Manage TB
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Lecture - 26
Diagnosis of Childhood Tuberculosis-Session 01

Hello, welcome to this session on Tuberculosis Diagnosis and Management. And this particular talk is on diagnosis of childhood TB and I am Dr. Varinder Singh from Lady Hardinge Medical College and Kalawati Saran Children's Hospital, Delhi to take you through how to diagnose childhood TB. Before we get to the diagnosis it is important to understand the natural history of childhood TB.

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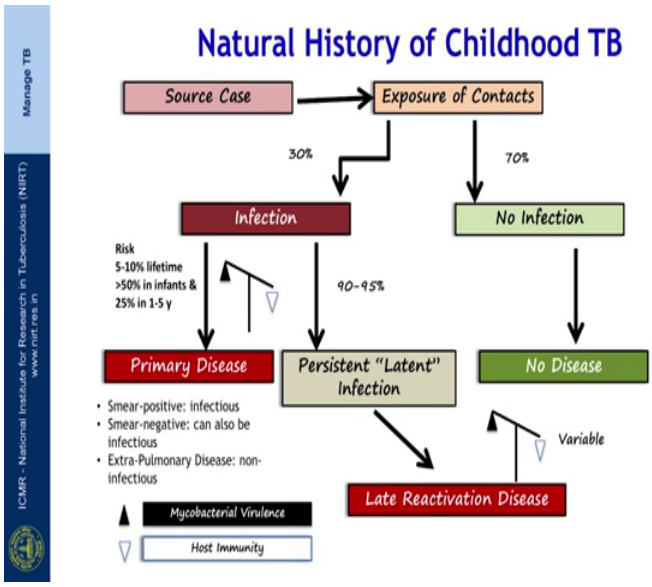

There was usually a source case enerald whose infective, and this source case exposes many of its contacts, which leads to a possibility of infection. Nearly 70 percent of the contacts perhaps will not gather and infection and therefore, would not be prone to a disease, while another 30 percent would get infected. The risk of developing disease among those infected depends on several things, among which is the how recent this infection has been and the age of the child.

Younger the child higher is a risk of developing disease. So, child who is below 5 years would have a risk of a above 25 percent, an younger infant may have a higher risk of a

about 50 percent in of developing the disease. While the life time risk is only about 5 to 10 percent. Those who develop the disease after the infection usually will develop a primary disease, which can be either a smear positive or a smear negative or may be in a extra pulmonary disease.

Among those who would not immediately develop a disease, there were have a persistent, latent infection which can later have a reactivation disease depending on the imbalance between mycobacteria virulence and host immunity as signified by these two triangles.

Why this is important to know is, because children therefore, are a good candidate for chemoprophylaxis because they have a very high risk of developing disease after infection that is why it is important to understand the natural history of childhood TB.

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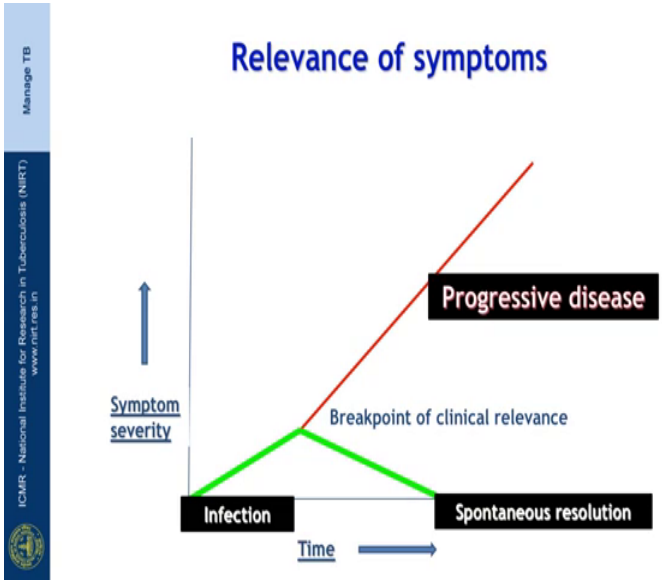

With this background, it is also important to add that from infection to disease it is almost like a continuum. And this continuum is like where the symptoms will come in?

If you have symptoms which are initially very mild, this may just be marker of infection which can undergo a spontaneous resolution. However, when this infection continuous to produce a disease or pathology, there would be a progressive increase in symptoms and that is that is the relevance of symptoms to differentiate between infection and a progressive disease?

How do you diagnose childhood TB is another important point.

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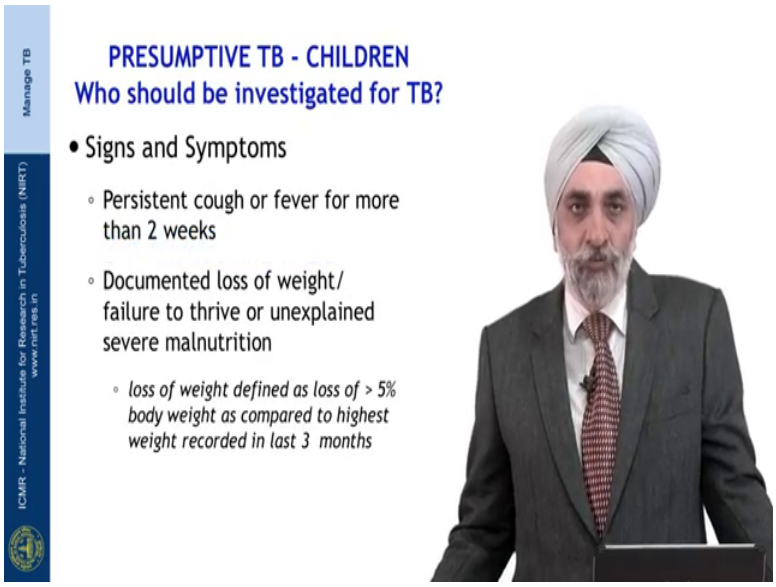

We presume TB in children, who have sudden sign and symptoms and among those the most important sign and symptom is persistent cough or fever for more than 2 weeks duration. In addition to this you could have a child who has a documented loss of weight or failure to thrive, an unexplained severe malnutrition in an older child, should always alert asked toward a possibility of a background illness or which TB in (Refer Time: 03:11) is very common.

Is there objective definition to loss of weight? Yes one should use an objective definition and that objective definition of loss of weight is loss of more than 5 percent body weight, as compared to the highest weight recorded in past 3 months that is important.

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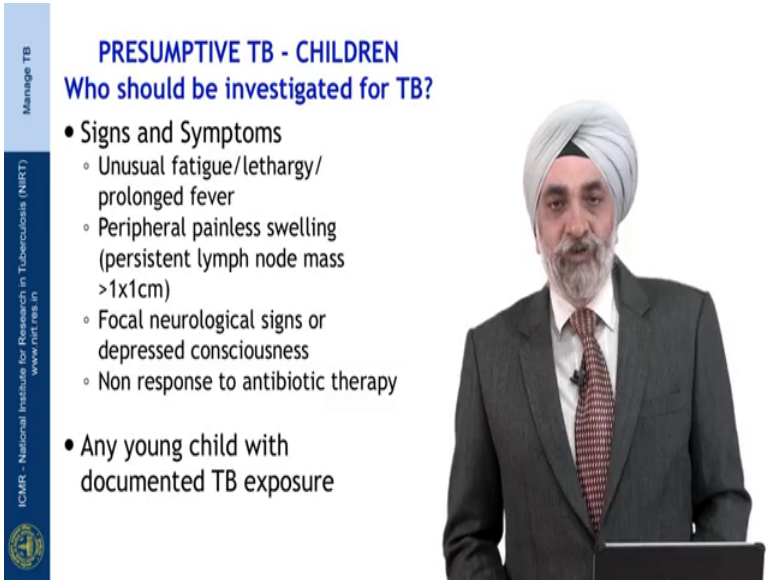

The other symptoms which sometimes would signify underlying TB could be an unusual fatigue or lethargy or a presence of peripheral swelling of lymph node, which is persisting or focal neurological signs or depressed consciousness. These sign symptoms are nonspecific; however, if they are they continue to persist after an adequate dose of antibiotic therapy, course of antibiotic therapy one should consider TB as a possibility.

Particularly in a child who has a documented TB exposure, as you would recall my slide on natural history of TB, children who are exposed an infected are at a higher risk of developing disease.

And therefore, this particular part of history becomes very important in suspecting or considering presumptive case of TB as they are called.

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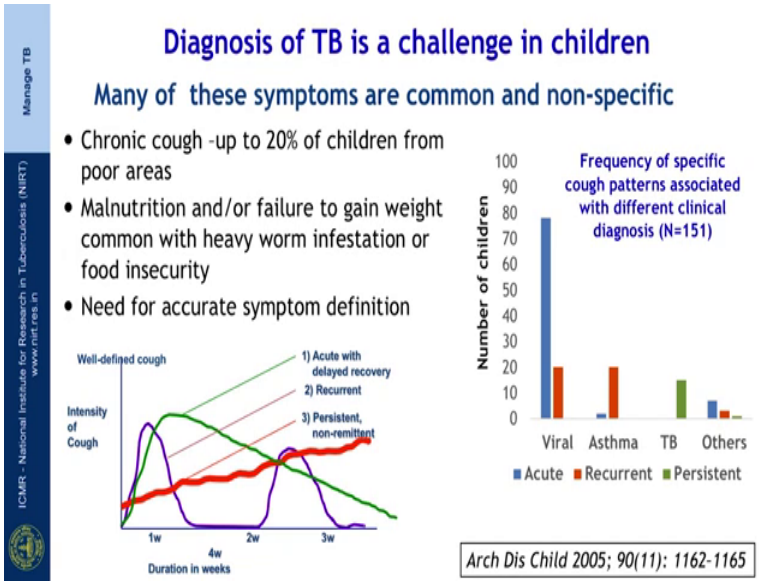

Diagnosis of TB in children still remains a challenge, because many of these symptoms which have eluded to in the last slide are common and nonspecific. You see chronic cough up to 20 percent of children from poor areas can very commonly have malnutrition or failure to gain weight is common with heavy worm infestation or with food in security.

So, there is a need for accurate symptom definition, let me elaborate this point by taking say cough as symptom to describe. When a mother comes to you and says that my child has cough for last 2 months, it could mean several things to her, it could mean my child started having cough. It increase, a now is gradually decreasing, but has not gone away that is the green part of the chart as you see. Or it could mean it is a child who this is a child, who had cough for some days was improving again had another cough as its predicted by the purple line.

Or it could be a child, who could have continue to have cough which is gradually increasing as depicted by the red line. For a mom all these 3 make cough a 2 months, for a doctor it means very different things as been shown by the study from South Africa. Where they said that if you have that purple pattern, then possibly you are dealing with more (Refer Time: 05:44) situations. If you have orange line then possibly you are dealing with or persistence symptom then you are dealing more with TB. So, remember

these signs are depended on the description of these symptom, those characterization is very important to consider what possibly diagnosis we are using.

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Once you have identified the presumptive case, how do you investigate this case further? That is important; what are the investigations which are available for diagnosis of TB in children?

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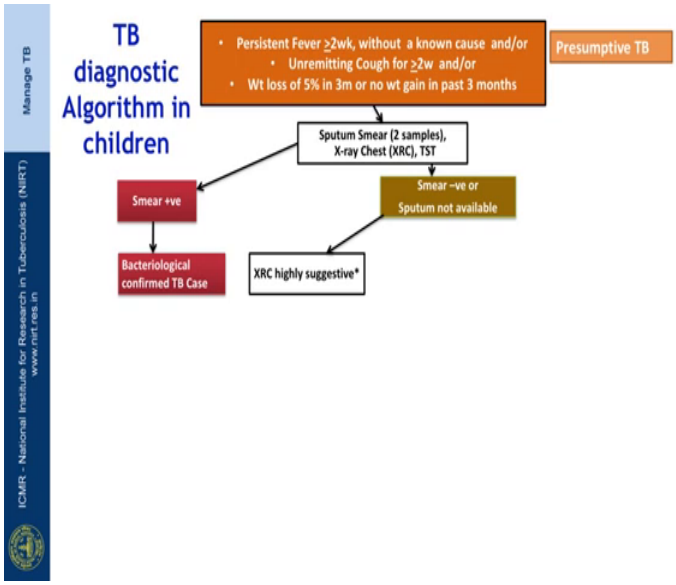

So, we start with this presumptive case, who has persistent fever more than two weeks without a known cause and or unremitting cough or weight loss. In this child your initial

attempt would be to get a microbiological diagnosis through sputum, which is easy to combine in an older child, but not easy to combine in a younger child. So, a spontaneously expected it sputum, an X-ray of the chest and a tuberculin skin test are amongst the first few TB as specific investigations which you will consider.

Once if this comes out to be smear positive, then life becomes relatively easy because this possible easy bacteriologically confirmed TB case in the given setting. However, if this does not come positive, then one has to relay on the other investigations or if this smear comes negative or the child is not able to give you sputum, because there is strike off or child is young enough not to produce sputum.

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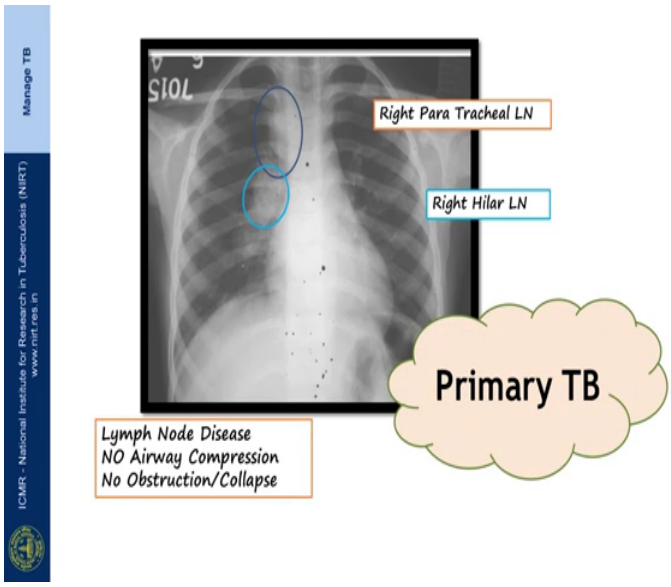

In all these scenarios it is X-ray which will direct the next steps. In the X-ray of the chest we have described or classified the findings into two sets. One is X-ray of the chest which is highly suggestive of TB remember it is highly suggestive, not diagnostic of TB. And what are those highly suggestive X-ray chest pictures let me share that with you.

As I said in my first slide or natural history, that children often would have a primary disease and when we say primary disease what we are referring to is, a lymph node component which you will get which may be para tracheal or may be in the hilar area. So, this type of presentation is possible in the X-ray chest, which is highly suggestive of TB in r r value in the given type of clinical presentation

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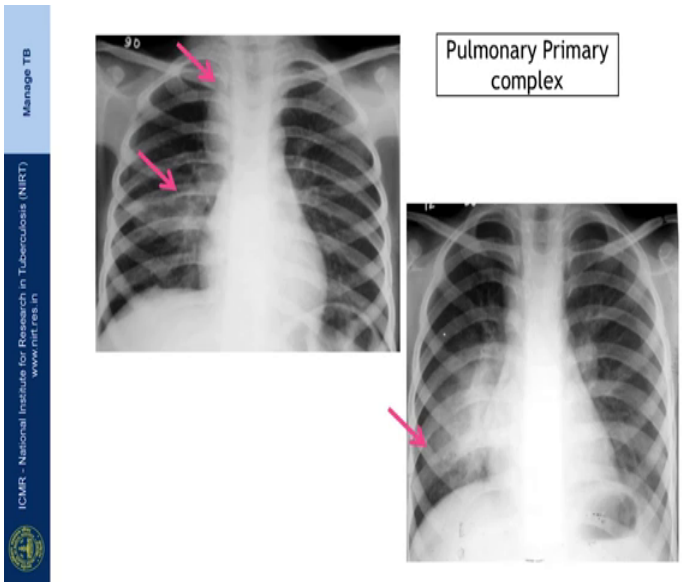

So, this is right para tracheal and right hilar lymph node; this is suggest of a primary TB. These component lymph nodal components some may sometimes may be associate with a parenchymal disease as you can see here or sometimes this parenchymal lesion may be more prominent, then the lymph node component. In the previous X-ray the parenchymal lesion was a easy; you had a definite right para tracheal node.

In this X-ray the node is on the contralateral side; it is possible to have contralateral lymph node disease along with ah parenchymal lesion on the other side. So, this is also a suggestive of a primary complex; so, this is para tracheal lymph node for you and the parenchymal lesion as you can see.

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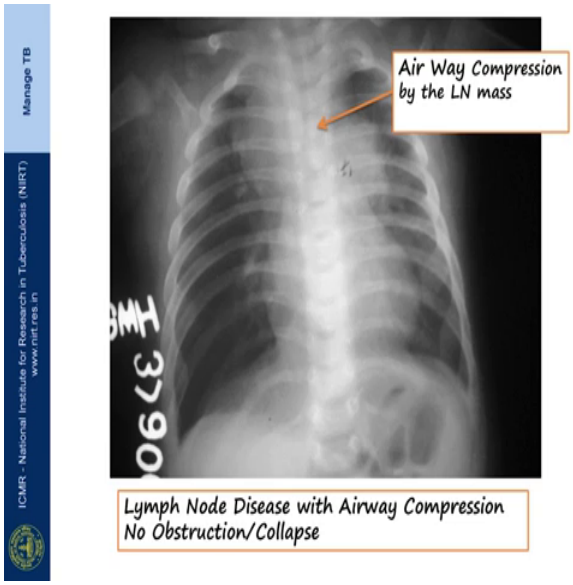

Sometimes there may be other suggestions, here you see a child who has large suprameatal triangle widening, but you also compare the two side this side of the lung looks hyper inflated. Here the air air way looks narrowed, this suggested the lymph node is having compression.

And that is that is another sign which may be available seen in primary complex, when the primary disease is progressing. The other then the hilar or para tracheal lymph node, the other highly suggested form of chest X-ray finding is a chronic cavitory pneumonia. The term chronic comes from the history, it is long standing, it is not a cure it is note happened over next over last 2 3 4 days because same cavitory pneumonia can happen with other necrotizing diseases like staple cockle, where the childhood have a very acute presentation.

So, when you have a chronic presentation with a cavitory pneumonia, where the cavity may be standalone with little surrounding parenchymal involvement or a cavity is a part of large consolidation; in a child with prolonged history, this is also consider quite suggestive of tuberculosis.

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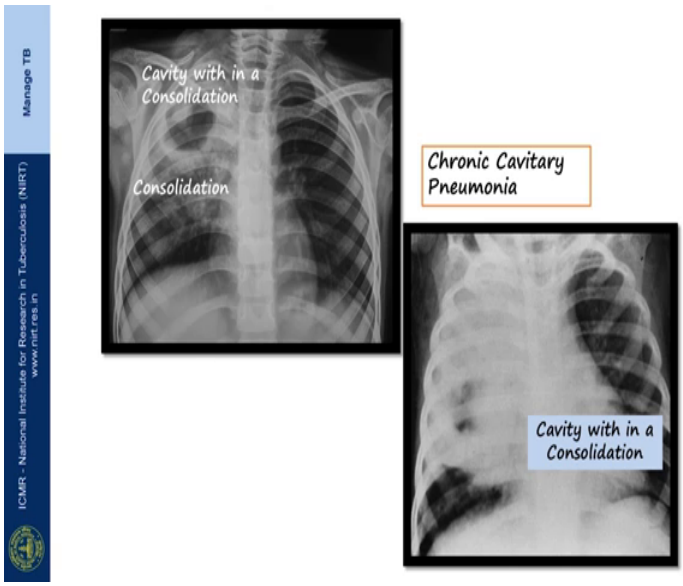

So, here you see consolidation with a cavity or cavity within a consolidation.

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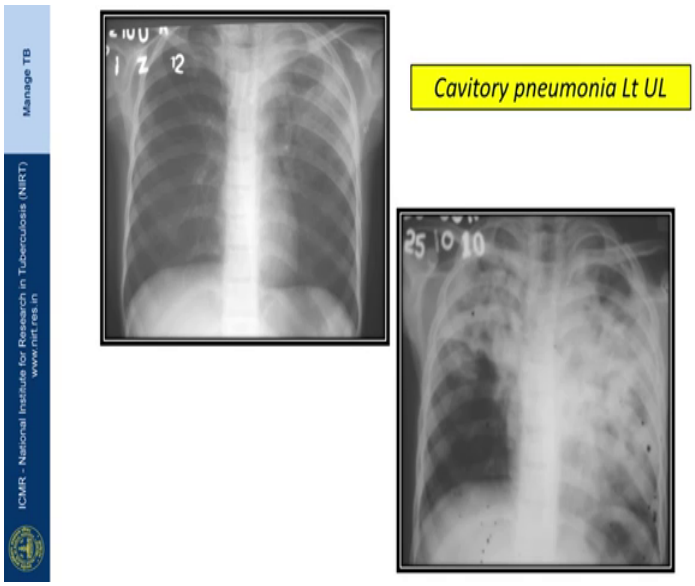

In older children, this may be part of an inhomogeneous capacity as you can see here. There is a cavitory lesion and there is areas of break down within this consolidation, you may see this like apical cavity with fibrosis which is pulling of the (Refer Time: 10:10) a chronic cavitory pneumonia with fibrosis which may be seen in adolescent because it is apical, this is a reactivation form of TB which can present like this.

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The third important radiological presentation, which is suggestive of TB is miliary which is like a snow strong. We have miliary small micro nodules about 2 millimeter, which as scattered on both the lung fields equally not spearing any area, they are quite suggestive of tuberculosis in our (Refer Time: 10:40). So, remember when we say specific or suggestive not specific, but highly suggestive forms of chest radiology then it is lymph (Refer Time: 10:51) node with or without parenchymal lesion it is miliary TB, and it is chronic fibro cavitory pneumonia.

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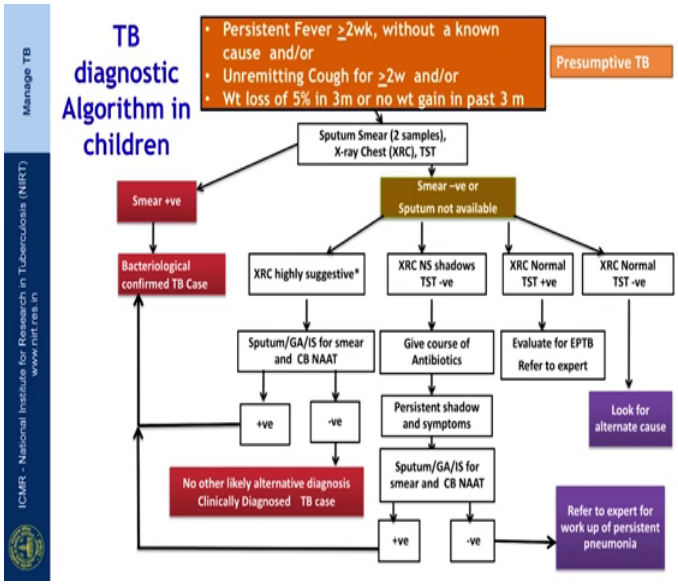

So, when you have X rays which is highly suggestive going back to the algorithm which we started with, then you do sputum or a gastric aspirate or induce sputum. I will elaborate about these respiratory specimen; as we go by and you can use smear or CB NAAT depending on the facilities available.

If you have a facility available for CB NAAT also called as genexpert or xpert RIF that is the commercial name available, then you could do away with smear because it is high much more sensitive then smear and there is no need to do smear in those situations. It if comes positive it is a micro biologically or a bacteriologically confirmed case of TB. However, there may be a situation where this may come negative because these are not test, which are 100 percent sensitive; this sensitivity of genexpert is or smear is not more than 50 percent; smear is far lesser.

So, you would have situations, where this test will come negative, but you have you may not have any other likelihood no alternative diagnosis, in this case you may still consider the child to have TB and treat them as a clinically diagnose case of TB.

Now, let us change stacks and look at the other forms you could have X-ray chest which shows nonspecific shadows like a consolidation or inhomogeneous capacity, TST may be positive or sometimes negative. Here there is a place for using a course of antibiotics, use a course of anti commonly use antibiotics are like amoxicillin (Refer Time: 12:24) and see whether these persistent shadows disappear not.

If you do not have responds to antibiotics then this is a child you would then subject to microbiological testing of this sputum or gastric aspirate or induced sputum for CB NAAT or smear depending on the facility. If it come positive again life is easy, but if it comes negative this is a child who needs referral to an expert for further work of because here is a child who has a persistent pneumonia, which is not responded to your antibiotic therapy and you need to see other causes including TB and therefore, you need a help of an expert.

This third situation could be that your TST is positive, there which shows the child has infection, but X-ray is normal. If this child was symptomatic this child merits evaluation for extra pulmonary TB and may be required a referral to an expert for further delineation. However, if your X-ray chest as well as TST are negative, then you have to

look for alternative causes these symptoms though suggestive of TB here this child may not be suffering from TB at all or may have something else.

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So, this is how this we use this algorithm to make a diagnosis of childhood TB. But this algorithm comes with certain conditionalities what are those conditionalities? First of first most important conditionality is that, this child should not be a retreatment case or should not have received ATT in prior to this or should not be a drug resistant TB suspect. Because in those situations the microbiological test come much earlier.

The other thing is when we say weight loss or not gaining weight it is very important documented appropriately. In a city like Delhi or up North in India where it the winters can be bring a load of two or three woolens, the difference in a 5 percent can come only because of cloths.

So, remember the child is weighed in minimal clothing each time and on the same weighing scale and these are not the difference is not because of such errors.

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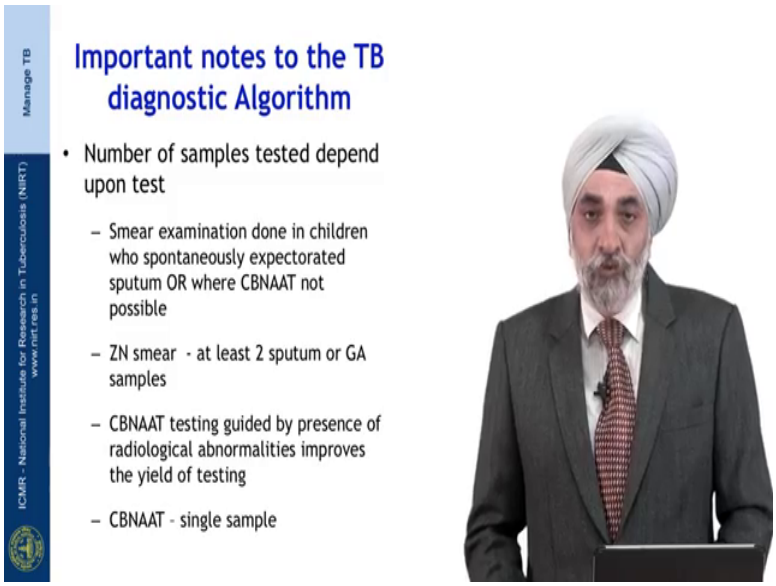

When it comes to the respiratory specimens, it is very important to know what samples are to be tasted. It depends on the facilities you have. If you have facilities for smear only then you would need at least two conjunctive day samples. If you have facilities for CB NAAT, in which you case do not go for smear testing; if there is an X-ray suggestion of TB, and here a single sample suffices and one does not meet to repeated.

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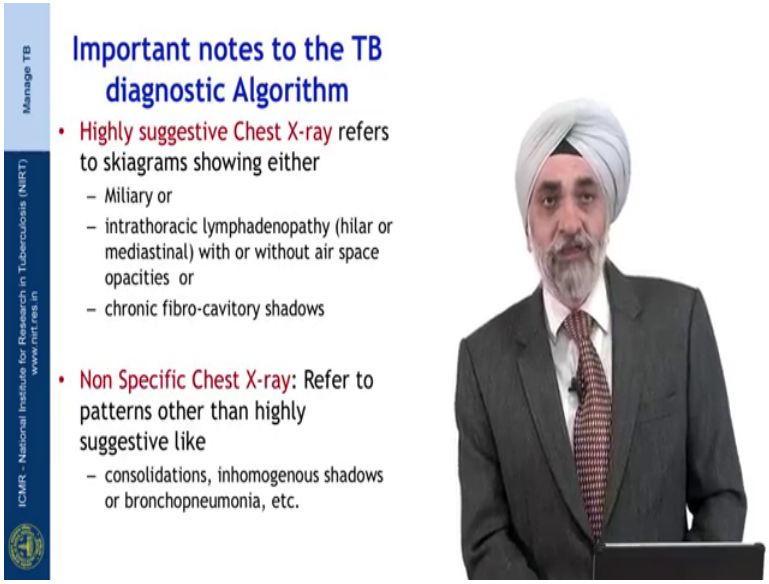

The other conditionality which comes to as I said just for reputation or reinforcement I would say remember the highly suggestive X rays, which refer to miliary, intrathoracic

lymphadenopathy an a chronic fibro cavitory in pneumonia. Nonspecific shadows refer to consolidations or inhomogeneous shadows or bronchopneumonia, which can be because of several pathologies and therefore, would require initially occurs of antibiotic before we decide to investigate this child for pneumonia it is a non-responds to antibiotic in this saturation, which makes more likely to be substring from tuberculosis; remember that.

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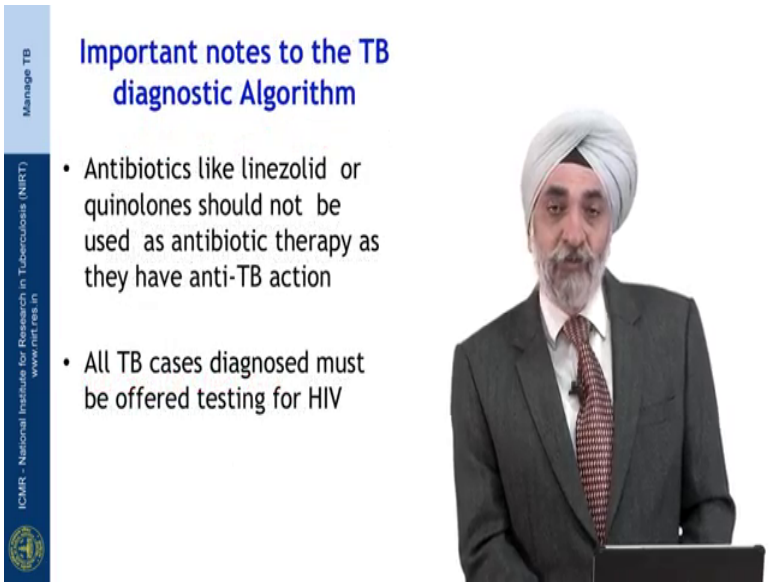

And equally important remember, when you are using this course of antibiotic; do not use a set of antibiotic like linezolids or linezolid or quinolone, because these have anti TB effect. So, if you are seeing a benefit with anti antibiotic, it should you should be using an antibiotic which is not a likely to have an effect on TB.

So, avoid one should not use linezolid or quinolone as a course of anti-biotic for deciding this persistent pneumonia. And it is equally important to remember all TB cases when diagnose must be offered testing for a HIV because these can co-exist.