TUBERCULOSIS

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mankind.

- Causative organism -Mycobacterium
- Etiopathogenesis of the disease is clearly understood.
- A vaccine against Tuberculosis has been available for close a century.

Introduction

development.

- ***An overwhelming majority of cases*** and practically all deaths due to Tuberculosis take place in developing countries.

- *Tuberculosis is currently second only to AIDS* as an infectious cause of death worldwide.

falling globally since 2003 .

- Organism can infect practically any organ of the body.
- Pulmonary tuberculosis accounts for over 80% of the total cases suffering from tuberculosis.

- meningeal,
- bone and joint,
- renal,
- genital,
- abdominal or mesenteric and
- tubercular lymphadenopathy .

- Tuberculosis is the ***commonest opportunistic infection in patients suffering from AIDS*** in large parts of the world.

- Transmitted by droplet nuclei after close contact with a person who has infectious disease.
- Effective treatment - available for over sixty years.
- World Health Organization declared TB as a ***global public health emergency in 1993***.
- Treatment : prolonged multidrug therapy which *increases the potential risk of non-adherence by patients*

- TB known by a number of names through

- Pott's disease: TB of the bone with characteristic vertebral fusion and deformity of the spine.
- The most familiar term for TB was consumption, which means to consume or wear away.

HISTORY

- '***Captain of the Men of Death***': the most fitting name among all
- Egyptian mummies from 2400 BC: show ***definite pathological signs of tubercular decay in fragments of the spinal column.***
- Around 460 B.C., Hippocrates identified phthisis as the most widespread disease of the times, and noted that it was almost always fatal.
- ***Sylvius was the first to identify actual tubercles in the lungs*** and other areas of consumptive patients in 1679.

- In 1882, Robert Koch discovered a staining technique that enabled him to see Mycobacterium tuberculosis.

- Over the centuries, TB has taken over 1 billion lives.
- Deaths due to tuberculosis comprise 25% of all avoidable deaths in developing countries.
- ***95% of TB cases and 98% of TB deaths*** are in developing countries.
- 75% of TB cases in developing countries are in the ***economically productive*** age group of 15 - 50 years.

Epidemiology: Global

- approximately 1 billion people will be newly infected,
- over 150 million will get sick, and
- 36 million will die of TB,

if control is not further strengthened

- 1.8 million cases occurring annually,
- Accounts for a fifth of the world's new TB cases and 2/3rd of the cases in South - East Asia.

- This makes India the ***highest TB burden country in the world***

Epidemiology: India

- Because it affects adults, tuberculosis causes ***enormous social and economic disruption.***
- More than 80% of the burden of tuberculosis is ***due to premature death***, as measured in terms of Disability Adjusted Life Years (DALYs) lost.

- 54 years).

- The burden of TB is enormous but is hidden by stigma.
- TB kills ***more women in India*** than any other infectious disease.
- Women with tuberculosis are often ***severely stigmatized***.

Agent :

Mycobacterium tuberculosis

- genus Mycobacterium,
- family Mycobacteriaceae and Order Actinomycetales.

- Gram positive, non - motile, non - sporing, pleomorphic rod.

- Bacilli are obligate aerobes growing most successfully in tissues having the highest partial pressure of oxygen, such as lung apices.

hours. Hence, lesions typically evolve in a sub - acute to chronic course.

- They are classified as *Acid - Fast Bacilli (AFB)* because they retain the carbol - fuchsin red dye after washing with acid, alcohol, or both.

- Mycobacterium bovis is the etiologic agent of TB in cows and rarely in humans.

- Both cows and humans can serve as **reservoirs**.

- Humans can also be infected by the

- Mycobacteriun africanum can be a rare cause of tuberculosis.

Other human pathogens belonging to the genus Mycobacterium include

- ***Mycobacterium avium*** which causes a TB - like disease especially prevalent in AIDS patients and
- Mycobacterium leprae, the causative agent of leprosy.

- Nutrition
- Immunity

Host factors

- Overcrowding
- Undernutrition
- Population explosion
- Lack of education
- Large families

Social factors

and droplet nuclei.

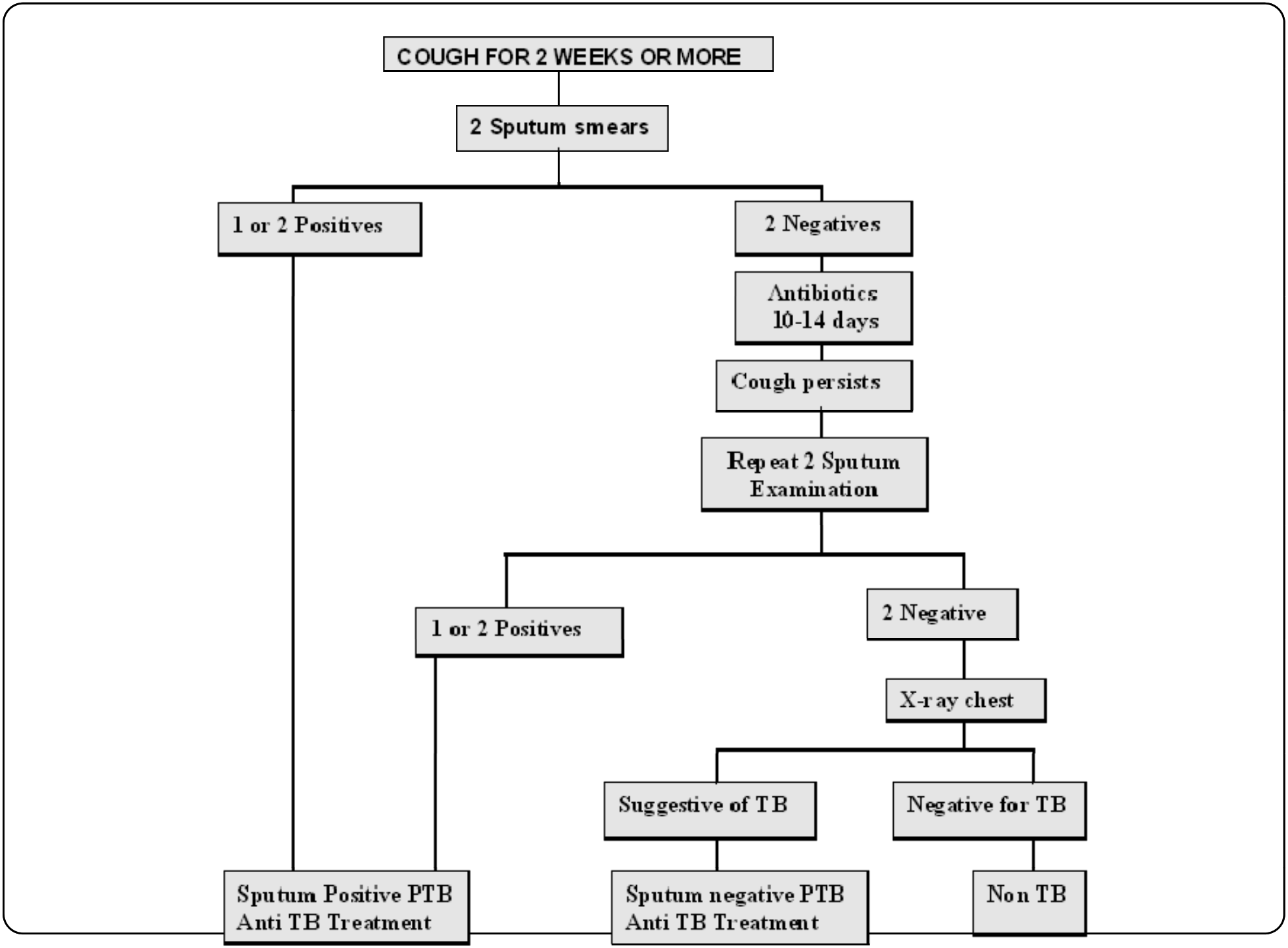
- Incubation periods: weeks, months or years.

culture

- Treatment
- BCG vaccination
- Chemoprophylaxis
- Rehabilitation
- Nutrition

Prevention & Control

Diagnostic Algorithms for Pulmonary TB



Revised Categories

Treatment groups	Type of patient	Regimen	
		Intensive phase (IP)	Continuation phase (CP)
New (Cat I)	•New sputum smear positive •New sputum smear negative •New extra-pulmonary •New others	2 H3R3Z3 E3	4 H3R3
Previously treated (Cat II)	•Smear positive relapse •Smear positive failure •Smear positive treatment after default •Others	2 H3R3Z3 E3S3/ 1 H3R3Z3	5 H3R3E3

MDR-TB and DOTS-Plus

- MDR-TB is a ***lab diagnosis***, NOT a clinical one
- MDR-TB levels of less than 1% to 3% in new cases and of *12% in re-treatment cases*.
- Emergence of resistance to Rifampicin in only 2% of patients, despite a high level (8%) of initial resistance to Isoniazid, either alone or in combination with other anti-TB
- ***Quality assured laboratory facility for culture*** and ***Drug Susceptibility Test*** must be available (NB: 2 – 4 months delay before DST results seen)

- Category II patient who is smear positive at the ***end of the fourth month of treatment or later*** will be identified as "**MDR-TB suspect**" and will be tested by culture and DST

- A patient who is an "MDR TB Suspect" should be referred by the respective medical officer – peripheral health institute (MO-PHI) to the District TB Officer (DTO)

- An MDR-TB suspect who is sputum culture positive and whose TB is due to bacilli that are ***resistant in-vitro*** to at least isoniazid and rifampicin (the DST result being from an RNTCP accredited IRL).

- **24 months** standardized 2nd line regimen given under **daily** DOT:
  - **6 Km Ofx Eto Cs Z E / 18 Ofx Eto Cs E**

- Dosages based on ≤45kgs / >45kgs wt bands Drugs supply: 3 months in IP / 6 months in CP
- All patients to receive pyridoxine 100mg daily
- *PAS to be used as substitute drug in case of severe ADRs* , crucial to monitor for adverse drug reactions and treat when required.

Km = Kanamycin; Ofx=Ofloxacin; Eto=Ethinamide; Cs=Cycloserine; Z=Pyrazinamide; E=

HIV & TB

- HIV co-infection strongest known risk factor for the progression of latent TB infection to active TB disease

- Estimated 7-10% annual risk of reactivation, with 60% lifetime risk (cf. 10% lifetime risk in TB infected, non-HIV infected individual)
- Conversely, TB amongst the most common causes of morbidity and mortality in people living with HIV/AIDS

- Immune response to TB bacilli increases HIV replication leading to a rapid progression of HIV disease

- Optimal access to DOTS will significantly reduce