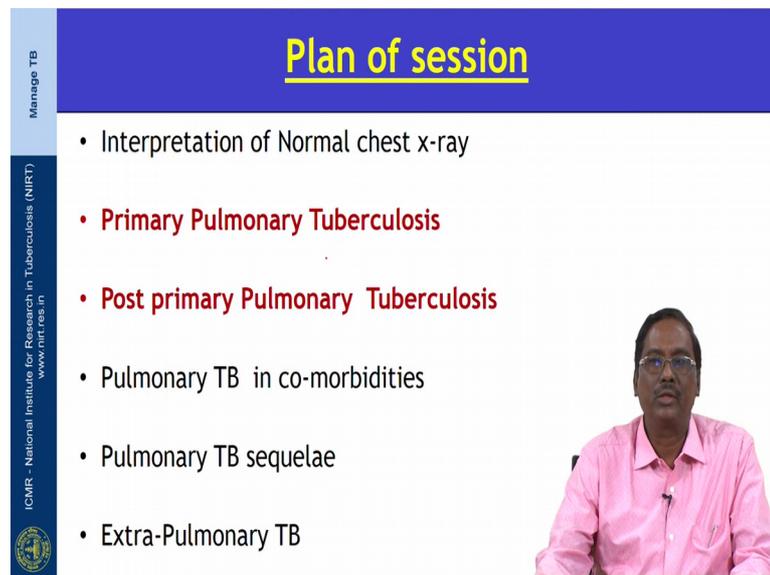


Manage TB
Dr. A. Chitrakumar
Institute of Thoracic Medicine, Chennai

Lecture – 17
Radiology in diagnosis of Tuberculosis
Session 02

Welcome to the next session of Radiology in diagnosis of Tuberculosis.

(Refer Slide Time: 00:18)



The slide features a blue header with the text "Plan of session" in yellow. Below the header is a list of topics: "Interpretation of Normal chest x-ray", "Primary Pulmonary Tuberculosis", "Post primary Pulmonary Tuberculosis", "Pulmonary TB in co-morbidities", "Pulmonary TB sequelae", and "Extra-Pulmonary TB". A video inset on the right shows Dr. A. Chitrakumar, a man in a pink shirt, speaking. On the left side of the slide, there is a vertical blue bar with the text "Manage TB" at the top, "ICMR - National Institute for Research in Tuberculosis (NIRT)" in the middle, and the website "www.nirt.res.in" at the bottom. A small logo is also present at the bottom left of this bar.

- Interpretation of Normal chest x-ray
- **Primary Pulmonary Tuberculosis**
- **Post primary Pulmonary Tuberculosis**
- Pulmonary TB in co-morbidities
- Pulmonary TB sequelae
- Extra-Pulmonary TB

So, in this session we are going to discover discuss about the role of radiology in the diagnosis of pulmonary tuberculosis. Radiological features of pulmonary TB is conventionally divided into primary pulmonary tuberculosis and post primary pulmonary TB, each with distinct radiological patterns with considerable overlap.

The radiological features depends on age of the patient underlying immune status and prayer exposure.

(Refer Slide Time: 01:02)

Manage TB

Primary Tuberculosis

- Primary complex
- Ganglio Pulmonary TB
- Consolidation
- Pleural Effusion
- Miliary tuberculosis
- Tracheo Bronchial stenosis



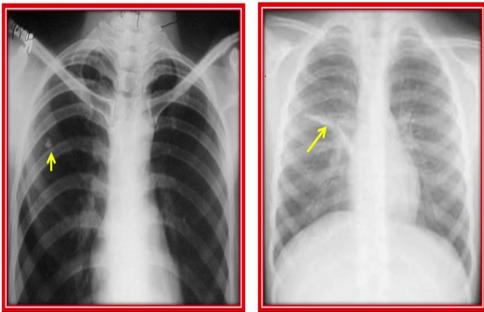
ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

Primary TB commonly effects children and adolescents, now increasingly encountered an adult also. Generally primary TB is a self limiting, it is not symptomatic. Classically 6 entity have been described in primary tuberculosis, the first two condition one is the primary complex and Ganglio pulmonary TB is characteristic of a primary TB, rest of a consolidation pleural effusion miliary tuberculosis and trachea bronchial stenosis have been shared by both primary and post primary tuberculosis.

(Refer Slide Time: 01:54)

Manage TB

Primary Focus



Gohn focus Lymphangitis



ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

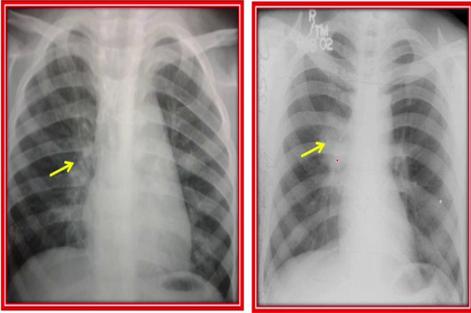
Primary focus or Gohn focus is an area of consolidation or ke shattering granuloma that most commonly occur in lower part of the upper lobe or upper part of the lower lobe with good immunity Gohns foci usually heals by calcification.

In chest X-ray the foci may seen as a calcification, this is only a telltale evidence of the past TB disease. Lymphangitis it is a discrete linear opacity with erase contour and miliary nodules in string of pearls, aligned along the lymphatic vessel. It represent tubercles inflammation of the lymphatics, linking a Gohn foci to lymph hilar lymph node next is a Gohn complex.

(Refer Slide Time: 03:05)

Manage TB

Primary complex



ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

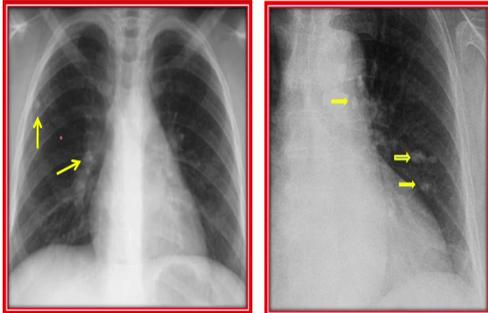
Gohn complex

When the tubercle bacilli disseminate from Gohn foci why are lymphatics, it reaches regional hilar node. So, the node become infected and they enlarge the enlarged node is known as a Gohn's complex.

(Refer Slide Time: 03:42)

Manage TB

Healed Primary Complex



Ranke Complex



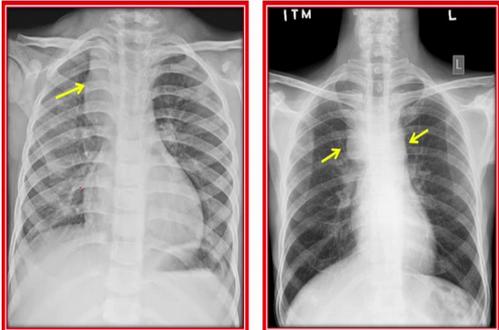
ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

So, which primary foci and Gohns foci constitute a primary complex? In 95 percent of the patient the primary foci and Gohns complex heal either by fibrosis or calcification it is called as a Ranke foci or Ranke complex.

(Refer Slide Time: 04:00)

Manage TB

Ganglio Pulmonary TB



Ganglio Pulmonary TB

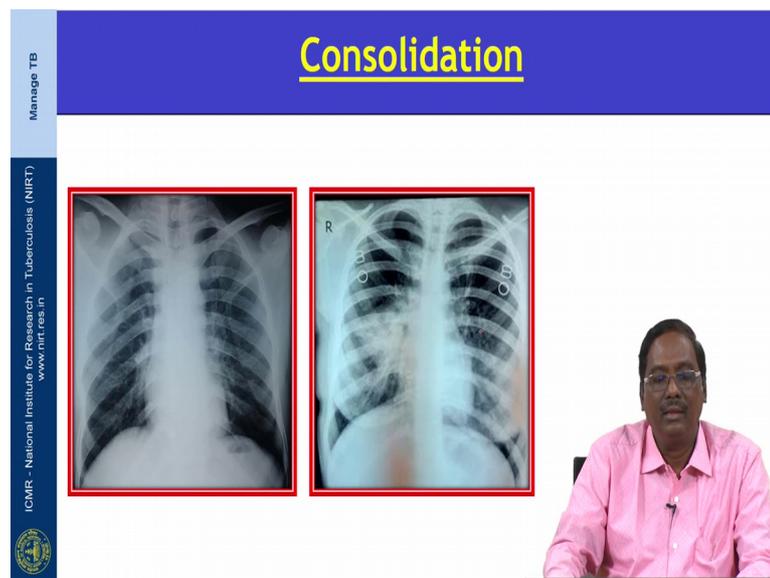


ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

Next is a Ganglio pulmonary TB, it is characterized by enlargement of the mediastinal, hilar lymph node with associated parenchymal abnormality.

This differentiate primary TB from post pulmonary tuberculosis, this seen in 96 percent of the children and 46 percent of the adult patient. So, the commonly involved nodes are right paratracheal, hilar, subcarinal, iota pulmonary and the most common set in Indian population right paratracheal is the most common. So, (Refer Time: 04:40) is seen in 3 percent of the cases. So, this is the lymph node it is a right paratracheal see in a primary TB.

(Refer Slide Time: 04:56)



Next is a consolidation. So, in 5 percent of the patient the Gohns foci extent into the other parts of the lung, it usually in a immune compromised patient.

Consolidation make involve a lobule segment or low bar. The primary consolidation, usually involves the anterior segment of upper lobe, middle lobe or lower lobe. Usually may be associated with the lymphadenopathy, that is the more important to differentiate consolidation from the post primary. So, this is a consolidation associated with the lymph node.

(Refer Slide Time: 05:43)

Manage TB

Pleural Effusion



ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

Next is a pleural effusion. Pleural effusion is one of the most common form a extra pulmonary TB and it is more common in a primary disease, it accounts for 38 percent cases of a primary TB and usually common in adults than children. It occurs 3 to 6 months after primary infection.

So, it manifest as a unilateral large effusion unilateral large effusion and without loculation that is very very important. So, usually with treatment it resolves completely without any complication. Proliferation in a primary TB may be associated with the lymph node and sometimes they may have a parenchymal involvement.

(Refer Slide Time: 06:38)

Manage TB

Miliary Tuberculosis (PPC)

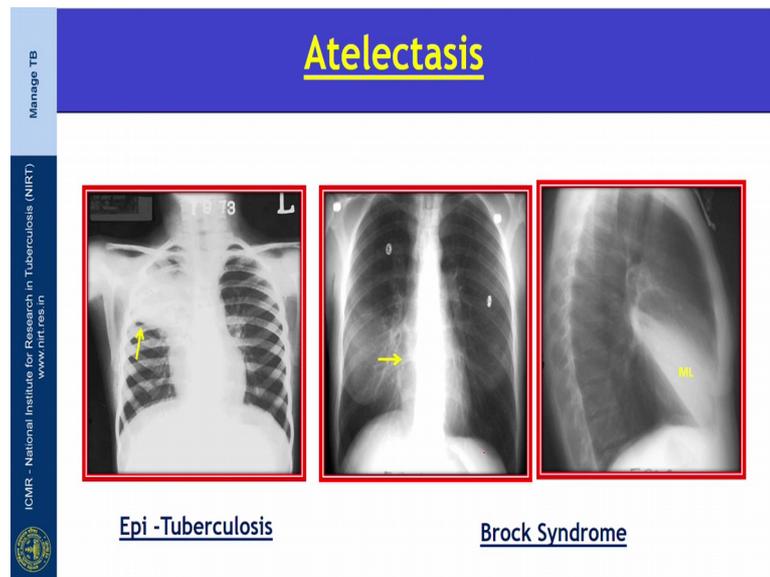


ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

This is a miliary TB; miliary is more common in a primary and you seen in 2.6 percent of the primary TB. It results from the hematogenous dissemination of the discrete TB bacilli, lead in to development of innumerable small granules in lung or other organ.

Radiologically miliary TB is look like a small similar discrete nodules and sparing the apex mostly involving the base. So, here there is also a lymph node involvement also. So, it is a more important point miliary tuberculosis in a primary maybe associated with the lymph node enlargement. So, here this is a patient a miliary TB with the pleural involvement also.

(Refer Slide Time: 07:38)



Next is a atelectasis, it is frequently present in primary tuberculosis due to air way compression by adjacent lymphadenopathy or air waste stenosis. They atelectasis at this is most notable in the right upper lobe anterior segment, we call it as a epi tuberculosis and it is also seen in a middle lobe.

So, it is popularly known it is a brock syndrome; this X-ray shows. So, middle lobe collapse, here there is a slope of the right cardiac border. The lateral X-ray showing classically a wedged middle lobe collapse, it is usually seen in a primary pulmonary tuberculosis.

(Refer Slide Time: 08:26)

Manage TB

Post-Primary TB

- Air-space consolidation
- Cavitation
- Miliary
- Tuberculoma
- Pleural Effusions
- Pneumothorax



ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

Coming to the post primary TB post primary TB occurs in previously sensitized patients and this has either pulmonary infection or reactivation of a dormant bacilli in primary infection. Primary post primary occurs predominantly in a adolescent and adults. (Refer Time: 08:54) involvement never ever occur in a post primary TB.

(Refer Slide Time: 08:58)

Manage TB

Consolidation



ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

The most commonest finding is a consolidation, it appears as a poor ill defined area of opacity, usually products with a predilection of a upper lobe epical segment and posterior segment.

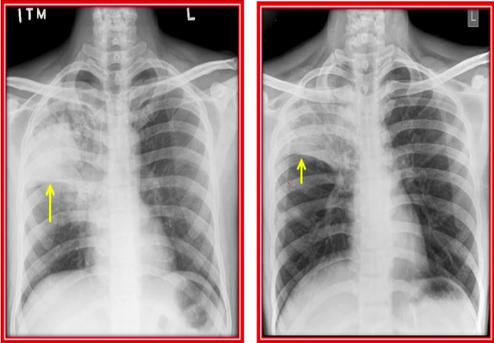
From the apex to there is a its spreads by bronchogenic spread and reaches the lower lobe also. Here there is a extension of the lesion from upper lobe to lower lobe. So, here this is a nodular lesion. So, usually it is a really it is a floppy opacity, and they qualis they form a nodular opacity, there may be a non segmental.

(Refer Slide Time: 09:45)

Manage TB

Consolidation-Lobar

ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in



The slide displays two chest X-rays side-by-side. Both images show a consolidation in the upper lobe of the right lung, indicated by a yellow arrow. The consolidation is wedge-shaped and has ill-defined margins. The left lung appears clear. The X-rays are labeled 'T M' and 'L'.

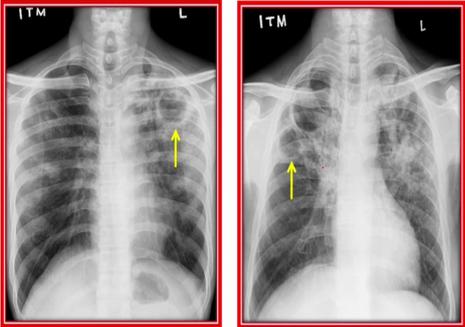
This is a consolidation involving the lobe upper lobe, this is also consolidation involving upper lobe. Usually air space opacity usually ill defined it become shorter when it touches the fisher. So, it is a upper lobe consolidation.

(Refer Slide Time: 10:09)

Manage TB

TB- Cavity

ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

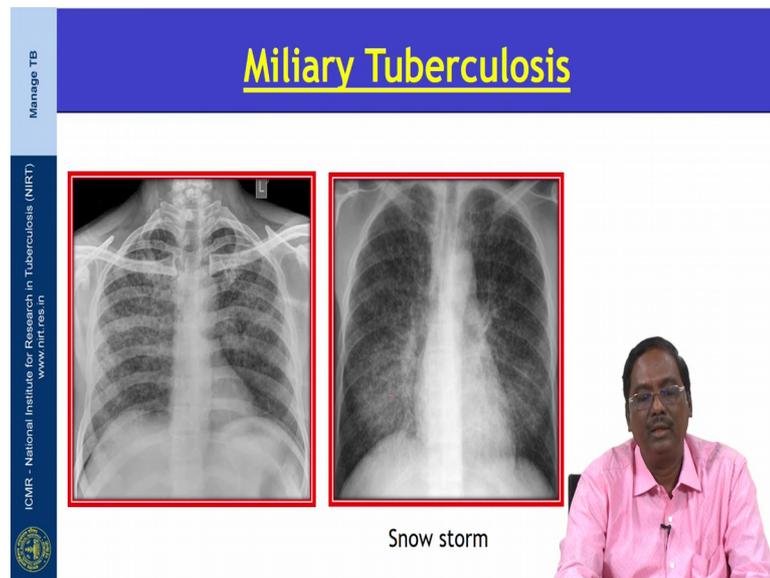


The slide displays two chest X-rays side-by-side. Both images show a cavity in the upper lobe of the right lung, indicated by a yellow arrow. The cavity is well-defined and has a thin wall. The left lung appears clear. The X-rays are labeled 'T M' and 'L'.

Next is a cavity, tab TB cavity is the (Refer Time: 10:12) of a post primary TB and is evident in 40 percent of the cases.

It usually occurs in a area of consolidation. The valves maybe thin or smooth or thick and a nodular; So, there may be presence of air fluid level in 20 percent of the cavity, presence of air fluid level indicates super infection with a fungus or a secondary infection. This is also a multiple cavity.

(Refer Slide Time: 10:50)



So, miliary tuberculosis it can also occur in a post primary also, it is; however, it is a less common in a post primary, it is again caused by erosion of the bronchial artery into systemic artery or a pulmonary vein. If this is a military nodules, they usually appear as a 2 to 3 millimeter millet see nodules. The small similar descript usually they same prominent in the lower zone.

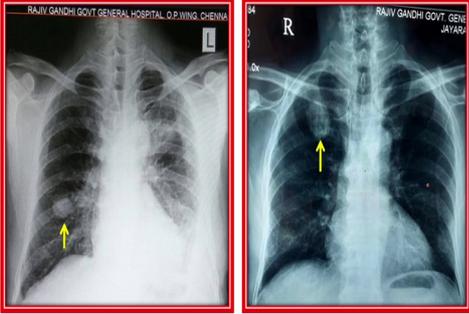
So, here there is no lymphadenopathy is very very important. It differentiate the miliary tuberculosis from the primary. Miliary tuberculosis in primary TB they have associated lymphadenopathy. If miliary TB is untreated they quails qualis they form a percent as a they become confluent and a percent as a snowstorm appearance mimicking a ards.

So, if appropriated treatment is started, the miliray nodules they completely resolved without any calcification. Next is a pulmonary tuberculoma.

(Refer Slide Time: 12:06)

Manage TB

Tuberculoma



ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in



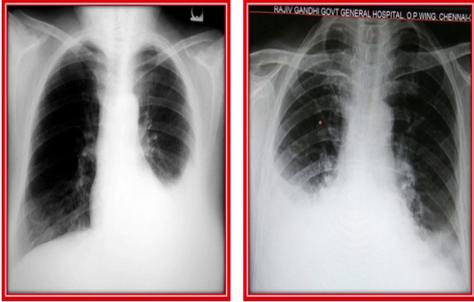
So, pulmonary tuberculoma radiologically appear as a well circumscribed nodule or mass, they appear either single or multiple, the size varies from 0.5 to 4 centimeter, pathologically it is a caseous mass encapsulated by a multiple concentric layer of connective tissue without surrounding inflammation and a spread. So, this is a tuberculoma.

So, with a patient this X-ray is showing even pleural thickening also. So, there is a tuberculoma the natural course of tuberculoma without treatment is classified into progression stationary or regression. Stationary course is seen in 30 to 50 percent of the cases.

(Refer Slide Time: 13:09)

Manage TB

Pleural Effusion



ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

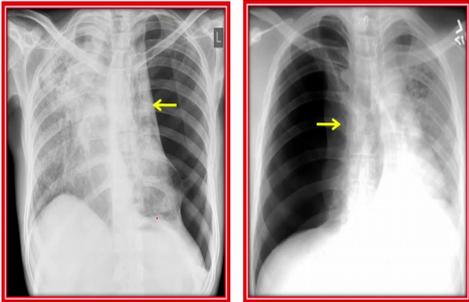
Again, proliferation it is also seen in a post primary. Here it is definitely due to rupture of the sub pleural foci or cavity into the pleural space, here the pleural effusion is either small or sometimes loculated because presence of pleural effusion in a post primary, we should suspect it is a definitely (Refer Time: 13:43).

So, it leads here poor prognosis. So, we have to treat adequately with NDTV in a case of proliferation of a post primary. If left untreated they form pleural thickening and calcification.

(Refer Slide Time: 14:04)

Manage TB

Pneumothorax



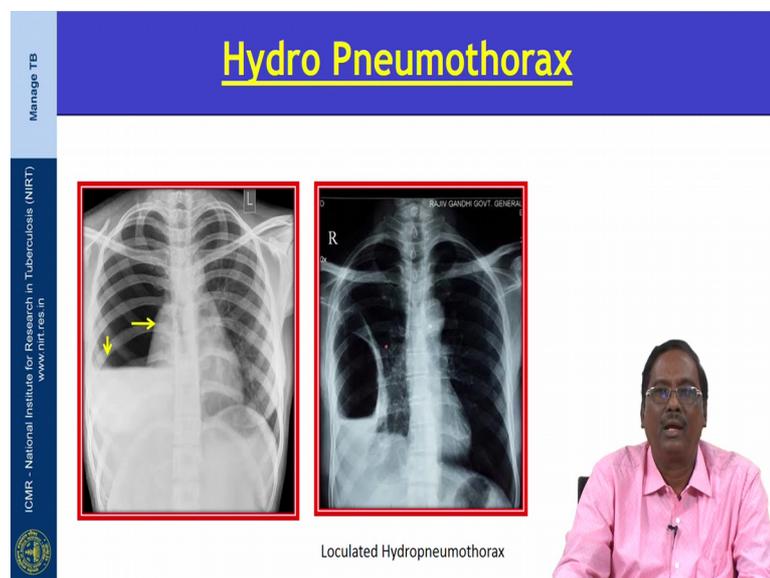
ICMR - National Institute for Research in Tuberculosis (NIRT)
www.nirt.res.in

Tension Pneumothorax

Next is a pneumothorax. Pneumothorax is nothing, but a here in the pleural space. So, this is a collapsed lung market. So, it is a right left pneumothorax here is a right pneumothorax here it is a the media straight up is completely shifted to left side it is known as a pneumothorax, it occurs approximately in 5 percent of the patient with the post primary tuberculosis.

So, this pneumothorax is usually seen in severe cavity tuberculosis, but rarely seen in a miliary tuberculosis. The pathogenesis of pneumothorax is a caseous necrosis of the sub pleural foci and they rupture in to the pleural space.

(Refer Slide Time: 14:53)



This is a hydro pneumothorax there is a process of both air and fluid. It is usually seen in a post primary, this is a loculated hydro-pneumothorax that is it different it is very difficult to differentiate from the lung abscess. So, with this we conclude the radiological features of a primary pulmonary TB and post primary pulmonary TB.

Thank you.