Neonatal Respiratory problems

AbdulRahman Alnemri.MD

Professor of pediatric

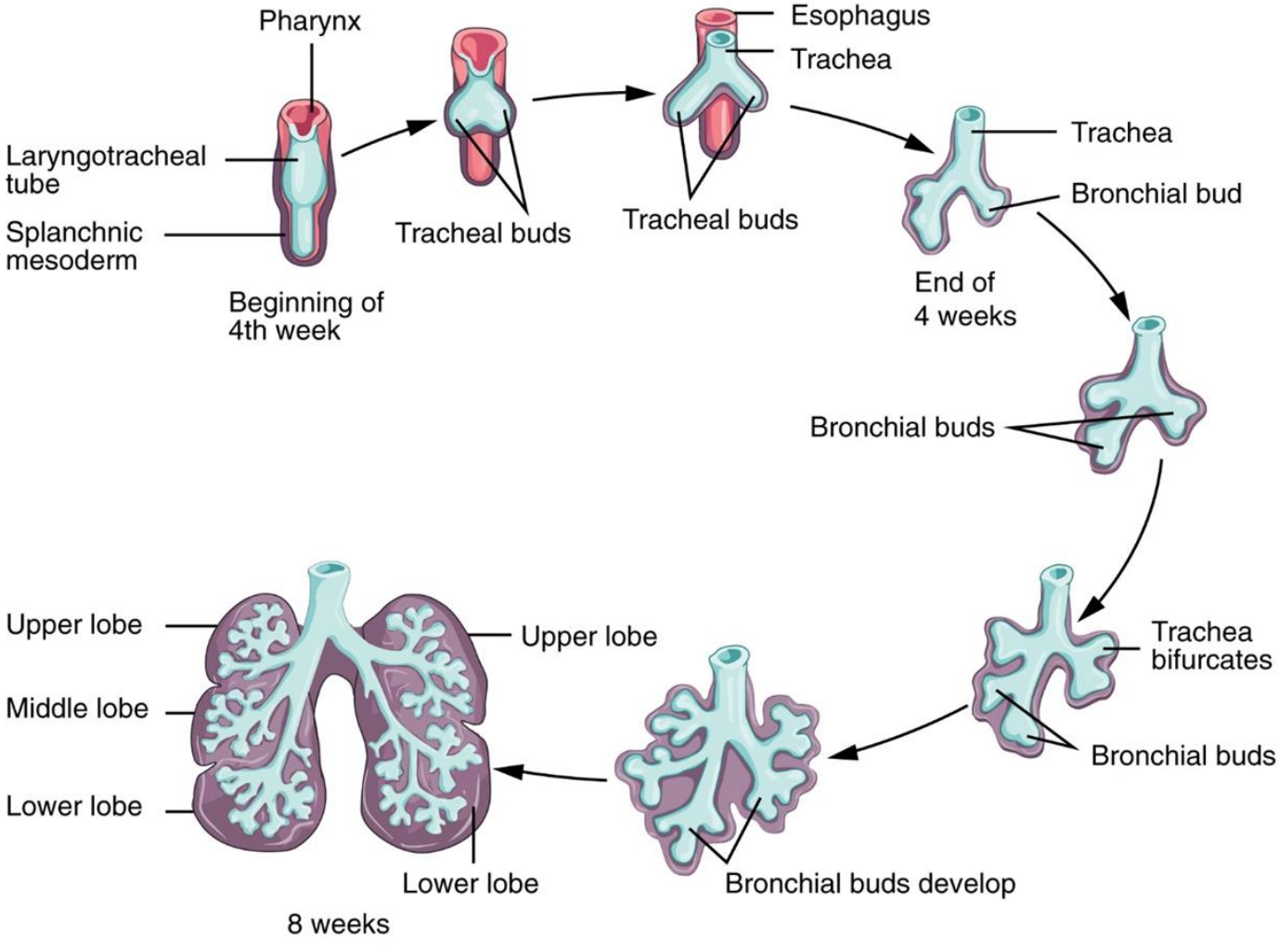
Consultant Neonatologist

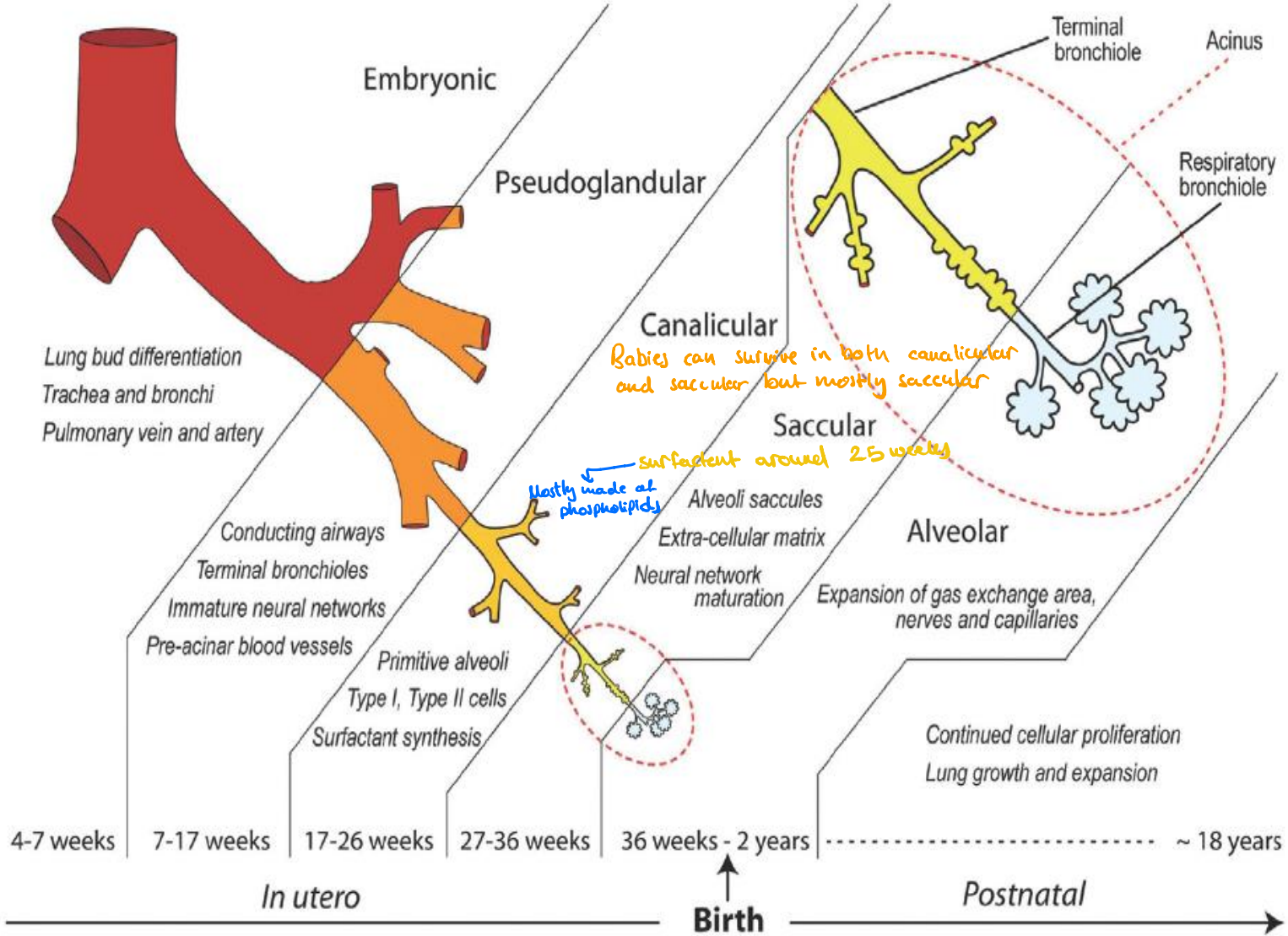
Head of NICU

LUNG DEVELOPMENT

Adapted from Moore and Persaud 2008.[1]

Babies born early have lungs that are smaller and less developed at birth than those of full-term babies.


Pharynx
Laryngotracheal tube
Splanchnic mesoderm
Beginning of 4th week
Tracheal buds
Esophagus
Trachea
Tracheal buds
Trachea
Bronchial bud
End of 4 weeks
Bronchial buds
Trachea bifurcates
Bronchial buds
Bronchial buds develop
Upper lobe
Middle lobe
Lower lobe
Upper lobe
Lower lobe
8 weeks



surfactant function: keeps alveoli open by ↓ surface tension

↳ deliver through intubation or LISA (less invasive surfactant administration) through LMA

Full complement of mature alveoli are present by

A. Early childhood — 8 years old

B. Birth

C. At 42 weeks

D. At adult life

* Asthma usually improves around 8 years of age due to maturation of alveoli

no surfactant → collapse → hypoxia → lactic acidosis (+ respiratory) → cardiac arrest

Antenatal Measures

- 26 years G3P1+1 mother arrived to A/E in preterm labor at 26 weeks of gestation. *Which of the following interventions will help in the preterm out come?*

A. Indomethacin
B. Betamethasone
C. Mg sulfate
D. Ritodrine

A ~~26~~ 28-week-gestation, ~~719~~ 850-g preterm infant borne after emergency C/section because of preeclampsia. observed to be tachypnea, with intercostal retraction and O2 saturation of 78

- What is the most likely cause of his respiratory distress?
  surfactant deficiency + immature lung (hyaline membrane disease) & most common cause of respiratory problems in neonates ↑ PRETERM!
- What are the other D/D?
- What is the next step you will do in delivery room ?
- what are the medication you may need to use in DR during or after resuscitation?

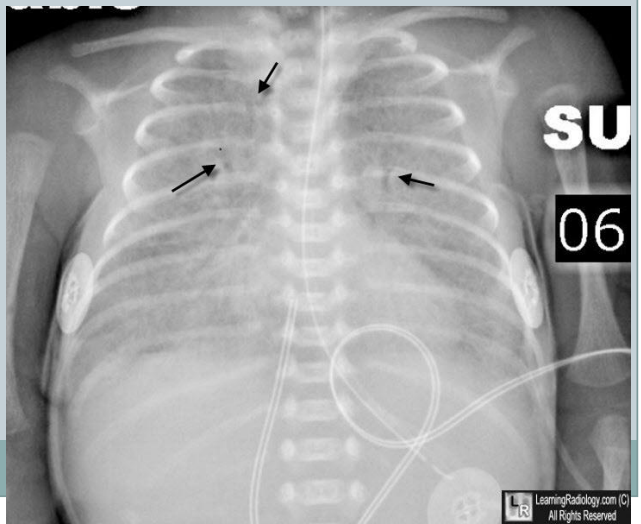
Premature mother preperation:
- 2 doses of steroids 4-6 hrs before delivery
- + Mg sulfate (for neuroprotection)
- + ABx

Baby:
- intubation + surfactant
- fluid resuscitation through umbilical line (low)
- epinephrine
- Vit K (to prevent hemorrhagic disease of the new born)
- Erythromycin eye drops to prevent chlamydia and gonorrhea

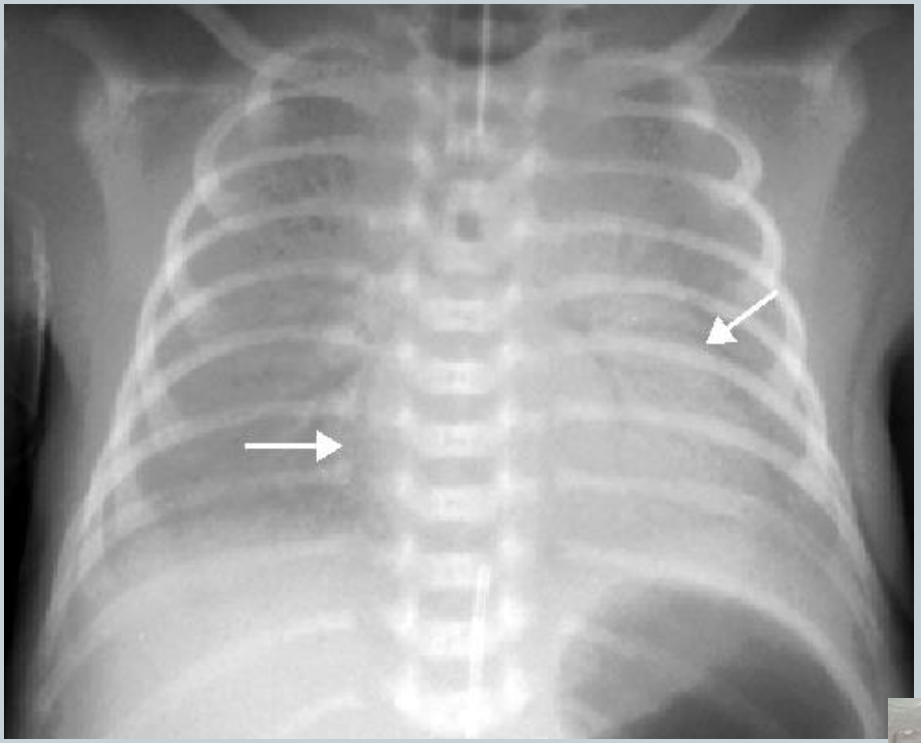
The radiological finding typically showed

A. Glass ground appearance with Broncho-gram
B. Collapse consolidation
C. Diffuse atelectasis
D. Pulmonary edema with pleural effusion
E. pneumothorax

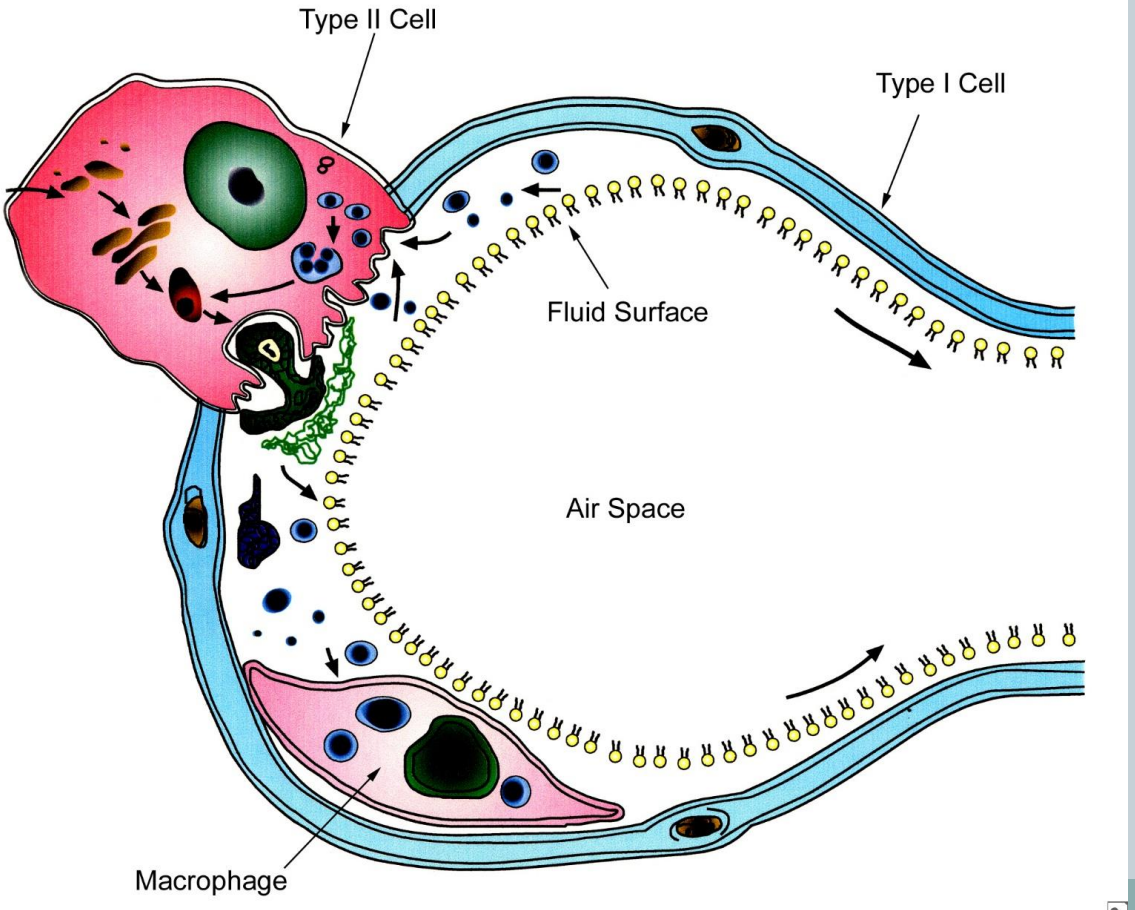
if you want to admit to NICU or to confirm ET position
↓
X ray



RDS or HMD



HMD



Complication of prematurity

After delivery room stabilization

- Admitted to NICU
- List the steps in the management of this preterm infant?
- CPAP OR Intubate connect to Mechanical Ventilation
- IV access and fluid therapy IV access through umbilical venous catheter, DIOW
- CBC, Blood culture and Gases monitoring
- IV antibiotics for GBS
- What is (are) the possible complication(s)?
  - infection /sepsis
  - respiratory failure
  - BPD (bronchopulmonary dysplasia)

Indomethacin rx is controversial doctor still uses it

EPM (expressed breast milk) after stabilization within 24 hrs through NGT (no coordination between sucking and breathing)

While he is on mechanical ventilation suddenly he developed bradycardia desaturation and change in skin color to black blue color

WHAT IS THE MOST LIKELY DIAGNOSIS? Alveolar rupture
↳ Pneumothorax → collapse

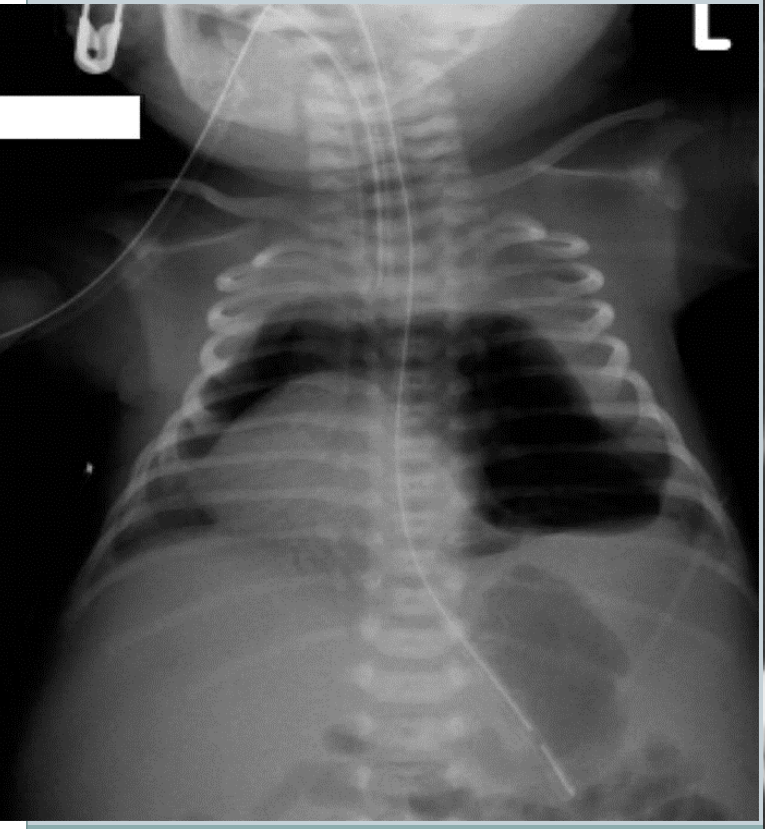
WHAT IS THE URGENT STEP IN THE MANAGEMENT?

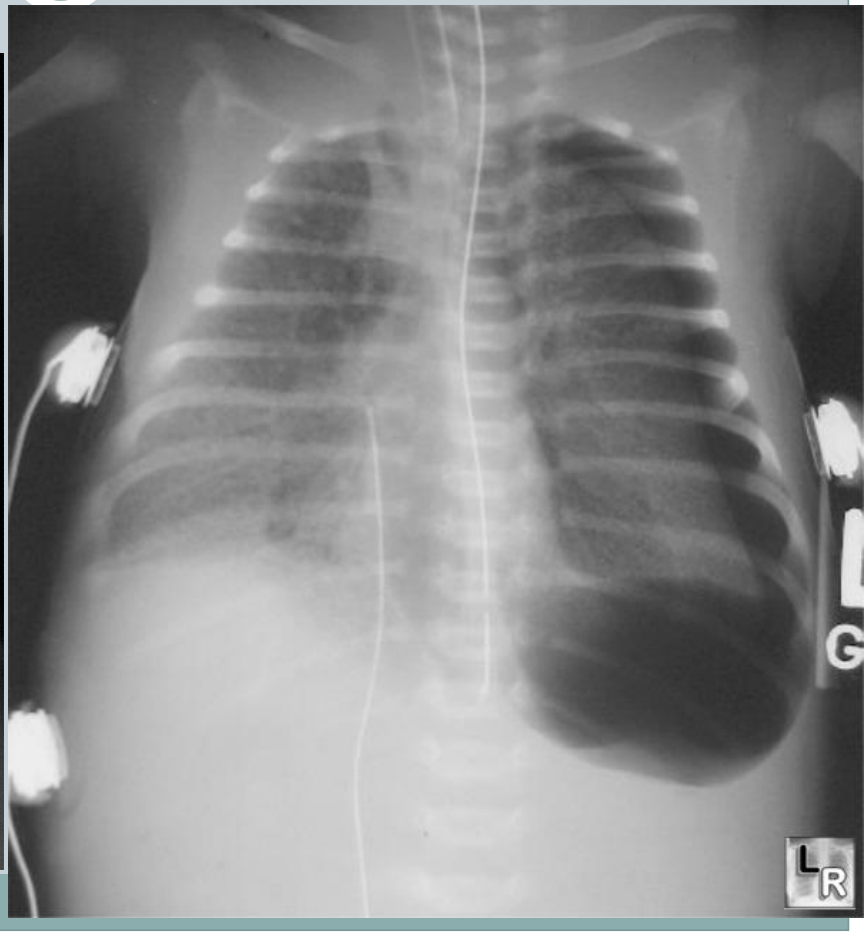
Needle decompression with butterfly needle in 2nd intercostal space midclavicular line

How to confirm diagnosis before Xray?

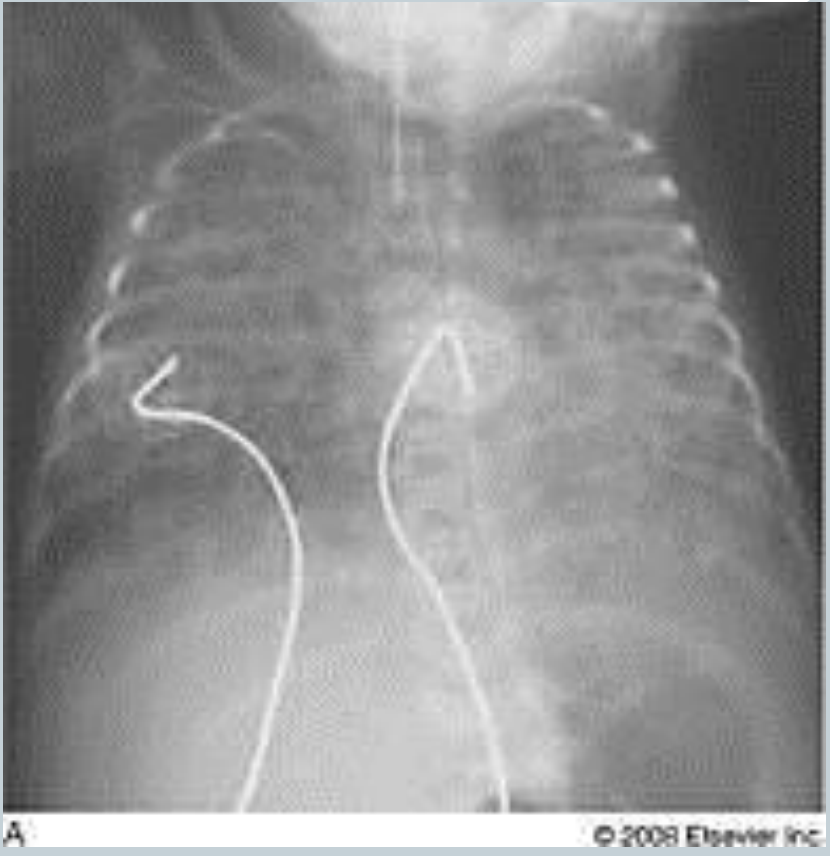
- Transillumination if + on the whole lung → pneumothorax
- Other clinical signs are not reliable

Air Leak syndrome





PBD



Case 3

- 28 wks mild RDS, on n.CPAP, shows increase in oxygen demand.
- Physical examination discloses a systolic murmur in the left infra-clavicular region, prominent cardiac impulse to palpation, and presence of palmar pulses.
- HR 160/min , RR 50
- O2 Sat 88% on FiO2 0.55
- BP 45/20 MEAN 29
- WHAT IS YOUR DX?

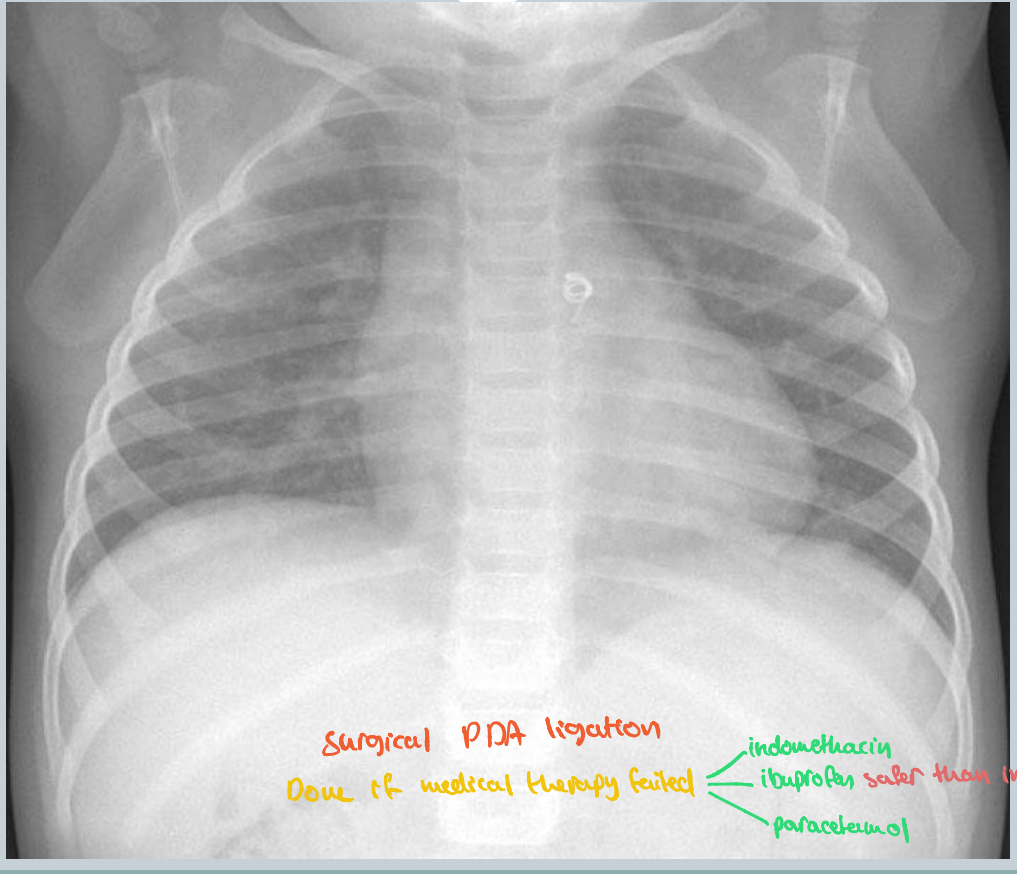
hemorrhagic pulmonary edema

PDA

The treatment of choice in this preterm infant

A. IV lasix
B. IV digoxin
C. IV antiboitics
D. IV Indomethacin

Treatment


Surgical PDA ligation
Done if medical therapy failed
indomethacin
ibuprofen safer than indomethacin
paracetamol

Case 2

- A 19-day-old male infant, whose birth weight was 980 g and estimated gestational age at birth 27 weeks, has sudden onset of apnea and bradycardia, temperature instability, and lethargy. He also has increased gastric residuals, abdominal distension, and bright red blood in stools,

- Abdominal examination reveals absence of bowel sounds, tenderness with guarding to touch, no palpable mass, and no skin discoloration.

Of the following, the clinical and radiographic findings in this infant are MOST consistent with :

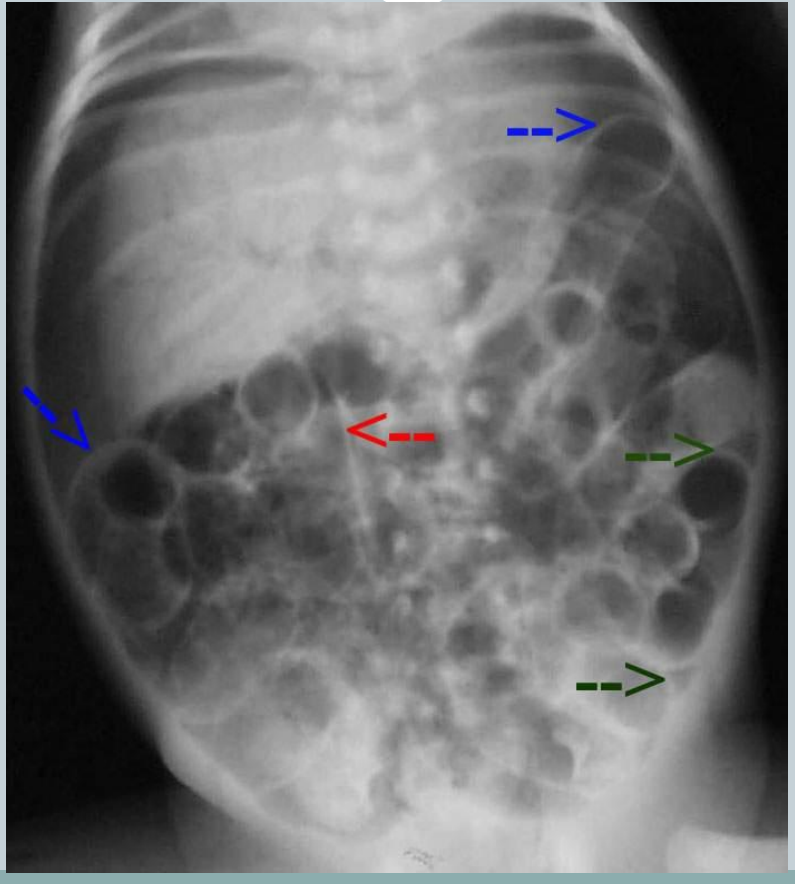
A. Intestinal perforation
B. Sepsis and paralytic illus
C. NEC
D. Intestinal obstruction

Treatment

- NPO
- Gastric decompression
- IV antibiotics
- Radiological follow up
- Surgical consultation
- Nutritional support

The early intestinal complication is

A. Intestinal adhesion
B. Intestinal perforation
C. Intestinal obstruction
D. Malabsorbtion with vilous atrophy



Male term infant developed sever respiratory distress with cyanosis immediately after birth

1. What farther points in history do you need to clarify?
2. On physical Exam sick neonate with B wt 3400gm, RR 70/min, HR 140b/min, O2 saturation 76%, sever intercostal retraction, scaphoid abdomen, decrease air entry (L) side
3. What farther clinical signs do you need to elicit?

ABG

- PH 7.16
- PaO2 43
- $PacO^{2}$ 67
- $Hco3^{-}$ 14
- BE - 12

scaphoid abdomen + normal chest / overinflated

↳ diaphragmatic hernia

Most diagnosed prenatally

Worst!

(L) CDH

Congenital diaphragmatic hernia

↳ severe pulmonary hypoplasia

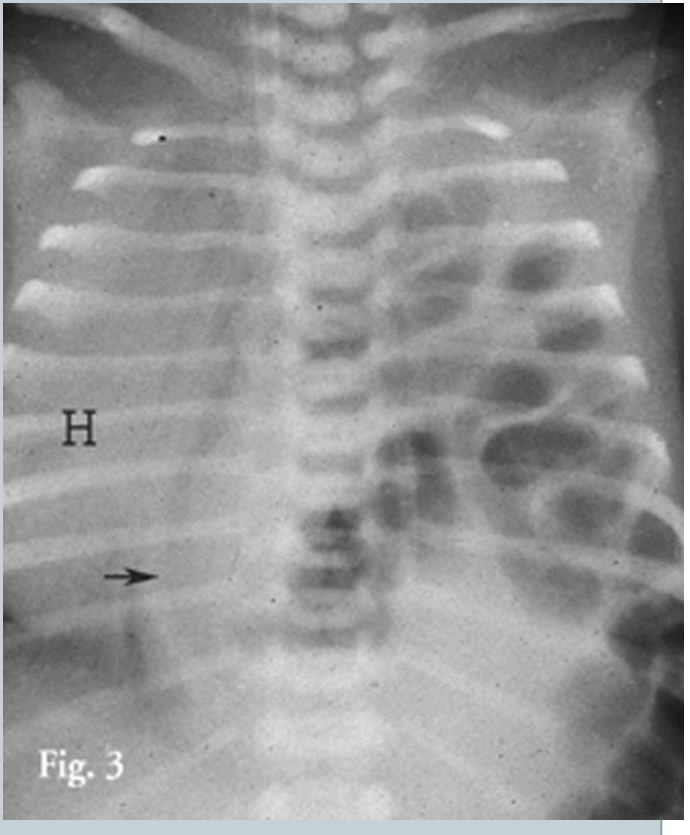


Fig. 3

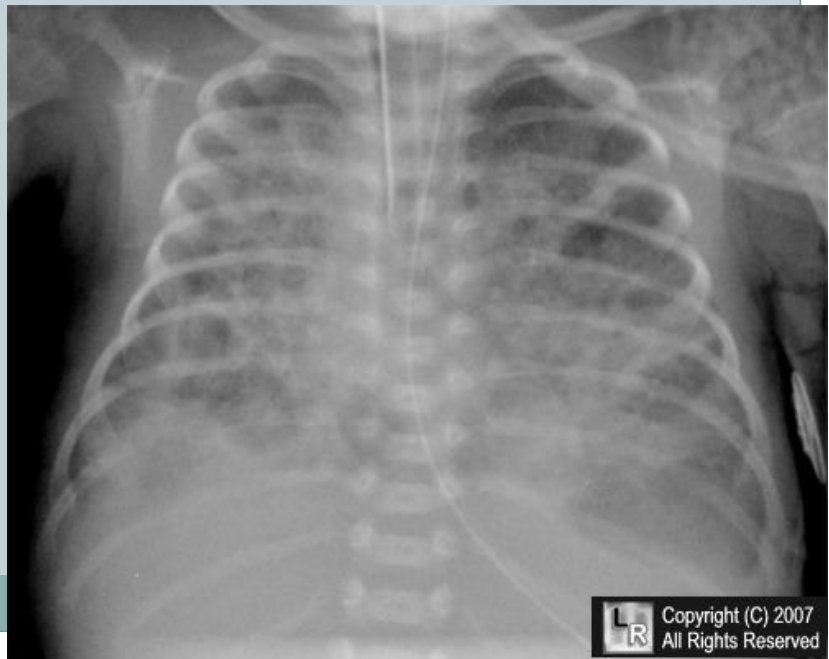
R . CDH

CDH

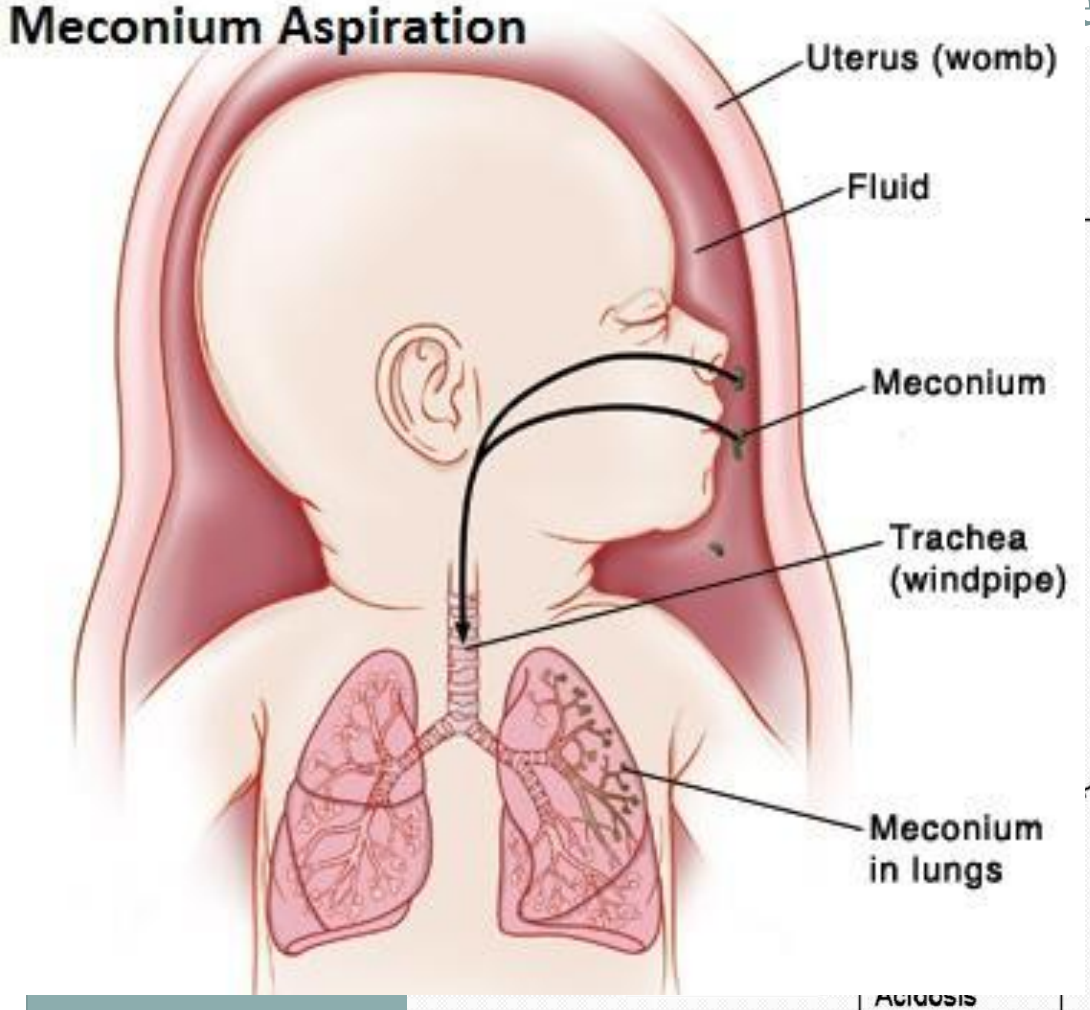
1. What is /are your differential diagnosis?
2. How do you manage this neonate?
3. Investigation
4. Treatment
5. Prognosis and complication

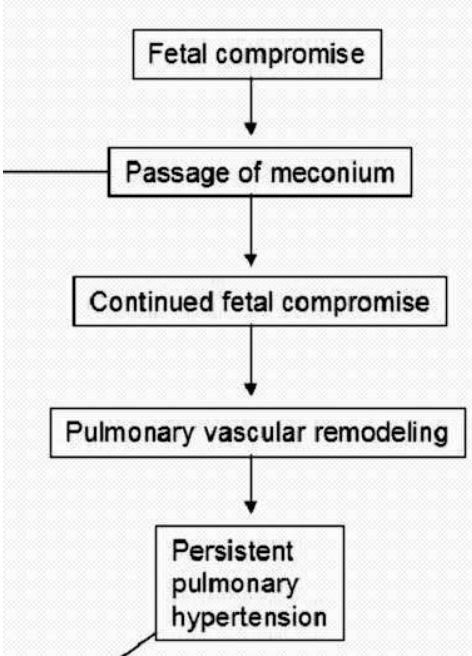
Term male infant born at 40wk developed sever RD immediately after Birth

- History
- Physical examination
- Management
- https://youtu.be/Hx1lLopbrtY



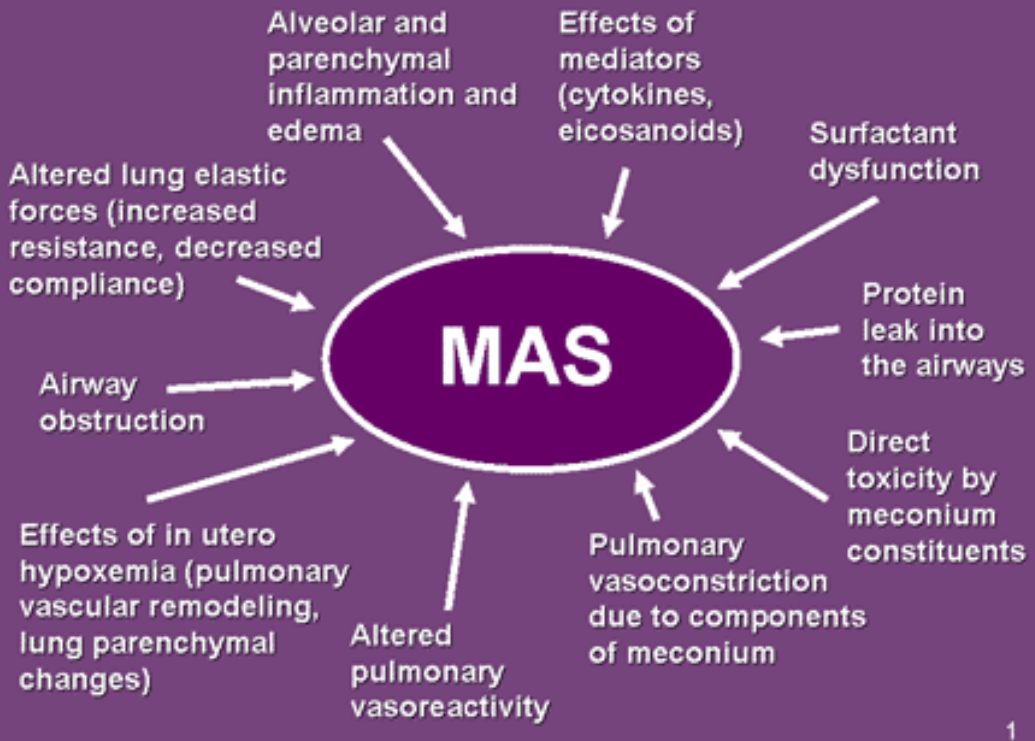
ed with MAS?



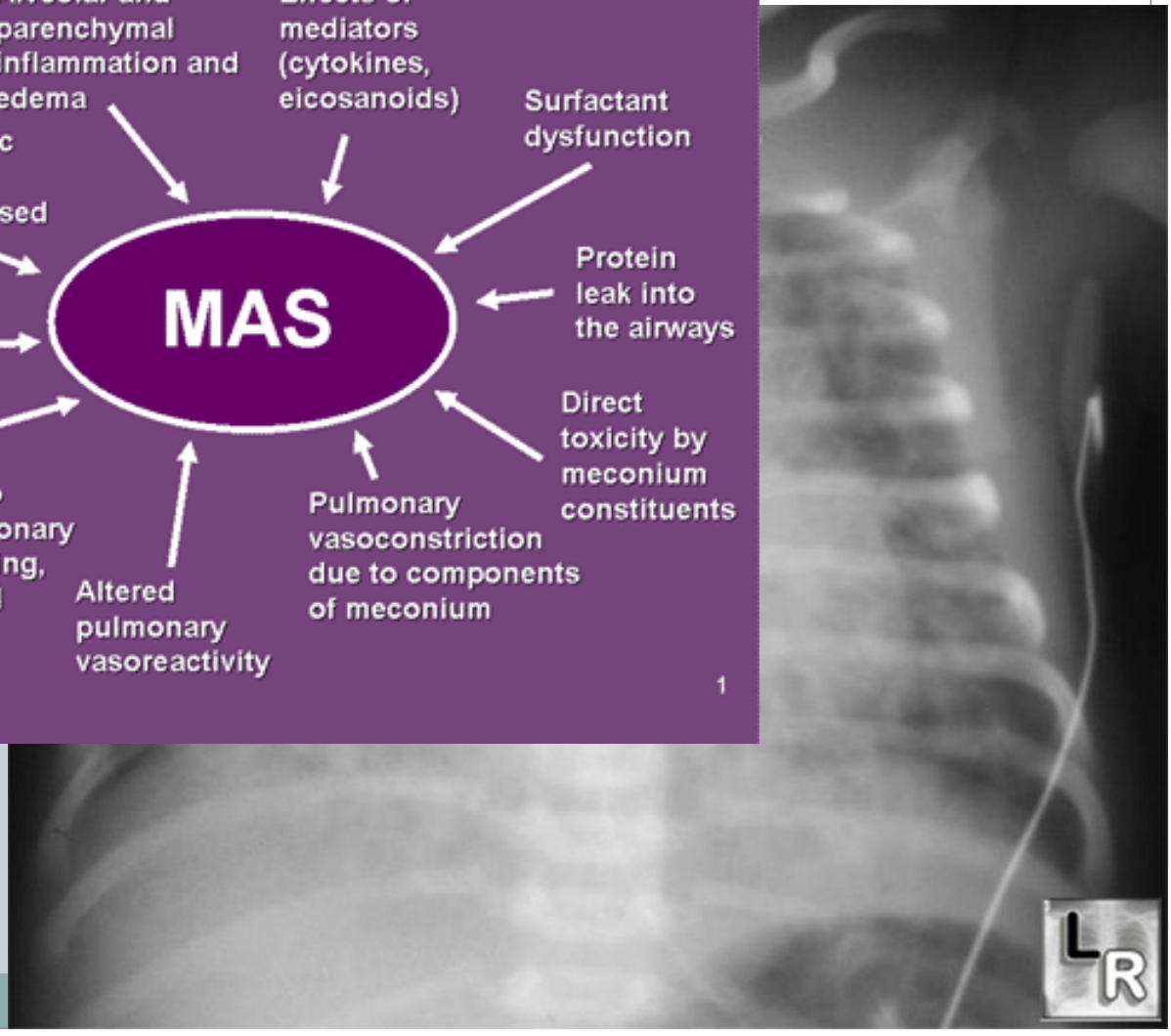


Acidosis

MAS Pathophysiology



1



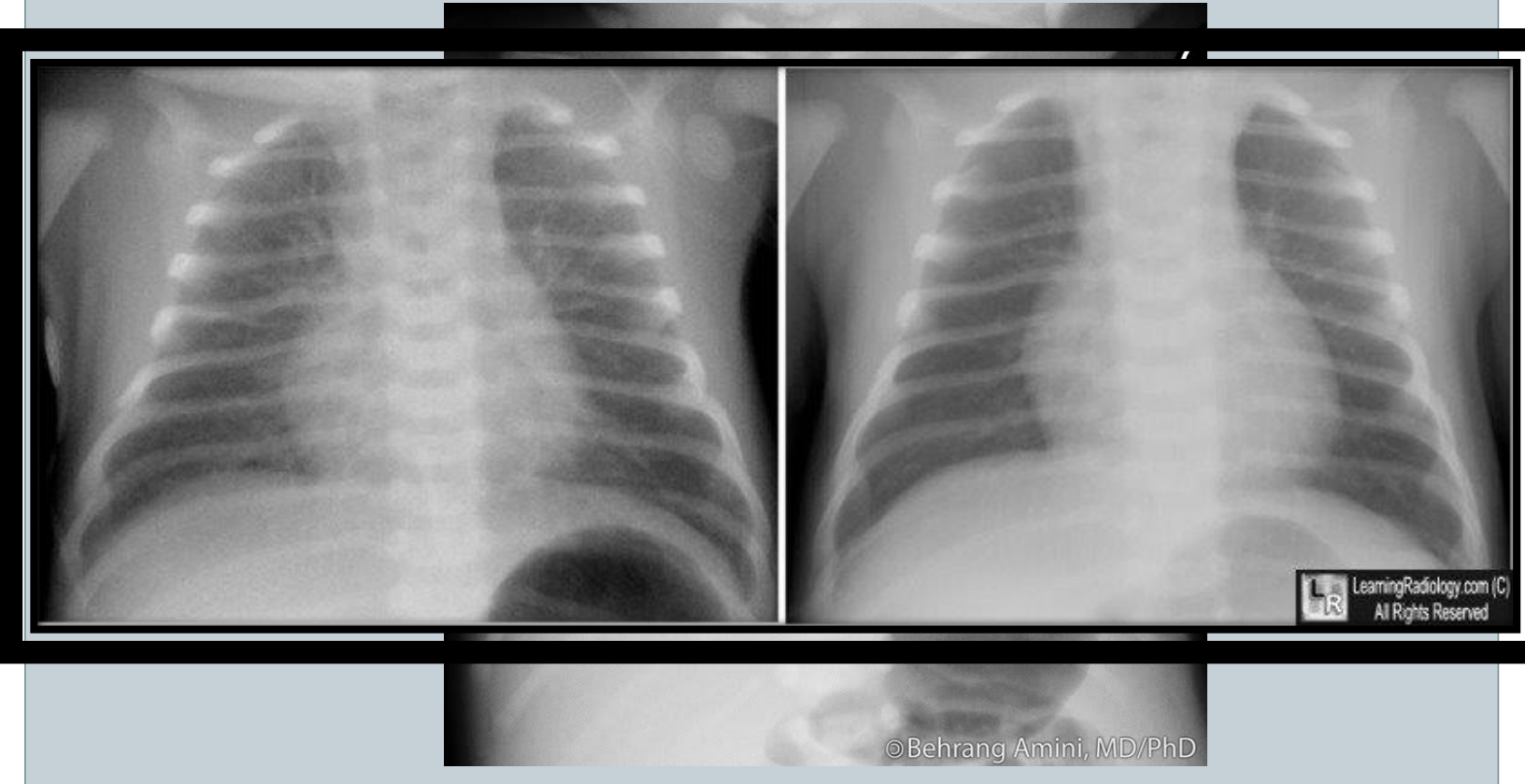
Term baby grunting, intercostal retraction

MCQ!

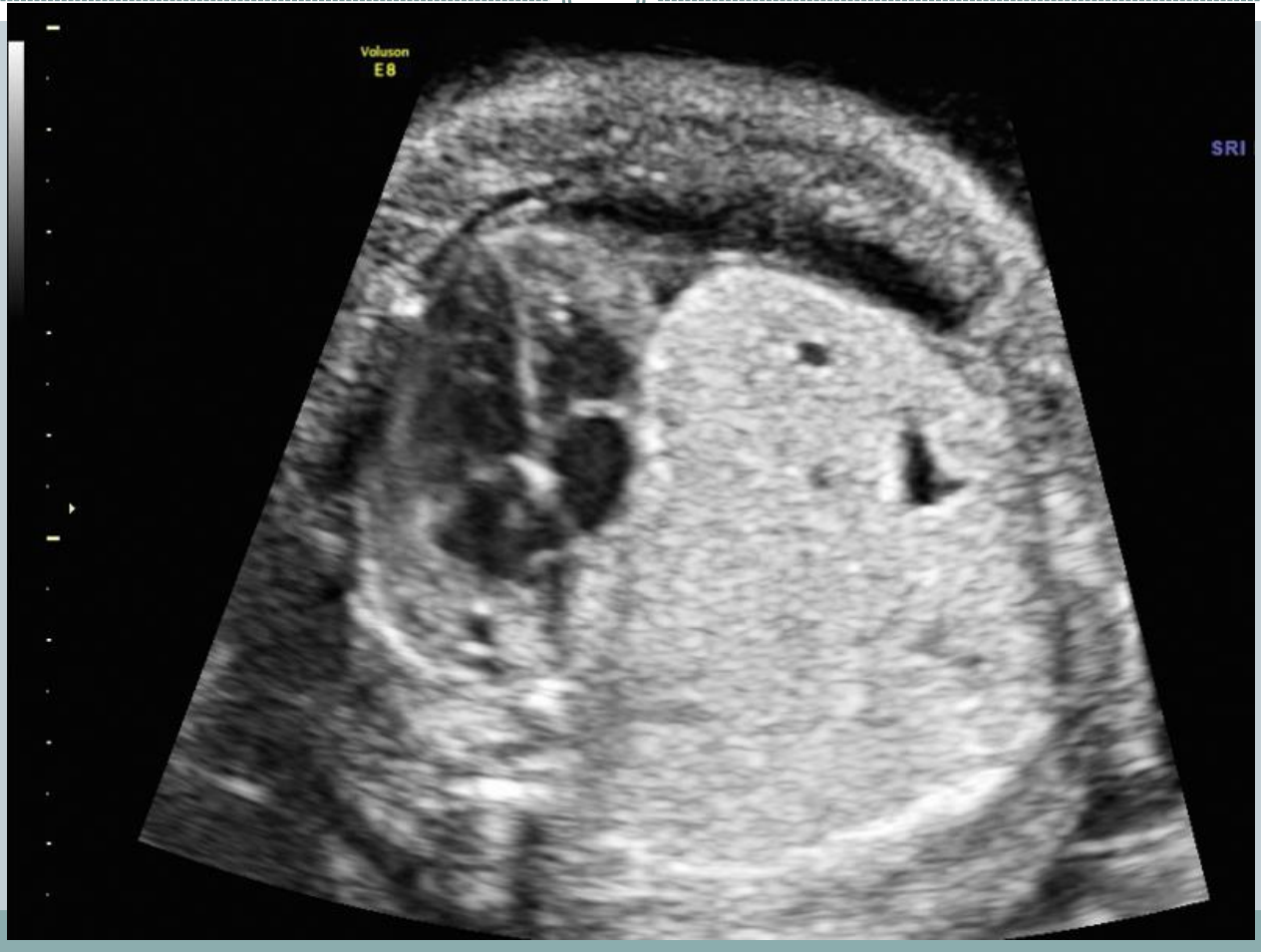
TERM MALE INFANT BORN AT 37WK BY ELECTIVE C/S

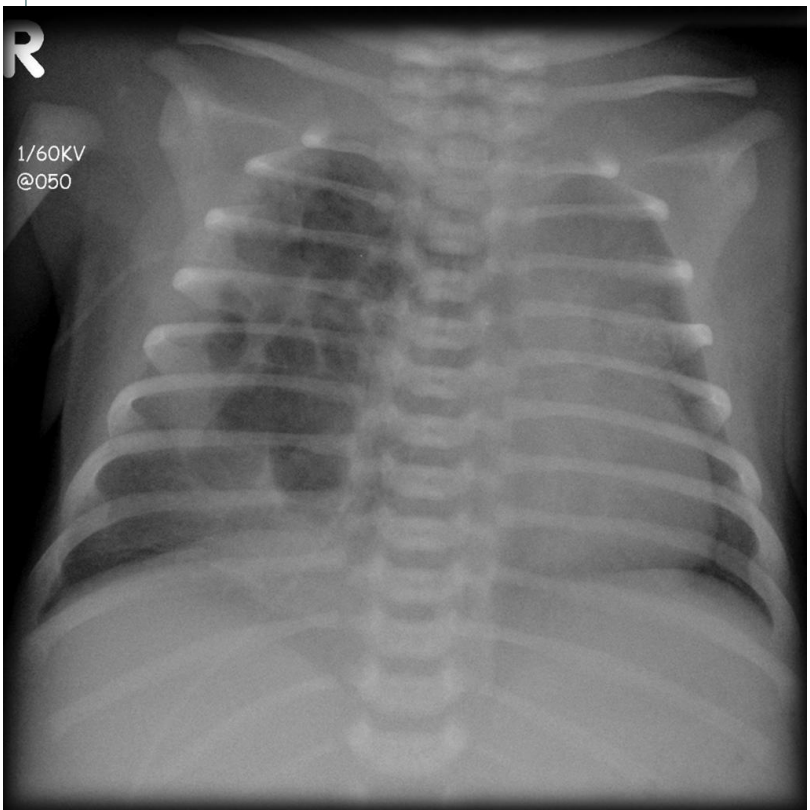
treatment of PHTN - sinaled NO

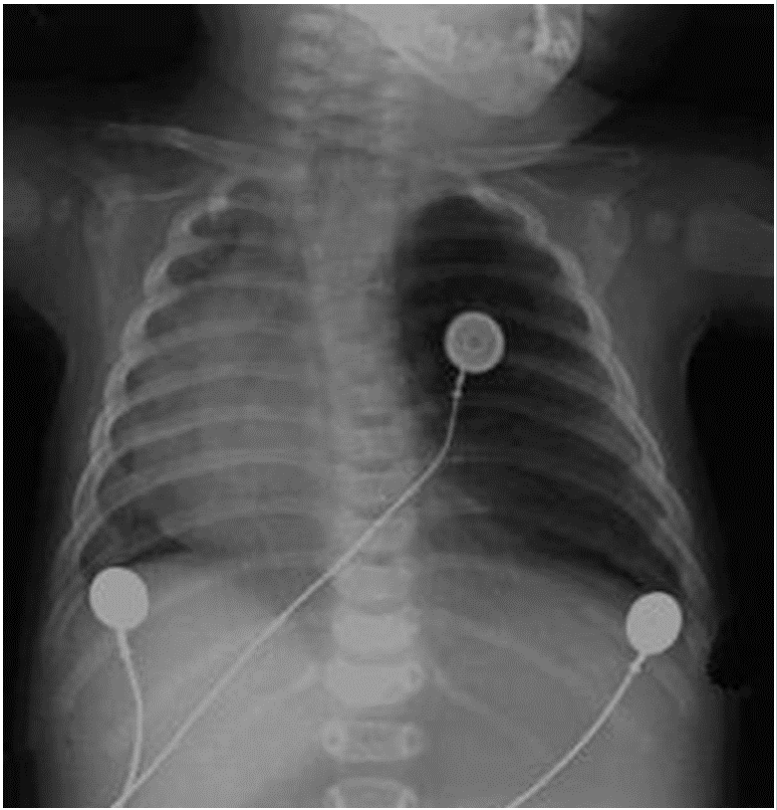
Transient tachypnea of newborn
(wet lung syndrome)

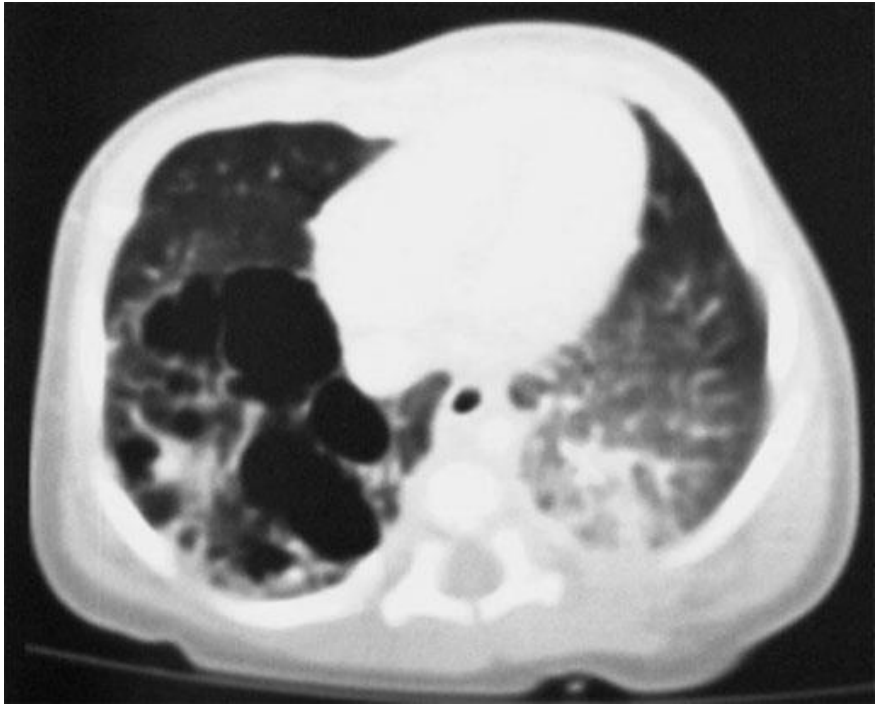


Antenatal U/S showed a symmetrical Lung shadow

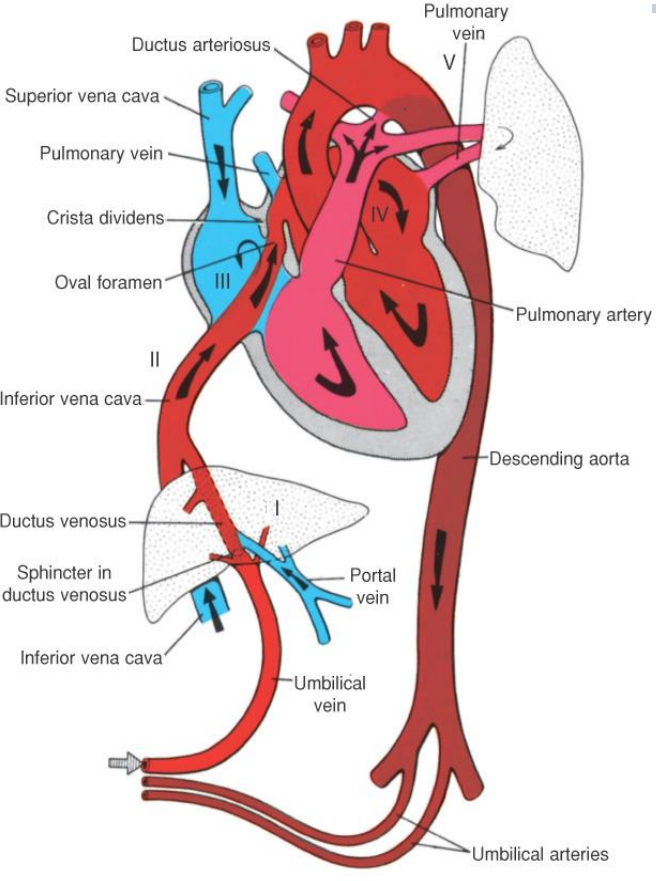


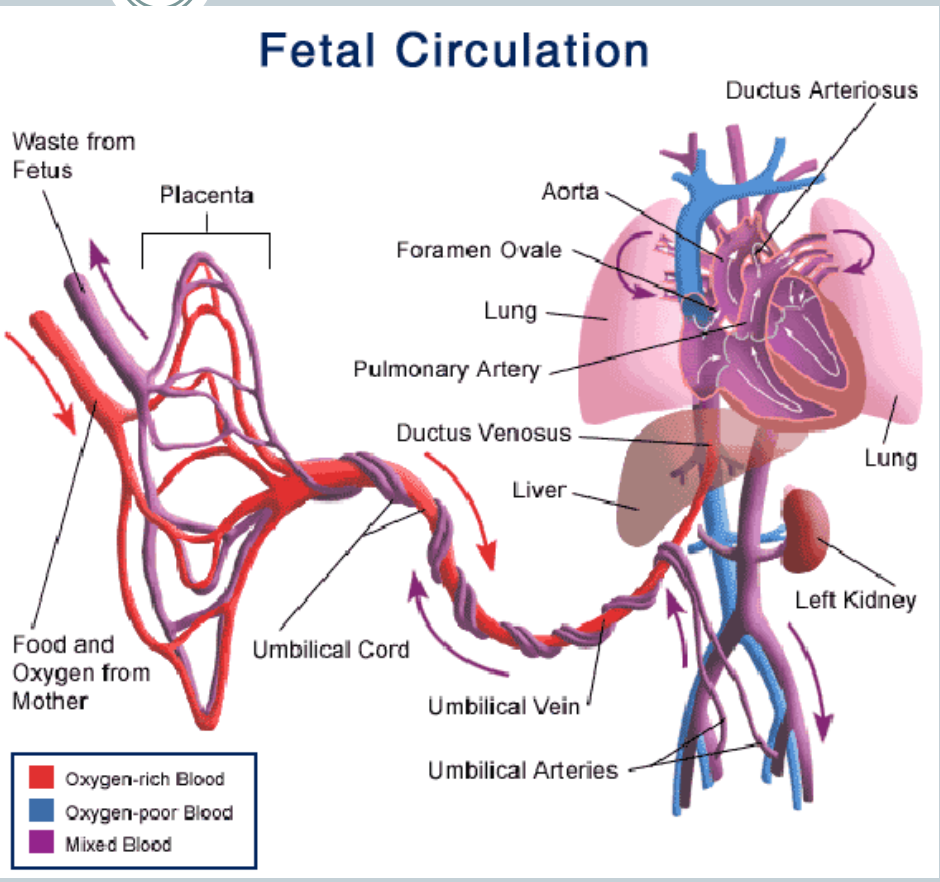

R
1/60KV
@050





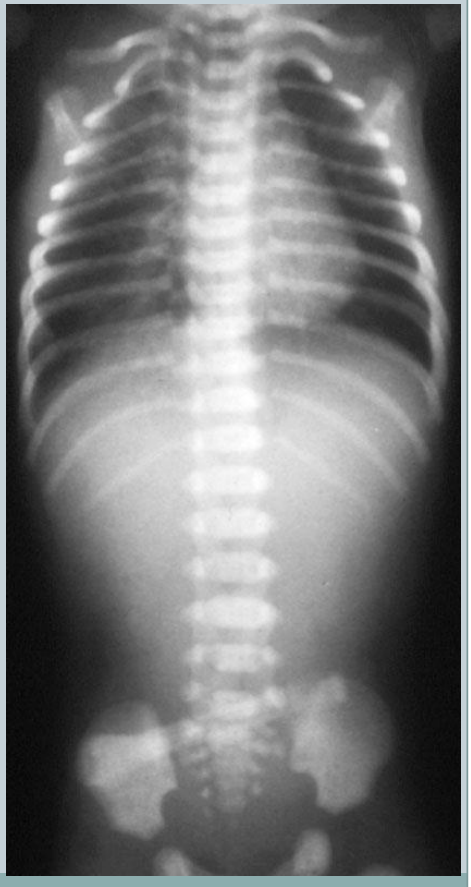
PPHN


Pulmonary vein
V
Ductus arteriosus
Superior vena cava
Pulmonary vein
Crista dividens
IV
Oval foramen
III
Pulmonary artery
II
Inferior vena cava
Descending aorta
Ductus venosus
I
Sphincter in ductus venosus
Portal vein
Inferior vena cava
Umbilical vein
Umbilical arteries


Fetal Circulation
Waste from Fetus
Placenta
Ductus Arteriosus
Aorta
Foramen Ovale
Lung
Pulmonary Artery
Ductus Venosus
Lung
Liver
Left Kidney
Food and Oxygen from Mother
Umbilical Cord
Umbilical Vein
Umbilical Arteries
Oxygen-rich Blood
Oxygen-poor Blood
Mixed Blood

Term infant with excessive salivation

1) What questions do you ask in farther history?
2) How do you confirm the diagnosis?
3) How do you treat this infant?



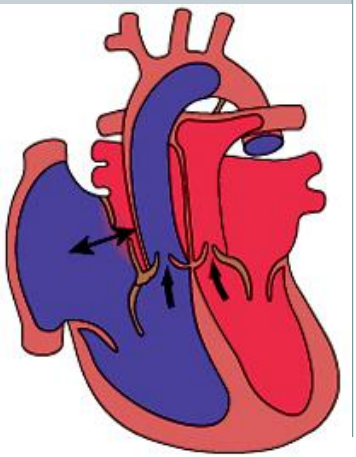
How do you approach these infants?

Perioral cynosis

CXR: **egg-shaped heart** with narrow mediastinum ("egg **on a string**")

TGA

- most common cardiac lesion in the cyanotic newborn
- aortic root arises anteriorly from the right ventricle and the main pulmonary artery arises posteriorly from left ventricle, resulting in parallel pulmonary and systemic circulations
- newborn presents with progressive cyanosis **unresponsive to oxygen** therapy as the ductus arteriosus closes and mixing between the two circulations diminishs; severe hypoxemia, acidosis, and death can occur rapidly
- if VSD present, cyanosis is not prominent, infant presents with CHF after a few weeks of life
- **Murmur:** none or grade II/VI SEM
- ECG: RAD, RVH



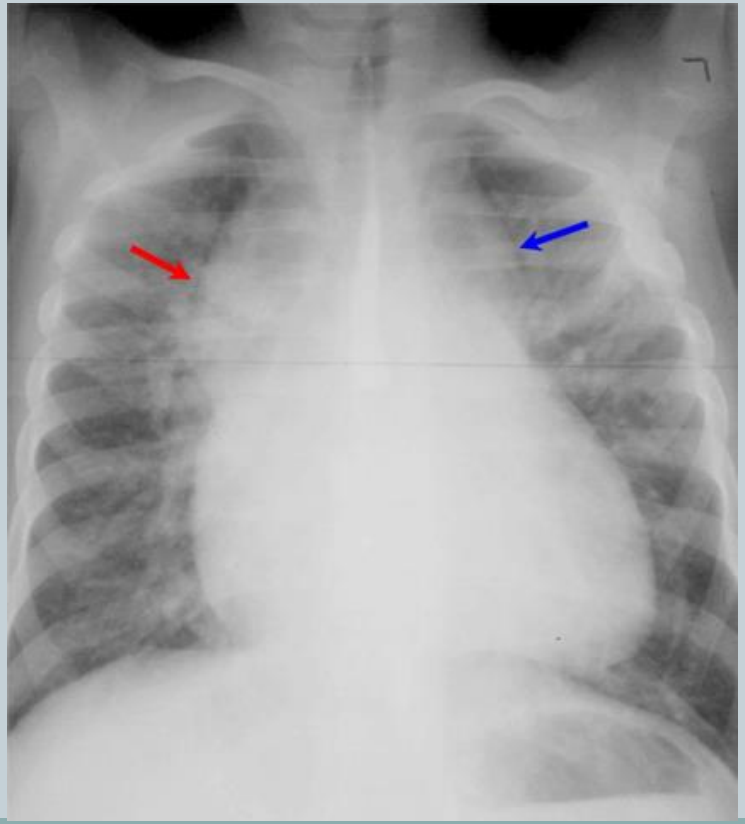
Management:

- Prostaglandin E1 infusion to keep ductus open
- Ventilation support
- Metabolic support
- Balloon atrial septostomy with catheter
- Surgical correction: arterial switch procedure

Boot-Shaped Heart

1) **VSD**
2) **RV outflow tract obstruction (RVOTO)**
3) **overriding aorta**
4) **RVH**

"snowman shape."



Thanks