours**
- ∩ **Pulm hemorrhage**
- ∩ **Malformations**
- ∩ **Cong diaphragmatic hernia**

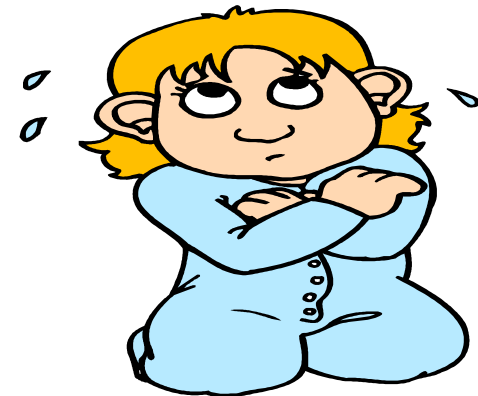
# Extra-pulmonary common causes

- ⌚ **Persist Fetal Circulat**
- ⌚ **Cong Card Malfor**
- ⌚ **Cerebral Hemorrhage**
- ⌚ **Polycythemia**
- ⌚ **Hypoglycemia**
- ⌚ **Hypothermia**
- ⌚ **Acidosis**



# Extra-pulmonary rare causes

- ∩ **Cerebral edema**
- ∩ **Drugs**
- ∩ **Neuromuscular**
  - **Asphixia**
  - **spinal cord**
- ∩ **Metabolic Diseases**



## Work - Up

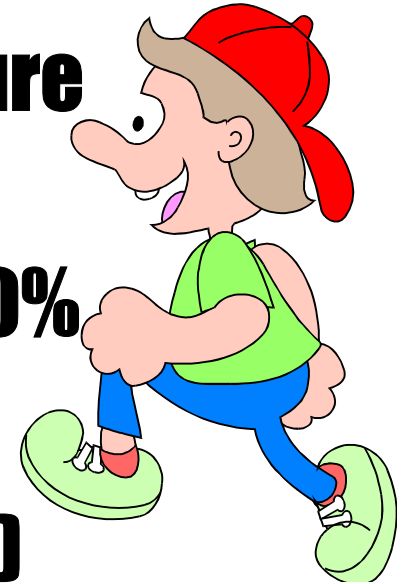


### **Extra- pulmonary or pulmonary?**

- ✓ ***If General condition is good and no cyanosis:***  
**Observe in incubator, control respiration and pulse frequency**
- ✓ ***If Cyanosis:*** **Observe in incubator, give O<sub>2</sub>,**
- ✓ **X ray of chest**
- ✓ **Umbilical/peripherhal artery line if FiO<sub>2</sub> > 0,40**
- ✓ **Infection work-up**

# Respiratory Distress Syndrome (RDS)

- ∩ **Surfactant deficiency and immature surfactant**
- ∩ **Lung compliance reduced to 10-20%**
- ∩ **Reduced lung perfusion (50-60%)**
- ∩ **Increased R-> L shunting (30-60%)**
- ∩ **Reduced lung volume**
- ∩ **Increased work of breathing**





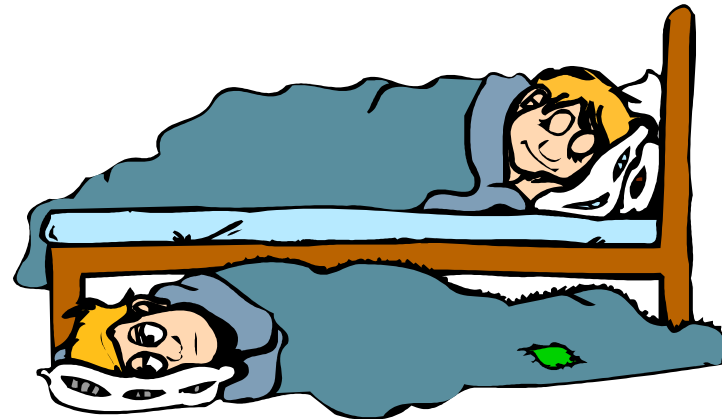
# Respiratory Distress Syndrome (RDS)

- ∞ **0.5 (-1.0) % of all births**
- ∞ **Increases with decreasing gestational age  
(GA < 28 weeks 60%)**
- ∞ **Most important neonatal morbidity and  
mortality factor**



# ***Symptoms and Signs***

- ∩ **Tachypnea > 60 breaths per min**
- ∩ **Expiratory grunting**
- ∩ **Retractions (sternal, inter- and subcostal)**
- ∩ **Cyanosis in room air**





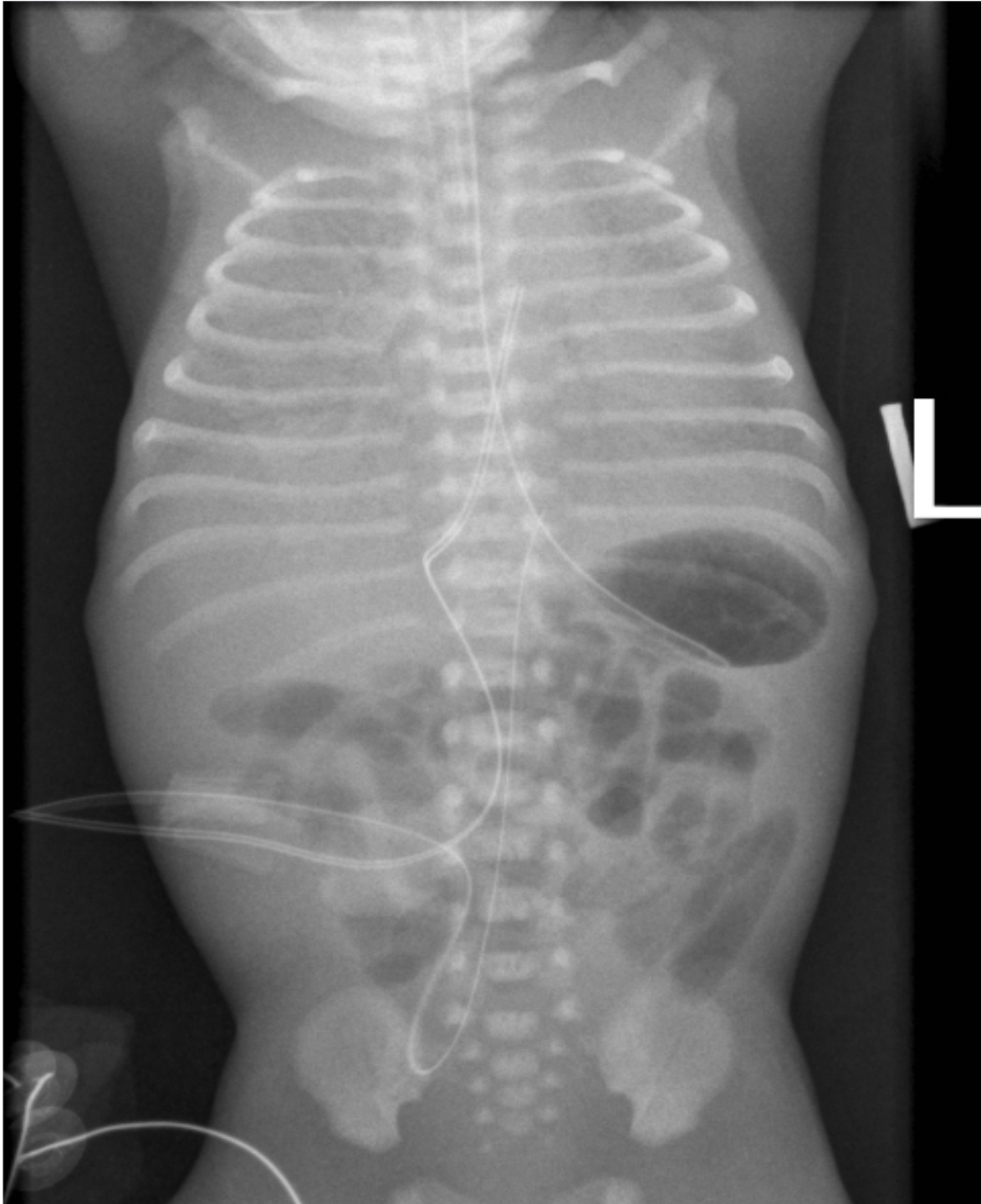
# **The natural course of Respiratory Distress Syndrome:**

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- ⌚ **Maximum after 24 -48 hrs**
- ⌚ **Spontaneous breathing in room air in uncomplicated cases**
- ⌚ **Deterioration at 3-5 days due to an open ductus arteriosus**

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# Differentials Diagnosis

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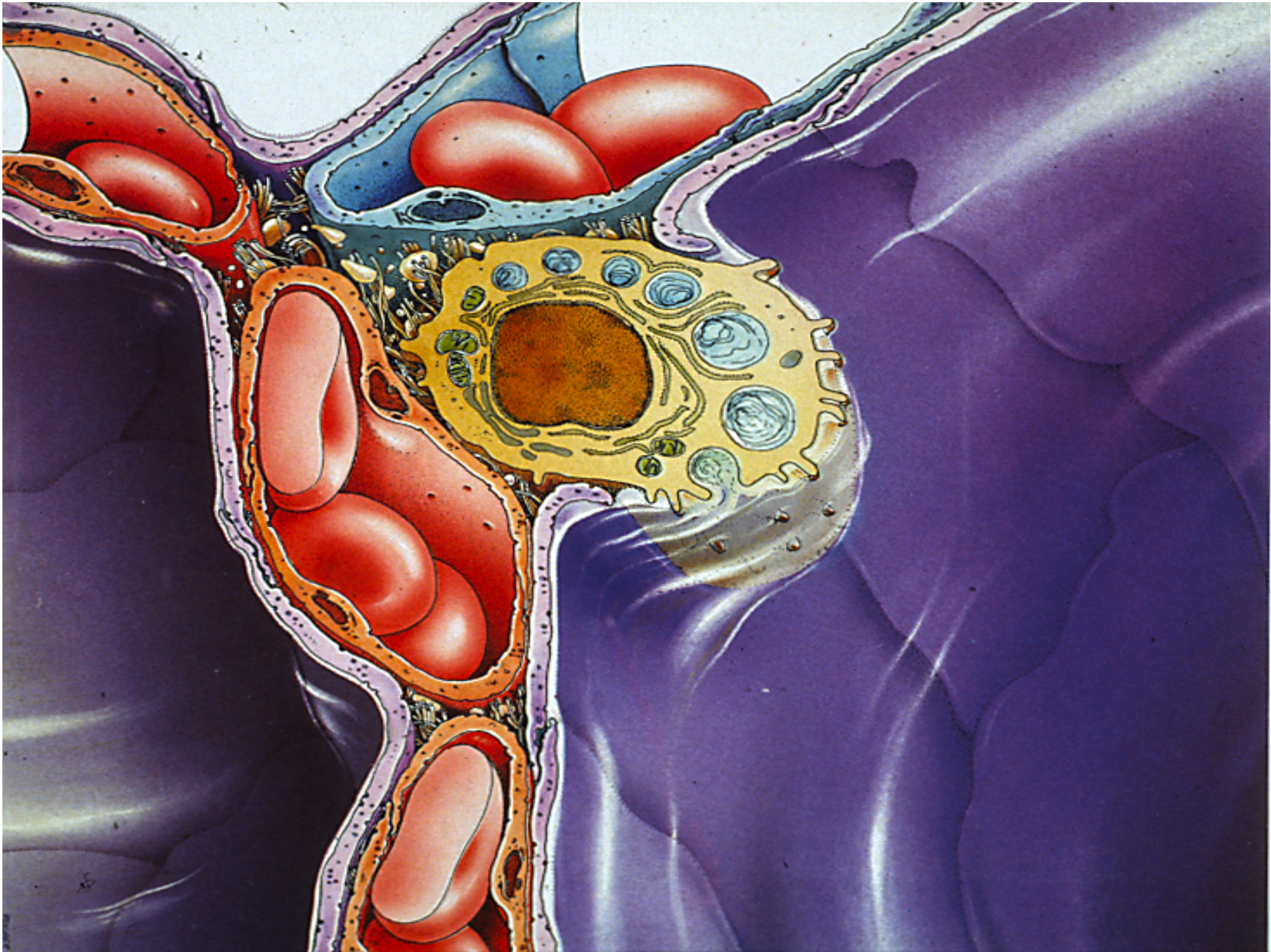
- ⌚ **Pneumonia/sepsis**
- ⌚ **Transient tachypnea of newborn**
- ⌚ **Congenital cardiac malformation**
- ⌚ **Pneumothorax/airleak**
- ⌚ **Primary pulmonary hypertension**



# Therapy

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- ∞ **Reduce prematurity rate**
- ∞ **Antenatal steroids 24 - 48 hrs before birth gives a 50% reduction in the incidens and 40% reduction in mortality**
- ∞ **Surfactant therapy reduces mortality/Chronic lung disease 30-40%**
- ∞ **General therapy: Oxygen, respirator, fluid-electrolytes, nutrition, antibiotics**





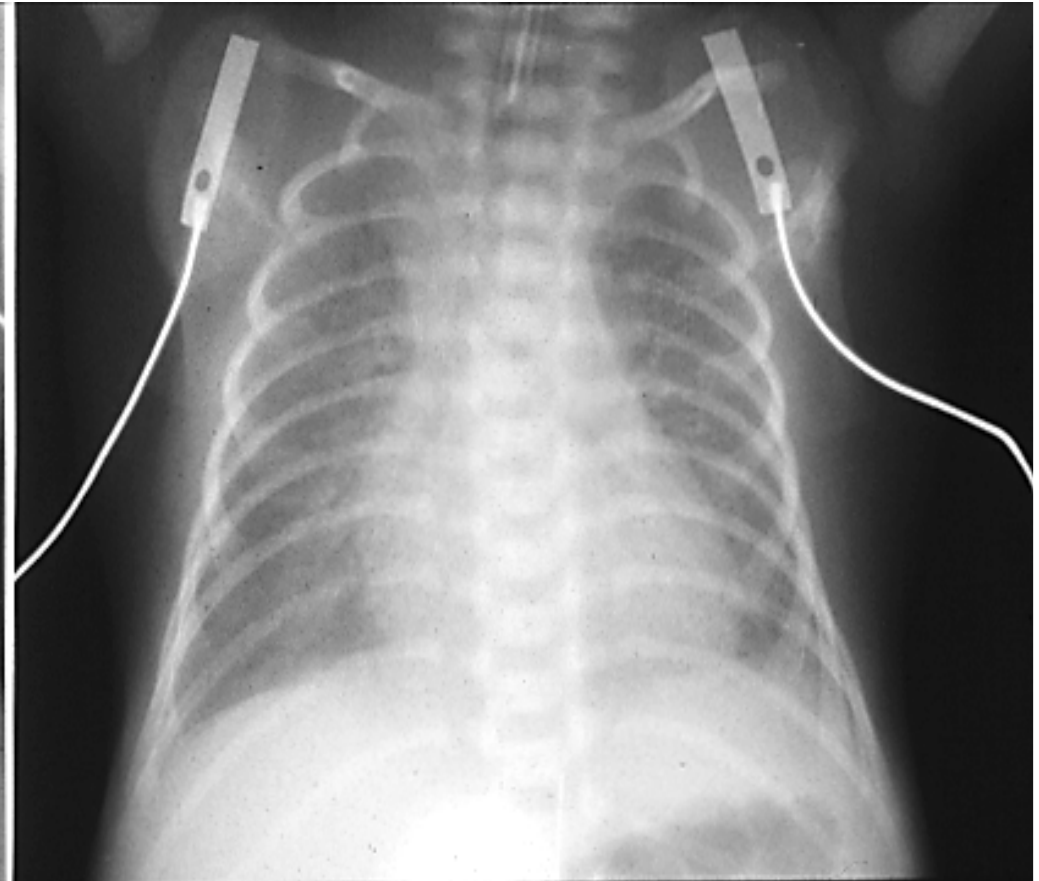
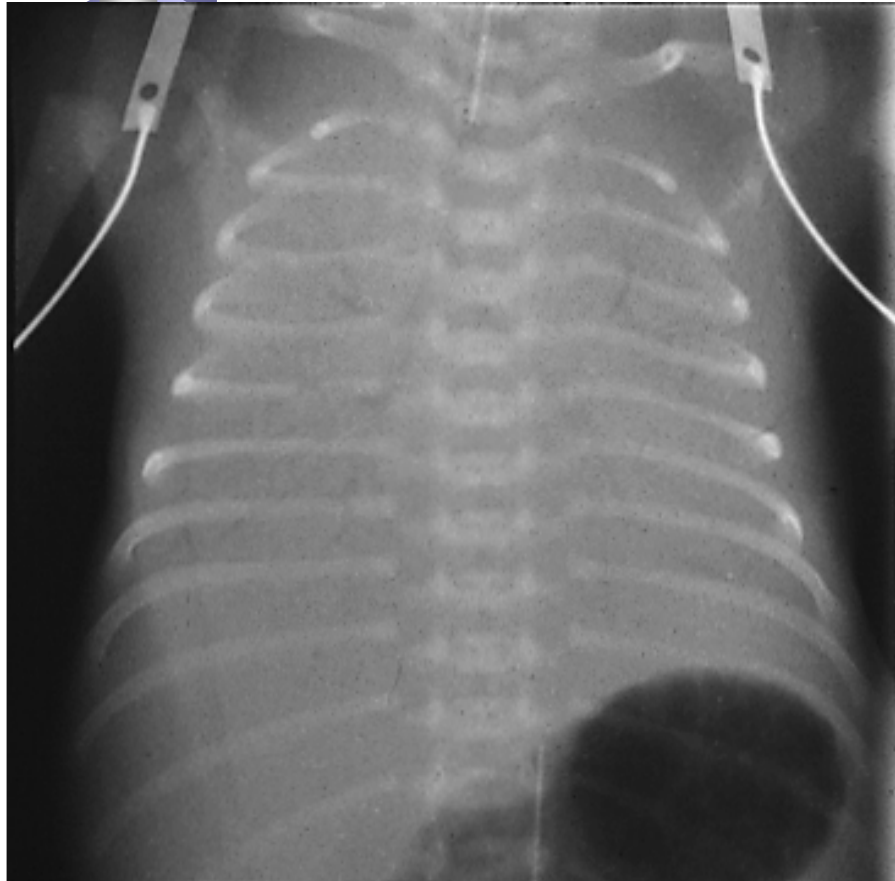
# Surfactant therapy

- ⌚ **Synthetic surfactant (almost not in use anymore)**
- ⌚ **Natural Surfactant (porcine, bovine)**
- ⌚ **Prophylactic vs Rescue**



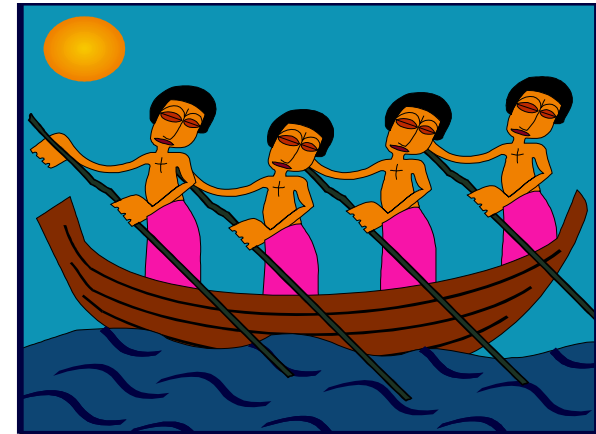
**Before Surfactant**

**1 hr after Surfactant**



# Classification of neonatal pneumoniae

- **Congenital**
- **Early onset (< 5-7 days)**
- **Late onset (> 5-7 days)**



# Pneumonia

- ❖ **Neonatal pneumonia may be an isolated focal infection but usually is a part of a general infection - sepsis.**
- ❖ ***Incidence of bacterial pneumonia:***  
**3,7 per 1000 live born (Oxford)**

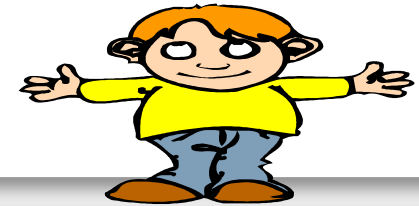
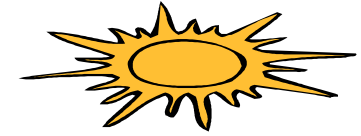


# Neonatal pneumonia



- **Acquired by the fetus (ascending, transplacental passage, PPRM, through intact membranes?)**
- **Gr B Streptococci (sepsis develops in 1% of colonized from maternal genital tract (1-4/1000 (USA).**
- **Intrapartum antibiotics as prophylaxis of group B pos mothers recommended ; AAP 1992-1997 .**

# ***Pneumonia - symptoms***



- ⌚ **Respiratory distress (tachypnoe, apnea, cyanosis, retractions)**
- ⌚ **Vomiting, hypotension**
- ⌚ **Poor weight gain, icterus, hypo/hyperthermia**
- ⌚ **Pulmonary hypertension and hypoxemia R-->L shunting**
- ⌚ **Reduced lung function (respirator patients)**
- ⌚ **Increased tracheal aspirate**

# Congenital pneumonia



- ∩ **Rare - high mortality**
- ∩ **Secondary to ascending infections (after PROM) – through intact membranes?**
- ∩ **Chorioamnionitis**
- ∩ **Intrauterine asphyxia**

# Early onset pneumonia



- ***1,8 per 1000 live newborn***
- **Gr B streptococci (70% in UK)**
- **H. Influenza**
- **S. Pneumoniae**
- **Listeria Monocytogenes**
- **Gram negative enterobakterier**
- **(Fungi)**
- **Virus (RS, Adeno, CMV, Coxsacki)**



## Late onset pneumonia



- ∩ Usual in preterm on artificial ventilation
- ∩ 10-35% of all on ventilator

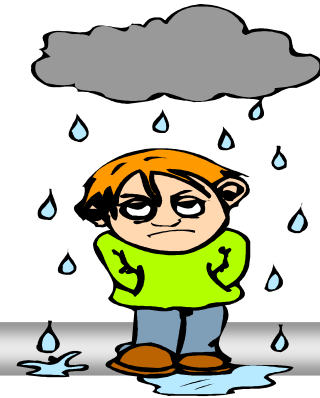
### Gram positive

**Staph aureus**  
**Enterococcus**  
**Gr B streptococcus**  
**Fungi**  
**Candida**

### Gram negative

**Enterobacter**  
**E. Coli**  
**Klebsiella**

## Pneumonia -other agents



- ⌚ **Ureaplasma urealyticum (in vagina, -> pneumonia and lung fibrosis)**
- ⌚ **RS virus (epidemics), more serious if chronic lung disease**
- ⌚ **Chlamydia (early onset - may cross intact membranes). In term infants typical debut 3-4 weeks of age. Slow onset.**  
**Treated with erythromycin**

# Pneumonia - Therapy



- ⌚ **Antibiotics**
- ⌚ **General supportive therapy**



# Transient Tachypnea Newborn

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- ⌚ **In term or near term neonate**
- ⌚ **cesarean delivery, forceps-assisted delivery, preeclampsia, hypotonia, and rapid labor**
- ⌚ **Delayed resorption of alveolar and interstitial fluid into the pulmonary interstitial vessels and lymphatics after birth.**

# Transient Tachypnea Newborn



## *Clinic*

**Tachypn**

**Cyanosis in room air**

**Grunting**

**Retractions**

**Oxygen need not increasing**

## *Differential diagnosis*

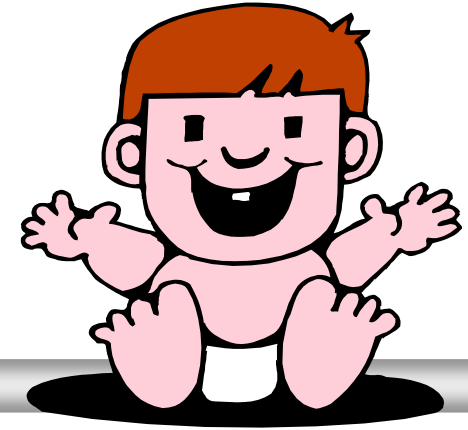
**RDS**

**Pneumonia**

**Meconium aspiration**

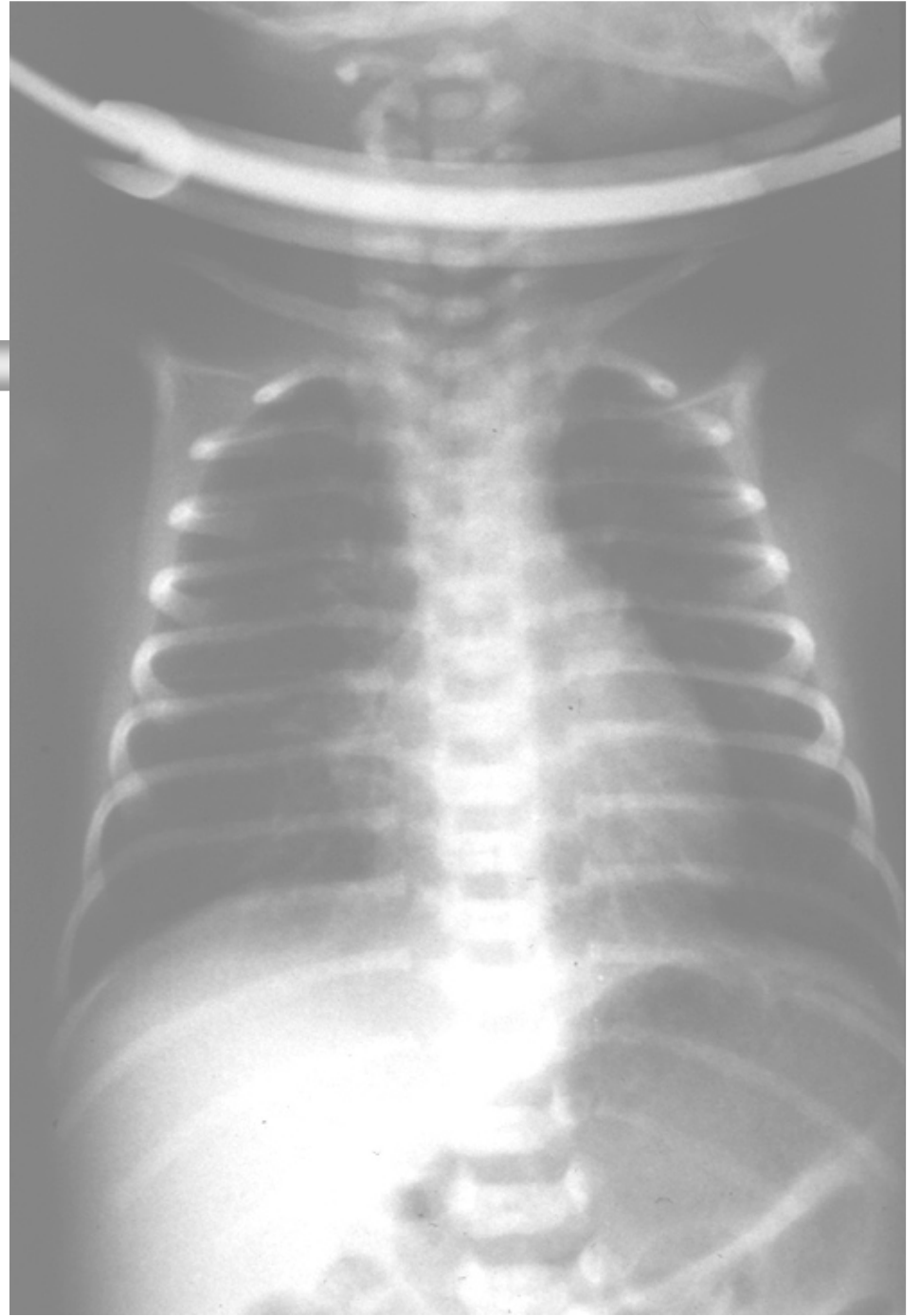
**Cong Heart malformation**

# TTN-X ray findings



## Ω X ray:

- **perihilar streaking, engorgement of perivascular lymphatics and interstitial vessels) with normal lung volume and heart size**
- **reticular pattern**



# ***Therapy***

- ⌚ **Observation in incubator**
- ⌚ **Oxygen if needed**
- ⌚ **Antibiotics until infection is excluded**





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