

Chest x ray of RDS and related disorders

Slide 1

In this webinar we will learn the about x-ray findings of common respiratory disorders of neonates including respiratory distress syndrome or HMD and pneumonia

Slide 2

In this webinar we will learn about the the characteristics of the normal X-ray and the X-ray pictures of common neonatal respiratory morbidities

Slide 3

First of all we would learn the characteristics of a normal neonatal chest x ray
Normal neonatal CXRs are shot antero-posteriorly while the baby is lying in a supine position. The anteroposterior orientation of X-ray is recognised by the prominence of posterior ribs as compared to anterior and comparatively oblique orientation of clavicle as compared to PA views. The neonatal ribs more horizontal compared to children and adults. Thymus is often prominent in neonatal chest Xrays. Normal CT ratio can be up to 0.65 on day 1 and 0.6 for rest of the neonatal period.
To check for the inflation we should observe the level of the diaphragm. Diaphragm is normally up to 8th rib posteriorly and 6th rib anteriorly such that we see 7-8 posterior intercostal spaces. Posterior intercostal spaces more than 8 qualify for hyperinflation and less than 7 under-inflation.

Slide 4

The common indications of chest X-rays in a neonate include

- To investigate the cause of respiratory distress
- To check the position of endotracheal tube, umbilical arterial and venous lines, and chest tubes
- To prove a clinical suspicion of airleak. It is important to remember that in the spectrum of airleak, non-invasive tests like transillumination should be immediately performed to take urgent decisions and one shouldn't wait for X-ray diagnosis in a clinically deteriorating baby.

Slide 5

Now let us discuss the characteristics of HMD on chest X-ray. In a neonate with surfactant deficiency the alveoli tends to collapse and thus we see under inflation (i.e. <7 posterior intercostal spaces). Additionally due to the patchy atelectasis we observe the reticulogranular pattern on chest X-ray which you can see in the x-ray on the right. As more and more alveoli collapse the X-ray displays groundglass opacity and appears whiteout.

Slide 6

Here in this X-ray, we can appreciate a typical air bronchogram of RDS which extends beyond the heart borders involving lung parenchyma. It is important to note that air bronchogram can be observed against heart even in the X-rays of normal neonates.

Slide 7

These X-rays display the typical white out appearance of HMD. One should always interpret findings of X-rays in light of clinical details. e.g. similar findings can be expected in a case of hemorrhagic pulmonary edema, very severe pneumonia leading to ARDS, pulmonary hypoplasia etc. A relevant clinical antenatal history and course of illness will give vital clues for identification of the clinical condition.

Slide 8

So to summarise, the typical x finding of HMD are

- Decreased lung volume
- Reticulogranular pattern
- Ground glass opacification
- Air bronchograms
- Whiteout lungs

Slide 9

Now let's discuss the chest X-ray findings of pneumonia. The typical findings of pneumonia is patchy alveolar or interstitial infiltrates, which leads to non-homogenous involvement of the lungs. The typical features of consolidation as seen in children and adults with pneumonia is not generally seen in neonates. In the initial stages of pneumonia, there is no effect on surfactant metabolism. Therefore usually the chest X-ray appears to retain normal lung volumes. However in the advanced stages the surfactant is destroyed by infective process and the X-ray may show bilateral more dense involvement of lungs and in extreme cases even whiteout appearance.

Slide 10

The typical x ray of meconium aspiration syndrome shows hyper-inflated lung due to ongoing ball-valve phenomenon secondary to presence of meconium in airways. Due to patchy atelectasis and hyperinflation, the X-ray shows fluffy or nodular opacities and hyperlucent areas.

Slide 11

TTNB manifests due to delayed clearance of amniotic fluid from the lungs after birth. Therefore the x-ray chest of TTNB is expected to show

- Prominent hilum with streaky shadows
- Prominent interlobar fissure visible on right side

- There may also be small pleural effusion. You will see blunting of the costophrenic angle
- Mild cardiomegaly
- Normal to increased lung volume

Slide 12

The pneumothorax is diagnosed by the presence of free air in the pleural cavity. Pleural air can be easily differentiated as it is

- Hyper-lucent i.e. appears more dark
- Doesn't have perihilar markings
- Shift of mediastinum to opposite side
- One can also appreciate the collapsed lung.

Slide 13

Lastly we will learn the X-ray findings of CDH. In CDH the x ray shows the presence of bowel in the left hemithorax, which have cystic appearance. Due to the presence of bowel in thoracic cavity, the mediastinum is shifted to opposite side as seen in the X-ray.

Slide 14

So in this webinar we have learnt

- Characteristic chest X-rays appearance of common pulmonary morbidities.
- These should lead to early diagnosis and should help in management decisions.