

Tuberculosis

The Basics

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TB Scenario

Family X lives in a coastal community in Nunatsiavut. The family consists of mother, father, four children between the ages of 12 and 21, grandmother and one little granddaughter.

TB Scenario

Grandmother has not been feeling very well over the last few months. She is 75 years old and rather fragile. She is losing weight and has developed a cough.

Her family tries to persuade her to go to the clinic. After a while she agrees.

TB Scenario

Grandmother gives a history of having no appetite and losing weight for about 3 months. Two months ago she developed a cough and lately there has been a bit of blood in her sputum. There is a vague reference on her chart indicating that she had TB many, many years ago but no reference to treatment. The TB Bible indicates that her mother and one brother died of TB many years ago.

TB Scenario

The clinic nurse is very concerned that she might have TB so she arranges to have some sputum collected for testing. She also makes arrangements for Grandmother to go to the Hospital as an outpatient to see the doctor.

TB Scenario

Grandmother goes to Goose Bay. She sees the doctor who is quite worried about TB and orders a CXR, CBC and ESR and more sputum for AFB and TB culture. He makes a point of reviewing the CXR as soon as possible. Good thing too because the CXR shows several large cavities in the lung apices.

TB Scenario

The doctor immediately arranges for Grandmother to be admitted to hospital to a negative pressure room and calls the CDCN to inform her of his suspicions. The CDCN informs the MOH immediately. Meanwhile the lab pages the doctor to say that two out of three sputa are positive for AFB 4+. This is later confirmed by culture.

TB Scenario

Grandmother is started on 4 drugs for two months and 2 drugs for 4 months.

She is discharged home only after she improves clinically, her sputa are negative on smear (3 x 24 hours apart) and her CXR shows improvement

Public Health Note

The MOH may be involved in the decision to allow a case of Active TB to discontinue isolation.

TB Control Priorities

1. Early identification and curative treatment of cases.
2. Evaluation and follow-up of close contacts.
3. Treatment of latent TB infection.

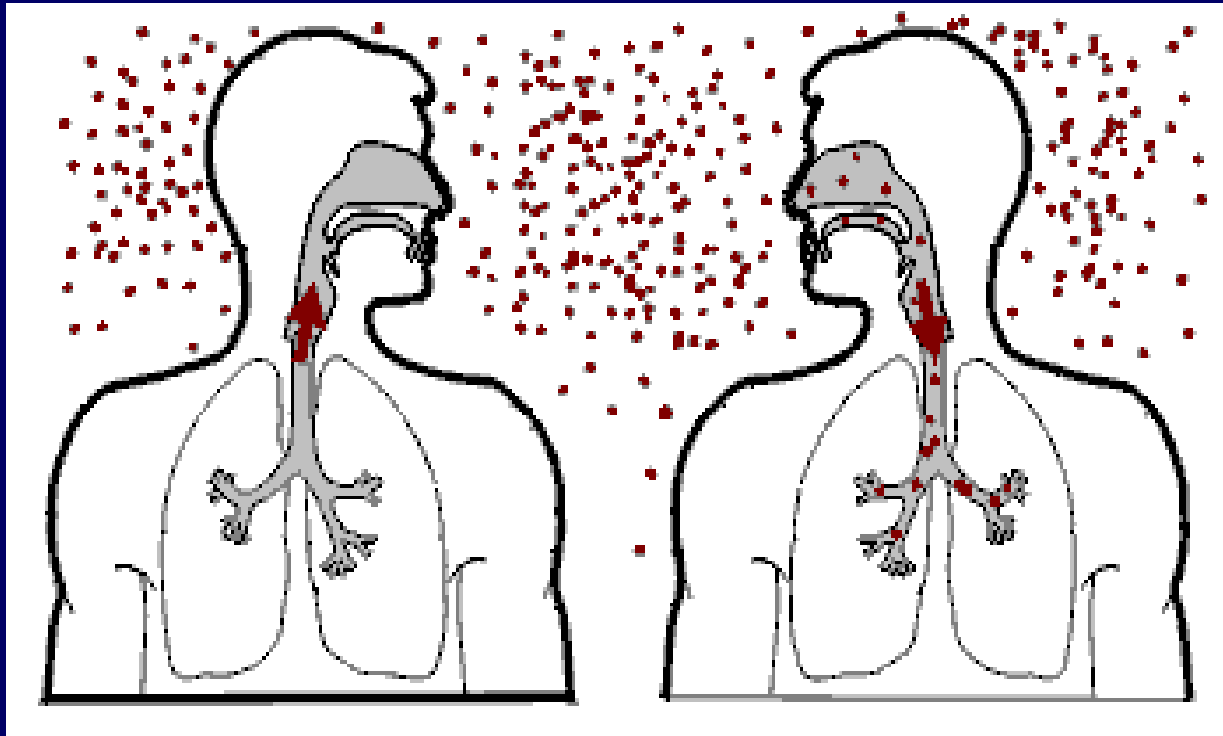
Initial Assessment

- Before contact tracing starts, review the details of the case.
- Think about
 - Type of TB the case has
 - Degree of infectiousness
 - Natural History of TB

Initial Assessment

- Personal history of TB
 - Previous TST, exposure to TB, past TB disease or infection, treatment
- Family history of TB
 - May indicate exposure to TB in the past

Transmission



TB Transmission

- **Factors related to infectiousness of source case**
 - Smear positive more infectious than smear negative
 - Pulmonary or laryngeal TB
 - Cough
 - Extensive CXR abnormalities

TB Transmission

- **Factors related to infectiousness of source case (continued)**
 - Viable bacilli in sputum of source case
 - Smear positive infects more contacts than smear negative-culture positive ie. Greater infectivity

TB Transmission

- **Factors related to infectiousness of source case (continued)**
 - Greater risk of disease among those infected by smear positive case than among those infected by a smear negative case
 - Some strains of *M. tuberculosis* may be more transmissible than others.

TB Transmission

- **Aerosolization of sputum by cough or other mechanism**
 - Force of cough
 - Watery versus tenacious sputum

TB Transmission

- **Environment where contact occurs**
 - Indoors
 - Poorly ventilated

Natural History of Disease

- Primary Infection
- Primary Disease
- Latent Infection
- Post Primary Disease

Natural History of Disease

- Primary Infection
 - Bacilli implant in the lungs
 - Immune defenses come into play
 - Regional lymphatic spread and occult bacillemia; seeds respiratory and non-respiratory sites eg. lung apices, renal cortex, end of long bones

Natural History of Disease

- Primary Infection (continued)
 - 5% of newly infected go on to primary or progressive primary disease within 1 to 2 years
 - 90% LTBI;
 - never develop post primary disease;
 - 5% reactivate i.e. postprimary disease after variable period of latency

Natural History of Disease

- Primary Disease
 - Often subclinical or mild, self-limited
 - Infants and children:
 - Asymptomatic or fever and non productive cough
 - CXR changes, unilateral patchy infiltrates or hilar adenopathy
 - Treat or may go on to Miliary TB or TB meningitis

Natural History of Disease

- Primary Disease (continued)
 - Adolescents and young adults
 - TB pleurisy; pleuritic chest pain and pleural effusion
 - Resolves spontaneously but 60% go on to active disease

Natural History of Disease

- Primary Disease (continued)
 - Children and adults can go on to Progressive Primary Disease with cavitation

Natural History of Disease

- Latent Infection
 - Bacilli may survive for years in small granulomas or solid caseous material
 - +ve TST +/- fibrocalcific changes on CXR

Natural History of Disease

- Post Primary TB
 - Usually localizes in upper lung
 - Liquification and cavity formation
 - Become infectious to others

Common sites of TB disease

- Lungs
- Pleura
- Central nervous system (TB meningitis)
- Lymphatic system
- Genitourinary systems
- Bones and joints
- Disseminated (miliary TB)

Conditions that increase the risk of progression to TB Disease

- HIV infection
- Substance abuse
- Diabetes
- Silicosis
- Prolonged corticosteroid therapy
- Other immunosuppressive therapy

Conditions that increase the risk of progression to TB Disease

- Cancer of the head and neck
- Hematologic disease
- End-stage renal disease
- Intestinal bypass and gastrectomy
- Chronic malabsorption syndromes
- Low body weight (10% or more below the ideal)

TB Scenario

Family X continued:

Meanwhile the MOH has directed that contact tracing should begin as soon as possible. We need to figure out where Grandmother might have gotten this from and who she might have given it to

TB Scenario

Where did she get it from: Based on the family history of TB and the note about TB on Grandmothers chart, it is very likely that grandmother was infected with TB at an early age. She may have had inadequately treated active disease but we will never know for sure. It is unlikely that she got it from someone else lately but we won't know for sure until we look at her contacts.

Contact Follow-up

- Close contacts are at increased risk
- Up to 3% will be found to have active disease
- 5 to 12% found to be infected will develop active disease within two years of exposure

Objectives of Contact Follow-up

- Identify source case (if index case is a child or has primary TB or non-respiratory TB)
- Identify secondary cases and initiate treatment
- Identify TB infected contacts and offer treatment for LTBI

Objectives of Contact Follow-up

In simple terms

- Where did the case get it from?
- Who did the case give it to?

Key Terms

Contact

- Those who may have been infected by a case of active Tuberculosis
 - Close household contacts
 - Close non household contacts
 - Casual contacts
 - Community contacts

Principles of Contact Investigation

1. Start contact investigation as soon as possible.
2. Be organized and systematic and meticulous.
3. Make sure the investigation is coordinated.

Principles of Contact Investigation

4. Consider a range of factors in identifying contacts:
 - a) How infectiousness is the case?
 - b) How long has the case been infectious?
 - c) How much was each contact exposed?

Principles of Contact Investigation

5. Start with the closest contacts and move out from there if there is evidence of transmission.
6. Use a standard approach to evaluate each contact.

Principles of Contact Investigation

7. Initiate treatment for LTBI rapidly in those most susceptible
8. Evaluate contact investigation

Contact investigation

- Requires time, co-ordination, expertise
- Resource intensive
- Must be meticulous
- Associated with anxiety in the community
- Communication must be clear and consistent

Steps in Contact Investigation

1. Report all new or suspected cases of infectious tuberculosis to MOH ASAP.
2. Identify all household and other close contacts

Steps in Contact Investigation

3. Interview close contacts regarding
 - circumstances and duration of contact,
 - presence of symptoms,
 - previous history of TB, TB exposure
 - prior TST.

Steps in Contact Investigation

4. Contacts with no previous history of TB or documented positive skin test should receive a tuberculin skin test.

Steps in Contact Investigation

5. Reactors are considered those whose initial TST is 5 mm or greater, or who have had an increase of 6 mm from a previous TST.

All reactors & all children < 6 & all immune compromised (regardless of TST) should be referred for clinical assessment including CXR.

Steps in Contact Investigation

6. Submit sputum for TB testing from all those with symptoms or CXR abnormalities.

Steps in Contact Investigation

7. Recommend treatment for LTBI as appropriate.

Steps in Contact Investigation

8. Repeat tuberculin skin test at least 8 weeks after the last exposure for all close contacts who had a negative initial test.

Steps in Contact Investigation

9. Review status of each contact on an ongoing basis until each one is discharged from follow-up.

TB Scenario

The public health nurse interviews grandmothers family while another nurse interviews grandmother in hospital. She makes a list of contacts and divides them into household contacts and then more casual contacts.

TB Scenario

Each contact is interviewed and their medical records and all files related to TB history, skin tests results, BCG etc are reviewed.

Based on this review each contact is followed up with a tuberculin skin test or with a clinical assessment, CXR and perhaps sputa

TB Scenario

It turns out that several of the grandchildren now have positive skin tests as does the great granddaughter who has spent a lot of time with grandmother.

TB Scenario

Great granddaughter is referred to LHC where CXR shows hilar adenopathy. Gastric washings are negative for TB but the diagnosis of primary TB is made on the basis of the CXR pattern and exposure history. The child is started on TB treatment.

Questions?