**Respiratory Tract Infections by Dr. Saedi**

* Things that Dr. Saedi said we should know:
  + You should know the difference between breast and formula milk? The calories in breast milk 1cc/1cal.
  + When does the child draw him/herself? Children draw circles before they learn how to draw squares.
  + When can he/she jump or ride a bike?
  + We should memorize the new guidelines for vaccinations.
  + Anterior fontanelle closes at 18 months.
* Firstly, we need to differentiate between upper and lower respiratory infections.
* Epiglottis and pneumonia (viral and bacterial) management should be thoroughly understood and know when we need to transfer the patients to the ICU.
* Philippine and China are places that are endemic with TB. The problem with TB is that we have all the investigations to detect TB, but it is a difficult disease to diagnose.
* Majority of infections in children are upper respiratory infections (URTI), and it is normal for kids to have up to 6 episodes of viral flu yearly and the incidence can increase up to 9 times per year in school children. The lower respiratory infections are the ones that might cause major complications.
* The etiology of URTI differs according to age.
* High fever is not usually seen with UTI in children.
* Anything below the vocal cord is sterile.
* When Respiratory Syncitial Virus (RSV) forms, it causes a large amount of phlegm that obstructs the airway.
* Rhinovirus (type C is the most serious type) is severe in asthmatics and these patients usually go to the ICU.
* Entero-virus: flu with vomiting and other GI symptoms; corona virus; SARS.
* Adenovirus (bronchilolitis obliterans) types 7 and 21 are the most severe form and hard to treat.
* Mycoplasma infects school-aged children.
* Can’t easily label a person with Chlamydia because it is an STD and not easily accepted in our society.
* Can’t get Candida or fungal infection unless you’re immuno-compromised or patients with severe asthma on high dose steroid (inhaled or systemic steroid) or cystic fibrosis.
* Pneumocystic carini is seen in immuno-compromised patients or post-transplant patients they present with respiratory distress and hypoxia.

**Causes of Respiratory tract infections:**

* 1. Anatomic defects
  2. External/internal compression
  3. Infections
  4. Miscellaneous ( ex , Forigne bodies )

**Main RTI in children :**

**1-Acute epiglotitis**

* It is important for all pediatricians to diagnose and manage epiglotitis because pediatricians will see these patients before ENT and it’s a medical emergency.
* Was common before Hib vaccine unless caused by atypical organisms, it results in severe infections with airway compromise and most patients who have acquired the infection are seen with tracheostomy scars.
* There is intense swelling of the epiglottis and surrounding tissues associated with septicaemia. Epiglottitis is most common in children aged 1-6 years but affects all age groups. It is important to distinguish clinically between epiglottitis and croup
* It is caused by H.influenza type B ( MCQ) and once we diagnose patient with epiglotitis (by swab and laryngoscope) transfer immediately to the ICU and intubate.

*Clinical picture:*

1. Voice is not hoarse but speech is MUFFLED.
2. Cough is not croupy. (cough is minimal or absent )
3. Patient is usually leaning forward, opening the mouth and maybe drooling.
4. Gasping for air.
5. high fever in an ill, toxic-looking child ( 38.8-40 )
6. an intensely painful throat that prevents the child from speaking or swallowing; saliva drools down the chin
7. soft inspiratory stridor and rapidly increasing respiratory difficulty over hours
8. the child sitting immobile, upright, with an open mouth to optimise the airway. علامه مميزه – مهمه جدا

Note: You don’t always need to do x-ray, but if you do, make sure there is a lateral view to show the thumb sign.

*Treatment:*

* The child should be transferred directly to the intensive care unit or an anaesthetic room, and must be accompanied by senior medical staff in case respiratory obstruction occurs
* Mainstay is to secure the airway. 🡪  The child should be intubated under controlled conditions with a general anaesthetic. Rarely, this is impossible and urgent tracheostomy is life-saving
* Elective intubation: the tube should be small because the area is edematous and to avoid injury.
* Extubation should be done when the patient is: 1- Afebrile. 2- Swallowing comfortably. 3- Air leak in tube.
* Put the patient in a dark room and monitor with a pulse oximetry, insert a naso-pharyngeal tube use a small size (0.5 mm smaller then the usual recommended size to avoid injury), which will show an air leak (a good sign for healing) rather than oral tube and intubate in the ER whenever you have an appropriate settings.
* Antibiotics 2nd or 3rd generation cephalosporins for 7-10 days
* THERE IS NO ROLE FOR STERIODS IN ACUTE EPIGLOTITIS!

**2-Croup (laryngotracheobronchitis)**

 there is mucosal inflammation and increased secretions affecting the airway, but it is the oedema of the subglottic area that is potentially dangerous in young children because it may result in critical narrowing of the trachea

1. Para influenza type 1 is the most common type while type 2 and type 3 are less common. RSV, adenovirus or influenza viruses can also cause it.( viral in 95% )
2. Mycoplasma pneumonia is the only bacteria that cause croup, especially in winter.
3. Starts as rhinorrhea and might progress to respiratory failure presenting as stridor and asynchronous thoraco-abdominal breathing مهمه جدا .
4. Mild disease lasts 7-14 days unlike epiglottitis.
5. Age group affected 6 months - 3 years. 🡪 peak incidence is in the second year of life
6. Less than 1% (one third of patients) requires intubation so you can reassure the parents.
7. X–ray not always done but shows a rat-tail sign indicating subglottic stenosis (steeple sign).
8. The typical features are a barking cough, harsh stridor and hoarseness, usually preceded by fever and coryza. The symptoms often start, and are worse, at night.
9. *Treatment:* 
   1. When the upper airway obstruction is mild, the stridor and chest recession disappear when the child is at rest. The child can usually be managed at home. The parents need to observe the child closely for the signs of increasing severity.
   2. Must give steroids, unlike epiglotitis. Moist air is used as supportive therapy by causing vasodilation.
   3. No role for antibiotics
   4. Give Oxygen if patient is hypoxic: (<92%) by pulse oximetry. It is important to maintain saturation above 92 because it drops by 3% during sleep.
   5. Any route of steroid can be given (IV, oral, IM). Place IM steroid (0.6 mg dexamethasone) lateral upper part of the thigh to avoid atrophy of the buttocks and possible limping.
   6. In severe cases Racemic Epinephrine (bronchodilator) can be used in the treatment but causes rebound phenomenon; therefore, must monitor patients for two hours after giving the drug and before discharge.

**3-Pneumonia**

* The incidence of pneumonia peaks in infancy and old age, but is relatively high in childhood. Pneumonia is a major cause of childhood mortality in resource-poor countries
* NB : factors relating to the etiology : ( Host ( normal or defected immunity ) – Age – Season – Environmental factors )

The pathogens causing pneumonia vary according to the child's age:

* Newborn - organisms from the mother's genital tract, particularly group B streptococcus, but also Gram-negative enterococci
* Infants and young children - respiratory viruses, particularly RSV, are most common, but bacterial infections include *Streptococcus pneumoniae* or *Haemophilus influenzae. Bordetella pertussis* and *Chlamydia trachomatis* can also cause pneumonia at this age. An infrequent but serious cause is *Staphylococcus aureus*
* Children over 5 years - *Mycoplasma pneumoniae, Streptococcus pneumoniae* and *Chlamydia pneumoniae* are the main causes.
* At all ages *Mycobacterium tuberculosis* should be considered.
* NBs :
* Streptococcus pneumoniae is the commonest cause of community-acquired pneumonia in all age groups.
* Staphylococcus aureus is common in age group less than 1.
* Group B strep is common in newborns.
* TB can happen at any age.
* Hib can affect any age group but is a rare cause.
* In immunocompromised patients, any organism can be the cause.
* Viral pneumonia treatment is supportive unless it worsens, you ventilate. Viral pneumonia is hard to be differentiated from bacterial pneumonia.
* Most common cause of viral LRTI is RSV.
* Bronchiolitis is a clinical diagnosis by history and examination. It is usually caused by a viral infection most commonly RSV. It commonly affects the small and large airways. 90% of children have it by their first birthday.

*Presentation:*

* Fever, wheezing, nasal discharge, and dry cough characterize seasonal viral illness.
* On examination, there are fine respiratory crackles and high pitch expiratory wheeze.
* In SA all year long because they travel a lot, but peak is February and January, while UAE and Bahrain peaks in March.
* Australia, News Zeeland, Japan in other months

From the book :

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| **Clinical features** |

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| Fever and difficulty in breathing are the commonest presenting symptoms, usually preceded by an upper respiratory tract infection. Other symptoms include cough, lethargy, poor feeding and an 'unwell' child. Localised chest, abdominal, or neck pain is a feature of pleural irritation and suggests bacterial infection. |

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| Examination reveals tachypnoea, nasal flaring and chest indrawing - the best clinical sign of pneumonia in children is increased respiratory rate, and pneumonia can sometimes be missed if the respiratory rate is not measured in a febrile child (so-called 'silent pneumonia'). There may be end-inspiratory respiratory coarse crackles over the affected area, but the classic signs of consolidation with dullness on percussion, decreased breath sounds and bronchial breathing over the affected area are often absent in young children. Oxygen saturation readings may be decreased; this is an indication for hospital admission. |

*Diagnosis*:

* Viral panel from nasopharyngeal aspirate showing RSV is the most important diagnostic tool.
* Chest x-ray not specific for RSV but if done shows: 1- air trapping; therefore, you do not need to do it to every patient with RSV. 2- Consolidation is due to secondary bacterial infection, 3- Atelactasis is due to excess mucous plugging leading to V/Q mismatch and CO2 retention.
* Chest x-ray is not needed unless patient was in respiratory distress.
* In bronchiolitis, hyper-inflated lungs on the chest x-ray and a dirty appearance but in pneumonia lungs are not hyper-inflated.
* If we give ventolin it increases the blood supply by causing vasodilatation and worsens the hypoxia by increasing the mismatch.
* If you do bronchoscopy you will suck large amounts of phlegm.

From the book :

A chest X-ray may confirm the diagnosis, but with the exception of a classic lobar pneumonia characteristic of *Streptococcus pneumoniae* ([Fig. 16.7](http://www.studentconsult.com/content/bookcontent.cfm?ID=HC016026)), a chest X-ray cannot differentiate between bacterial and viral pneumonia. In younger children, a nasopharyngeal aspirate is useful to identify viral causes, but blood tests, including full blood count and acute-phase reactants, are generally unhelpful in differentiating between a viral and bacterial cause. A small proportion of pneumonias are associated with a pleural effusion, where there may be blunting of the costophrenic angle on the chest X-ray. Some of these effusions develop into empyema and fibrin strands may form, leading to septations, which make drainage difficult ([Fig. 16.8](http://www.studentconsult.com/content/bookcontent.cfm?ID=HC016026)). The incidence of childhood empyema has risen over the last decade, the precise reason for which remains unclear. Ultrasound of the chest will often distinguish between parapneumonic effusion and empyema.

*Complications*

1. Atelactasis (commonest)
2. Fatigue
3. Respiratory failure
4. Bronchiolitis obliterans especially with adenvirus
5. Myocarditis
6. Pericardial effusion
7. Supraventricular tachycardia

*Risk factor for severity:*

1. Pre-maturity.
2. Low birth weight.
3. Age <6-12 weeks.
4. Chronic pulmonary disease.
5. Hemodynamically significant cardiac disease.
6. Immunodeficiency.
7. Neurological disease.
8. Anatomical defect of airway.

*Environmental risk factors:*

1. Older siblings carrying infections from school.
2. Concurrent birth siblings.
3. Native American heritage.
4. Passive smokers.
5. Household crowding.
6. Childcare attendance.
7. High altitude (Abha, Tiaf).

*Treatment:*

* Oxygen, bronchodilators and physiotherapy but no suction.
* If the patient has respiratory distress or has social reasons (too many kids at home, or lives far away from hospital), or dehydrated patients, or underlying disease then the patient should be admitted.
* IV fluid.
* 30% respond to ventoline; steroid not recommended.
* Ribavirin (teratogenic). According to “BMJ”, there is no clear evidence that this drug will help patient get better so it is not recommended.
* Racemic epinephrine is a mixture of epinephrine and a sympathomimetic bronchodilator that is delivered by aerosol and the patient should be assessed after administration of the drug.
* Chest physiotherapy is not really needed but you can do it.
* Endemic months: September, November, December, and January. Think of prophylaxis with Pallivizumab 15mg/kg every month for 5 months, if he doesn’t get the infection. If he gets the infection during the 5 months, he will acquire immunity and no need for the drug anymore.
* Serious infection does not happen with RSV except if the patient becomes septic then we should start antibiotics.

From the book :

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| Evidence-based guidelines for the management of pneumonia in childhood have been published (British Thoracic Society). Most cases can be managed at home, but indications for admission include oxygen saturation <93%, severe tachypnoea and difficulty breathing, grunting, apnoea, not feeding or family unable to provide appropriate care. General supportive care should include oxygen for hypoxia and analgesia if there is pain. Intravenous fluids should be given if necessary, to correct dehydration and maintain adequate hydration and salt balance. Physiotherapy has no role. |

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| The choice of antibiotic is determined by the child's age, severity of illness and appearance on chest X-ray. Newborns require broad-spectrum intravenous antibiotics. Most older infants can be managed with oral amoxicillin, with broader-spectrum antibiotics such as co-amoxiclav being reserved for those who are complicated or unresponsive. For children >5 years of age, either amoxicillin or an oral macrolide such as erythromycin is the treatment of choice. |

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| Parapneumonic effusions usually resolve with appropriate antibiotics, but the small proportion that develop an empyema require drainage of the collection. This may be achieved by either placement of a chest drain with or without the installation of a fibrinolytic agent in the intrapleural space (e.g. urokinase) to break down any septations, or by surgical decortication. Practices vary between different centres |

**4-Mycoplasma pneumonia**

* Differential diagnosis of adult chronic cough and sore throat.
* CXR not specific but suspect M.pneumonia if more than 5 years old (school age).
* Can be unilateral or bilateral and 20% can have pleural effusion( on X ray )
* WBC is normal or slightly high; unlike in pneumococcal pneumonia where the WBC is highly elevated and might reach 23,000.
* Cold agglutinin test is positive.
* *Treatment:* Macrolides (azythromycin-erythromycin) be cautious when giving it, it can cause deafness, and in cardiac disease may lead to death so it is a contraindication then. Erythromycin is the safest.

**5-Bacterial pneumonia**

* Etiology :

The pathogens causing pneumonia vary according to the child's age:

* Newborn - organisms from the mother's genital tract, particularly **group B streptococcus, but also Gram-negative enterococci**
* Infants and young children - respiratory viruses, particularly RSV, are most common, but bacterial infections include ***Streptococcus pneumoniae* or *Haemophilus influenzae****. Bordetella pertussis* and *Chlamydia trachomatis* can also cause pneumonia at this age. An infrequent but serious cause is *Staphylococcus aureus*
* Children over 5 years - ***Mycoplasma pneumoniae****, Streptococcus pneumoniae* and *Chlamydia pneumoniae* are the main causes.
* At all ages *Mycobacterium tuberculosis* should be considered.
* *S/S:* fever, chills, rigors, cough, chest and abdominal pain. Younger patients have less specific signs and symptoms. Dehydration and irritation of the colon, causing diarrhea are symptoms in a children less than 5 years that you should not ignore.
* Lobar pneumonia (hypo or hyper natremic dehydration due to the diarrhea) usually has very bad pleuritic pain.
* Infection during neonatal period: could be listeria monocytogenes (cattle organism). It is an extremely rare gram –ve bacilli treated with ampicillin.
* After neonatal age group, strep pneumonia, staph and Hib are more common.
* Carries of Strep pneumonia must take prophylaxis by ciprofloxacin (600 mg) after coming back from Hajj.

*Investigations*:

* Most cultures don’t show growth because patients abuse antibiotics; therefore, start patients on empirical antibiotics. مهمه جدا
* Blood culture yield on 30%.
* WBC 30-35,000.
* Sputum does not yield high results unlike in adults.
* Pulse oximetry is enough in children, while ABG is not needed.

*Treatment:*

* Start empirical therapy
* Oxygen (it is considered as a drug so must specify the correct dose).
* Augmentin: if less than 5 years and not severe or if more than 5 years of age.

Features of sever Dz in Older children :

* + 1. O2 <92
    2. RR >50
    3. Tachipnea
    4. Prolong capillary refill ( > 2 Sec )

*Indication for transfer to ICU:*

1. Pneumonia is so severe and child developing respiratory failure requiring assisted ventilation.
2. Pneumonia complicated by sepsis (high WBC and low BP).
3. Failure to maintain Oxygen saturation above 92 or if PO2 is less than 60%.
4. Shock.
5. Elevated respiratory rate is an indication for pneumonia.
6. Paradoxical breathing.
7. Recurrent apnea.

*Indications for hospital admission:*

1. Significant tachycardia first parameter to change is respiratory rate.
2. Prolonged capillary refilling.
3. Chronic lung disease with pneumonia.
4. Severe disease in older children.
5. RR> 50 (normal respiratory rate in neonates is 50).
6. Dehydration.
7. Not feeding.
8. Difficulty breathing
9. Intermittent apnea.

Note: pneumonia is considered severe if patient was tachycardic, O2 saturation is less than 92%, RR is more than 50 breaths/min.

*Complications:*

1. Para-pneumonic effusion ( IMP )

* With the most causative organism, being staph, Hib, and strep pneumonia. If transudate, it is less likely to be infection, exudate is infection.
* Aspirate is taken to lab and shows decreased glucose and increase protein. It is a slow healing complication.
* No need to drain it unless patient is in distress ( tachipnic ). مهمه
* Thoracocentesis is usually diagnostic and not always therapeutically needed.

1. Empyema:

* WBC>15,000.
* Protein> 3g/day.
* pH<7.2.
* We also have to order LDH and take a culture from the pleural aspirate, recovery is very slow.
* *Management:* ABx and drainage (only if patient is distressed). Therefore, thoracocentesis is used for diagnosis and treatment and as mentioned before treatment incase of distressed patient. Staph. Areus infections can have thin walled cavities (pnematoceles) with a 40% risk of progressing into pneumothorax so these patients should not fly or dive.

1. Lung abscess: usually occurs in the posterior lobe. Treatment is penicillin G, clindamycin (lung or oral anaerobes), or flaygl (GI anaerobes)
2. Pnumocele :

40% of staph pneumonia

Resolve spontaneously within 3 months 🡪 during this period advice the pt not to Fly or Dive مهمه

1. Hemolytic uremic syndrome

*Predisposing factors for necrotizing pneumonia:*

1. Congenital lung cysts
2. Sequestration
3. Neurological disease
4. Broncheactasis
5. Immunodeficiency
6. Certain pneumococcal strain
7. Staph aureus with
8. Septicemia
9. Mets infection with osteoarthritis, osteomyelitis
10. Hemolytic uremic syndrome

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| 6- Bronchiolitis |

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| Bronchiolitis is the commonest serious respiratory infection of infancy: 2-3% of all infants are admitted to hospital with the disease each year during annual winter epidemics; 90% are aged 1-9 months (bronchiolitis is rare after 1 year of age). Respiratory syncytial virus (RSV) is the pathogen in 80% of cases. The remainder are accounted for by human metapneumovirus, parainfluenza virus, rhinovirus, adenovirus, influenza virus, and *Mycoplasma pneumoniae*. Dual infection with RSV and human metapneumovirus is associated with severe bronchiolitis.   |  | | --- | | **Clinical features** |  |  | | --- | |  |  |  | | --- | | Coryzal symptoms precede a dry cough and increasing breathlessness. Feeding difficulty associated with increasing dyspnoea is often the reason for admission to hospital. Recurrent apnoea is a serious complication, especially in young infants. Infants born prematurely who develop bronchopulmonary dysplasia or with other underlying lung disease, such as cystic fibrosis or have congenital heart disease, are most at risk from severe bronchiolitis. The characteristic findings on examination ([Fig. 16.5](http://www.studentconsult.com/content/bookcontent.cfm?ID=HC016020)) are:   * Sharp, dry cough * Tachypnoea * Subcostal and intercostal recession * Hyperinflation of the chest:   + - Prominent sternum   + - Liver displaced downwards * Fine end-inspiratory crackles * High-pitched wheezes - expiratory > inspiratory * Tachycardia * Cyanosis or pallor. | | **Investigations** |  |  | | --- | |  |  |  | | --- | | Respiratory viruses are now usually identified by PCR analysis of nasopharyngeal secretions. A chest X-ray is unnecessary in straightforward cases, but if performed, typically shows hyperinflation of the lungs due to small airways obstruction, air trapping ([Fig. 16.6](http://www.studentconsult.com/content/bookcontent.cfm?ID=HC016021)) and often focal atelectasis. Pulse oximetry is used to measure and monitor arterial oxygen saturation continuously. Blood gas analysis, usually a capillary sample, is only performed in severe disease to identify hypercarbia when additional ventilatory support is considered. |   **Complications :** IMP  atelectasis.  Apnea and respiratory failer  Bronch obliters (especially with Adeno )  **High risk : IMP**  Cardiopulmonary dz  Cystic fibrosis  VSD  'immunodeficincy  Neonates  **Risk factors for severity** :   * + 1. Pnumonia     2. Low bitrth wg     3. Age <6-12 W     4. Chronic pulmonary dz     5. Cardiac dz     6. Immunodeficiny   Environmental RF :   1. Older siblings 2. Native American 3. Passive smoker 4. High altitude 5. Crowded house  |  | | --- | | **Management** |  |  | | --- | |  |  |  | | --- | | This is supportive. Humidified oxygen is delivered via nasal cannulae; the concentration required is determined by pulse oximetry. The infant is monitored for apnoea. Mist, antibiotics, steroids and nebulised bronchodilators, such as salbutamol or ipratropium, have not been shown to reduce the severity or duration of the illness. Fluids may need to be given by nasogastric tube or intravenously. Assisted ventilation in the form of nasal or facemask CPAP or full ventilation is required in a small percentage of infants admitted to hospital. RSV is highly infectious, and infection control measures, particularly good hand hygiene, are needed to prevent cross-infection to other infants in hospital.  NB: Never do Nasal suckthion ( oral is Ok )  Steroids : Not recommended  Do Not do chest Physio |     Prophylaxis : For high risk pt give RSV Immunoglobulin |

**7-Tuberculosis**

* Atypical patients don’t rule out TB, example 10 year old girl came with uveitis PPD was done showing an induration of 23 mm and her mother and father had an induration of 56mm and 32mm respectively.
* Children infected with TB always have an adult (index case).
* Somalia, China, and Philippines have MDR (INH resistance). مهمه
* Children don’t require isolation because they get the primary infection, which is usually non-infective. Adults become non-infective 2 weeks after the initiation of Anti-TB.
* Etiology : Mycobacterium Tuberculosis
* Culture takes 4-6 weeks, now PCR shows results 2 hours.
  + - * Problem in diagnosis :

**In active dz :** difficult to Isolate

Recovered in 50-60% of the cases

**In latetent dz** : cannot be cultured

* Mostly less than 4 year olds are infected.

*Clinical features:* Insidious onset مهمه

1. Weight loss.
2. Anorexia.
3. On and off fever.
4. Hepato-splenomegaly.
5. Headache (always suspect meningitis مهمه جدا ).
6. Abdominal pain.
7. Dysphagia due to lymph node compression.
8. Children with TB meningitis ongoing TB within community.

Note: Always go for induration not erythema in PPD. PPD is –ve in 30% if the cases. مهمه – سؤال

*Management:*

Diagnosis

* Z-N strain should be done in 24 hours showing acid-fast bacilli. If PPD is negative, repeat in two weeks.
* BCG vaccine in children is effective against preventing TB meningitis, miliary, and severe TB. Some people develop BCGitis at the site of injection because they have defective inflammation (IL-2 deficiency).
* If you can diagnose by chest x-ray, treat as pneumonia. If there is no improvement, widen your differential.

Medication

* Isoniazid is safer for latent TB. Complications arise within the first year always check patients LFT associated with most anti-TB drugs.
* If a child had contact with a positive T.B case:
  + If PPD was negative, treat with INH (if he/she was less than 4 years or has HIV). We repeat the PPD after 3 months.
  + If PPD was positive, do chest x-ray, if the CXR was negative treat prophylactically with INH for 6-9 months, if the CXR was positive treat as TB.

**Remember : the main side effect of Anti Tb med : Is Hepatotoxicity مهمه**

*Indications for steroid:*

1. TB meningitis and increased ICP due to brain stem inflammation and increase in head circumference.
2. Endobronchial (TB collapse or airway trapping).
3. Miliary TB, pericarditis, pleural effusion, peritonitis.

Complications :

1. Mullary Tb and Tb meningitis ( 3 – 6 M )
2. Endo…… Tb (9 M ) غير واضحه
3. Bone and joints ( 1 Y )
4. Renal ( 5-25 Y )

Treatment of contact :

1st Do PDD 🡪 -ve ( the INH < 4 y OR HIV ) 🡪 repeat in 3 M 🡪 -ve Reasure

+Ve

+ve

Do CXR 🡪 -ve ( INH positive )

+ve

Tb is confirmed