Tuberculosis in adolescents: Current and future issues

DR NOOR ALIZA MD TAREKH
PAKAR PERUNDING RESPIRATORI, HSAJB
Introduction

• Adolescents are the transition period from childhood to adulthood.

• According to WHO, adolescent age is between 10 to 19 years.

• At this age, they are suppose to be healthy but they may die prematurely.
Introduction

- An estimated 1.3 million adolescents died in 2012, mostly from preventable or treatable causes.

- Road traffic injuries were the leading cause of death in 2012, with some 330 adolescents dying every day.

- Other main causes of adolescent deaths include HIV, suicide (80% of death in 10-19 yrs in US), lower respiratory infections and interpersonal violence.
Tuberculosis in Malaysia: Current trend

WHO global TB report 2014, data for Malaysia

- Prevalence 131 (62–225) per 100,000 population
- Incidence 99 (86–110) per 100,000 population
Tuberculosis (TB) accounts for 1.7 million deaths, according to the recent WHO report, this ranks second to HIV as a cause of death globally.

In 2012, 8.6 million incident cases of TB were reported with 530,000 new cases of TB being children less than 15 years.

There is not much data on tuberculosis in adolescents.
• Studies have shown that adolescents are a vulnerable age group having higher chance of getting pulmonary TB infection and disease compared to younger children and adults. (De Pontual L, Balu L, Ovetchkine P, Maury-Tisseron B, Lachassinne E, Cruaud P, et al. Tuberculosis in adolescents: A French retrospective study of 52 cases. Pediatr Infect Dis J. 2006 Oct;25(10):930-2.)

• Studies conducted in South Africa had shown that the adolescents have the high force of infection. The high force of infection in this age group can be implicated to the increase in the social gathering during this age period, which will lead to increase in the exposure to infectious TB disease. (Wood R, Liang H, Wu H, Middelkoop K, Oni T, Rangaka MX, et al. Changing prevalence of tuberculosis infection with increasing age in high-burden townships in South Africa. Int J Tuberc Lung Dis. 2010 Apr;14(4):406-12)
Six Singaporeans under treatment for drug-resistant TB

The Straits Times (20 February 2013)

16 others have latent infection, three Selegie cybercafes likely source

SIX Singaporeans are being treated for a more dangerous, drug-resistant type of tuberculosis (TB) whose likely source has been traced to three cybercafes at Parklane shopping mall.

The six fell sick from February to December last year. Five had frequented cybercafes Spot On Gaming, Volcano and Aquarius at the Selegie mall. The other person is a family member.

So far, some 112 family members, friends and close contacts have been called up for tests by the Tuberculosis Control Unit at Tan Tock Seng Hospital.

Of the 109 who have been screened, 16 were found to carry the latent form of the infection.

This means that they are not sick or infectious yet, as the bacteria remains inactive in their bodies. But one in 10 people with latent TB can go on to develop the full-blown disease.

All six patients are currently being treated by the TB unit. Those with the latent disease have been advised to seek treatment.

To get screened, call the TBCU on 6258-3142 or 6357-7412
• Adolescents are more susceptible to developing TB disease than younger children because of the hormonal changes and the altered protein and calcium metabolisms associated with adolescent growth. (Wilcox WD, Laufer S. Tuberculosis in adolescents: A case commentary. Clin Pediatr 1994;33:258–262)

• Studies conducted in United States during 1993 to 2001 had shown that adolescents aged 15 to 18 years were more likely to be smear positive. (Nelson LJ, Schneider E, Wells CD, Moore M. Epidemiology of childhood tuberculosis in the United States, 1993-2001: the need for continued vigilance. Pediatrics. 2004 Aug;114(2):333-41.)

• Among adolescents, extrapulmonary tuberculosis is more common than pulmonary tuberculosis. Hilar lymphadenopathy was commonest followed by tuberculous meningitis and pericarditis occurring in equal proportion. (Kam A, Ford-Jones L, Malloy P, Khan K, Kitai I. Active tuberculosis among adolescents in Toronto, Canada: Clinical features and delays in diagnosis. Pediatr Infect Dis J 2007;26)
Why it is important to study TB among adolescents?
KUCHING: There has been an alarming increase in tuberculosis (TB) cases among youths in Sarawak over the last four years.

The state Health department is closely monitoring the situation and to identify the causes behind the surge in those as young as 20.

"We are at a loss as to why there has been a resurgence of TB cases, especially among young people. It is an alarming situation and until now we have yet to identify the pattern, and this is perplexing to us," Assistant Minister of Public Health Datuk Dr Jerip Susil said.
KADAR INSIDEN TB REMAJA (15-24) JOHOR 2009-2014
Clinical presentation of Tuberculosis among adolescents

- The clinical presentation of the pulmonary TB in adolescent age group is different compared to children and adults.

- It is seen as a mixture of childhood forms and adult patterns in their clinical, radiological and microbiological findings.

- Adolescents are more likely to present symptomatically, as opposed to being identified during contact investigations.
Clinical presentation of Tuberculosis among adolescents

• Before puberty, TB among adolescents is similar to children with Ghon complex or primary complex (Ghon focus, lymphangitis and enlarged regional lymph nodes) and hematogenous dissemination (Miliary TB).

• After puberty, the pathophysiology of TB among adolescents is similar to adult type with granulomas on histopathology and cavities and cotton wool lesions on chest radiographs.
Issues in TB among adolescents

1. Delay in diagnosis

- The delay in the final diagnosis of Tuberculosis disease from the onset of symptoms is a big challenge in adolescents.

- The study conducted in Toronto, Canada has found that the average time from the onset of symptoms to diagnosis of Tuberculosis disease was 5.25 months with a median of 4 months.
Issues in TB among adolescents

1. Delay in diagnosis

- Apart from late presentation, difficulty to diagnose and treat of TB in adolescents because of the difficulty in obtaining reliable specimens (especially for extrapulmonary disease) contributes to the delay in diagnosis.

- This delay in diagnosis leads to the delay in the treatment of tuberculosis and thus increased infectivity of the diseased person in the community.
2. **Advanced stage**

Due to delay in diagnosis and late presentation, many adolescents with TB presented in advanced stages of disease which will increase morbidity and mortality.

3. **Risk of spreading of disease to community**

Adolescents tend to have cavitary Pulmonary TB and together with delay diagnosis they can become the source of infection in the community.
Teenager died as doctors failed to spot tuberculosis

by BEEZY MARSH and SCOTT MCLEAN, Daily Mail

A girl of 16 has died from tuberculosis, reigniting fears over the spread of the lung disease.

Teenager died of tuberculosis after string of doctors fail to spot condition and one even branded her 'lovesick'

By JAMES TITCOMB

4. Compliance issues

- Medication noncompliance has been shown to be more than 4 times greater in adolescents than in adults.  

- This will increase the likelihood of developing drug resistance tuberculosis and making the condition more severe and difficult to treat.

- Adolescents appear to have INH-resistant strains more frequently than children.  
4. Compliance issues

- Substance abuse

- Tobacco, alcohol, drug abuse begins in adolescence

- Drug abuse – 4.5% among adolescents

- 17.8% of adolescents smoke
4. Compliance issues

- Sexual desires increase and sexual activities begin.
  - 47% of women were married before 16 yrs.
  - 12% of women between 15-19 yrs have already become mothers.
  - 20-30% adolescent boys and 10% adolescent girls sexually active before marriage.
  - Adolescent abortion 1-4.4 millions per year.
  - 10% of teenagers suffer from STIs
  - HIV prevalence is 0.18% among 18-24 yrs olds.
INHALING DEATH
SAY NO TO DRUGS
What about BCG?

BCG has a role in protecting a child from getting severe form of TB until the age of 15.
What about IGRAs?

The newer immunological based tests such as IGRAs are not well suited for use in TB/HIV co-infection and in high burden TB areas, where they cannot be accurately used to distinguish active from latent TB.
What about schooling…

Are adolescents with tuberculosis and on treatment are allowed to attend to classes?

• Since patients with active TB may be sick and infectious, they may be advised to refrain from school during the initial stages of treatment until clinically better and they are no longer infectious. Most patients are no longer infectious after approximately two weeks of treatment. Such patients should continue treatment and can return to school; they are not a threat to others.
So how do we tackle this problems?

• Contact investigation
  – most of the adolescent only presented when they are symptomatic
  – but the commonest risk factor is contact with tuberculosis index
Person in close contact with smear positive PTB are at higher risk of getting infected
Targeted tuberculin skin testing is intended to identify children and adolescents at risk for LTBI who would benefit from treatment to prevent the progression to TB disease.

Menzies et al found that almost three-quarters of recent US TB cases in adolescents were potentially preventable through identification of TB risk factors, and the use of targeted tuberculin skin testing identified 8% of the adolescents in this series.

Targeted Tuberculin testing focuses on testing children with risk factors.
So how do we tackle this problems?

• Treatment for LTBI
  – in adolescents treatment for LTBI should be indicated in those with risk factors after ruling out active TB
  – WHO guidelines advocate chemoprophylaxis for HIV infected and TB-exposed children under 5 years only.
Future prospects

New vaccine pipelines

- The Bacille Calmette-Guerin (BCG) vaccine is currently the only vaccine in use against tuberculosis.

- The efficacy of this vaccine is limited to prevention of severe forms of tuberculosis among children and there are lots of problems in cases of TB/ HIV coinfection.
Future prospects

New vaccine pipelines

Two conceptually different strategies have been pursued: firstly, the development of ‘priming vaccines’, which, it is hoped, will replace BCG by providing better and longer protection; secondly, the design of ‘booster vaccines’ to boost pre-existing BCG-derived immunity (Roth et al., 2006).

Novel vaccines currently under development -72f, Hybrid 1, Aeras 402, rBCG-UreC-Hly, MVA- 85A (Doherty et al, 2007).
TB Biomarkers

There are three major reasons that can be used to justify the need for TB biomarkers:

1) a diagnostic test which is able to differentiate between healthy individuals with a latent TB infection and patients with active disease is needed;
2) a prognostic test which can be able to predict the risk of latent TB becoming active needs to be established;
3) to monitor TB disease activity and to determine follow up treatment outcomes.
Even as kids reach adolescence, they need more than ever for us to watch over them. Adolescence is NOT about letting go. It's about hanging on during a very bumpy ride. RON TAFFEL
Case study
Case 1
INTRODUCTION

• Name: NM
• IC No: 97XXXXXXXXXXX
• Referred from KK Pontian
• Immunocompetent.
• No history of contact with PTB patient.
• College student.
History of illness

- Diagnosed as smear positive pulmonary tuberculosis and complete treatment within period 18/3/14 - 18/12/14

- During follow up, noted patient having worsening shortness of breath on exertion.

- CXR repeated in September 2014, showed collapse consolidation of left upper lobes possibly due to central lymphadenopathy/central tumor.
Electively admitted on 2 December 2014 for bronchoscope.

Bronchoscope done:
- post nasal and larynx: normal
- left upper lobe: endobronchial stricture at left main bronchus about 1 inch from main carina and 11 inches from nose, not able to pass scope through
- right lung: no endoluminal lesion, inflamed mucosa
Narrowing of left main bronchus opening
• Diagnosis: left main bronchus stricture secondary to endobronchial tuberculosis

• Management plan:
  
  endobronchial stent (offered to patient)

• Bronchial wash AFB D/S: no AFB seen
• Bronchial wash MTB culture ogawa: no AFB seen
• Bronchial wash MTB culture Bactec: no AFB seen
Seen by respiratory team at Hospital Serdang
Date: 5 February 2015

Procedure:
- rigid bronchoscope and balloon dilatation with topical mitomycin application was done.
- Complicated with pneumomediastinum and pneumothorax → conservative management
In Hospital Serdang
Date: 18 March 2015

Procedure:
- Since LMB stenosis recurred, silicon stent was deployed.
Hospital Sultanah Aminah
Date: 20 April 2015

Surveillance Bronchoscope
→ stent in situ but displaced
Refer back to Hospital Serdang
Date: 23 April 2015

Repeat rigid bronchoscope
→ Stent in situ not migrated
→ Scope able to pass through
→ Noted granulation tissue proximal to the stent, cryo of granulation tissue done surrounding the stent
→ Distal airway dilated
Hospital Sultanah Aminah
Date: 20 May 2015

Surveillance bronchoscope:
→ Stenting patent
→ Mucosa at the opening is slightly granulating
→ No stenosis
Monthly bronchoscopy showed patent stent with clinical and spirometry improvement.
### Summary of All forced tests

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<th>FVC</th>
<th>PEF</th>
<th>FEV1/FVC</th>
<th>Quality</th>
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**ATS/ERS Criteria [2005]: Criteria Met**

Key: * - Default best; ^ - Manual best; + - Individual best

Variation is based on FEV1 + FVC.

### Selected indices of the best blows

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**Interpretation: (ATS)**

Base: Moderate Obstruction

**Predicted Source:** Indonesia - 3 Indonesian Universities in collaboration with Oregon University and Boehringer Ingelheim (1992) 13-70 years Results at BTPS.
HOSPITAL SULTANAH AMINAH JOHOR BAHRU

Jabatan Perubatan Respiratori

ID: [Redacted]
Name: [Redacted]
Age: [Redacted]
Height: 155 cm
Weight: 43 kg
Exam Date: 11/08/2015 11:05
BMI: 17.9
Factor: 100
Gender: Female
Ethnic Origin: Asian
Smoking: Non Smoker
Dyspnoea: 0

Please Note: Spirometry data and graphs are either best individual values or composite curve

Summary of All forced tests

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Variation is based on FEV1 + FVC

Selected indices of the best blows

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Interpretation: (ATS)

Base: Mild Obstruction

Predicted Source: Indonesia - 3 Indonesian Universities in collaboration with Oregon University and Boehringer Ingelheim (1992) 13-70 years Results at BTPS.
Issue and Challenges

- Recurrence was common: 80% of patients had a primary relapse of airway stenosis

- Complications of stents include migration, granuloma formation and obstruction
Case 2
Hosp Muar - 21/8/13

- NFMF, 16 Malay girl presented with cough with yellowish sputum for 5 weeks and fever for 1 month
- CXR: nodular opacities of both lung fields suspicious of pulmonary TB
- Treat as PTB and started HRZE + B6
- No history of contact with PTB patient.
- Immunocompetent.
Reticulonodular lesion
At 2 months of treatment, well. CXR as shown above and was changed to maintenance phase
• At 3 months of treatment, she complained of swelling over the right side of the neck for 1 month

• Clinically swelling about 3 x 4 cm, non-tender, non-fluctuant

• Maintenance phase was continued and was given augmentin and refer to surgery and for USG

• Sputum Bactec/Ogawa (send earlier) - AFB mixed with other bacteria
• At 4 months of treatment, swelling getting bigger and USG done showed large heterogenous subcutaneous hypoechoeic collection seen at anterior base of neck (inferior to thyroid lobes). A tract is seen extending from this collection to another collection at left lateral part of base of neck and suggest for CT scan.

• FNAC of swelling- no AFB

• Cytology showed acute suppurative inflammation consistent with abscess

• IM Streptomycin was added and she was discharged with SHERZ. On clinic follow-up her condition remains stable.
CECT neck/thorax/abdomen (7/1/14)

- Irregular multiloculated rim-enhancing collection in the subcutaneous region of the anterior lower neck with extension into the left supraclavicular region, extension adjacent to the left brachiocephalic trunk, and anterior mediastinum adjacent to the left main pulmonary artery.

- Multiple hypodense splenic lesions suggestive of tuberculous splenic abscesses.
Anterior mediastinal collection

Suprasternal collection
Splenic lesions
• 11/6/14 presented with fitting episode
  – GTC seizure lasted 10min then resolve spontaneously
  – + uprolling eyeballs
  – + drooling of saliva
  – + post-ictal drowsiness

• CECT brain (12/6/14):
  – Enlarging multiple enhancing nodules in the brain parenchyma
    with associated mass effect.

• CECT brain (13/7/14):
  – Enlarging right subfrontal lesion with worsening white matter
    edema surrounding all lesions. No new enhancing lesion.
Brain tuberculoma

CECT brain (12/6/14):

Enlarging multiple enhancing nodules in the brain parenchyma with associated mass effect, suggestive of tuberculoma.
• Referred to CCJB in view of worsening brain lesion.

• Patient was admitted to TB ward on 21/7/14, in view of worsening brain lesion and culture resistant to streptomycin, she was started on IM Kanamycin OD + HRZEO.

• She was also given IV Dexamethasone.

• In ward tolerating anti-TB, then discharged on 27/7/14.

• On clinic follow-up her condition remains stable with repeated CT brain, thorax and abdomen reveals some improvement.
Makmal Tibi, Jabatan Patologi
Hospital Sultanah Aminah, Johor Bahru
Tel: 2231666 ext 2670

Request No: 500064419
Name: NUR FATIHAH MOHammad P
IC No: 970220016598
Sex: F
Age: 18

Ward: -
Department: -
Hospital: Hospital Muar
Lab ID: M 3809-13

Order Date: 26-06-2013 14:44
Sample Rec. Date: -
Validation Date: 26-02-2014 10:11
Validation Status: Validated

TISLAB LAB. EXT 2670
AUTHORIZED PERSONNEL: DATIN DR GANESWIRE (CLINICAL PATHOLOGIST) MICRO. HEAD OF UNIT EXT 2660

CULTURE REPORT

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Culture Result:

BACTEC: Culture identified as M. tuberculosis Complex (MICAK 30/9/2013)

Susceptibility Test (Outsource)

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Drugs</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013/1204</td>
<td>Streptomycin 1.0</td>
<td>R</td>
</tr>
<tr>
<td>2013/1204</td>
<td>Isoniazid 0.1</td>
<td>S</td>
</tr>
<tr>
<td>2013/1204</td>
<td>Rifampin 1.0</td>
<td>S</td>
</tr>
<tr>
<td>2013/1204</td>
<td>Ethambutol 5.0</td>
<td>S</td>
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</tbody>
</table>

Susceptibility Test (Bactec 960 TB)

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</tbody>
</table>

Date Report OS: 2013/1204
Date Completing OS: 2013/1204
Reduction in size of intracranial tuberculoma with improvement of perilesional edema. No new brain lesion.
Minimal reduction in the size of previous collection seen at the anterior mediastinum.
Resolving suprasternal collection. No new collection seen.
Multiple hypodense splenic lesions show reduction in size
CECT brain/TAP (31/5/15)

- Reducing size of intracranial tuberculoma.
- Resolved anterior mediastinal and suprasternal collection.
- Slight improvement of the splenic and perisplenic lesions.
- New long segment large bowel wall thickening involving descending colon, transverse colon and distal part of descending colon.

→ Refer gastro for colonoscopy
→ TCA 22/9/15 to CCJB
Disseminated Tuberculosis
(lungs, brain, LN, spleen, ?gut)
## Sputum Investigations

<table>
<thead>
<tr>
<th>Date</th>
<th>Sputum</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>23/8/13</td>
<td>MGIT</td>
<td>MTB complex</td>
</tr>
<tr>
<td>22/7/14</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>23/7/14</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>24/7/14</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>22/7/14</td>
<td>MGIT</td>
<td>MTB not isolated</td>
</tr>
<tr>
<td>23/7/14</td>
<td>LJ</td>
<td>MTB not isolated</td>
</tr>
<tr>
<td>7/9/14</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>8/9/14</td>
<td>Direct smear</td>
<td>5 AFB per 100 field</td>
</tr>
<tr>
<td>9/9/14</td>
<td>Direct smear</td>
<td>3 AFB per 100 field</td>
</tr>
<tr>
<td>10/9/14</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>11/9/14</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>14/9/14</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>19/5/15</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>20/5/15</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>21/5/15</td>
<td>Direct smear</td>
<td>No AFB seen</td>
</tr>
</tbody>
</table>
ED: 22/8/2013

- HRZE + B6 (22/8/13 – 31/10/13) : 72 doses
- HR + B6 (1/11/13 – 9/1/14) : 70 doses
- SHRZE + B6 (10/1/14 – 9/3/14) : 56 doses
- HRZE + B6 (10/3/14 – 20/7/14) : 135 doses
- HRZEO + B6 + IM Kanamycin (OD)
  (21/7/14 – 13/12/14) : 147 doses
- HRZE + B6 + IM Kanamycin (EOD) (14/12/14 till now)
Issue and Challenges

- How long should I continue her treatment?
  - She has received the treatment from 22.8.2013 till now.
- Should I stop the treatment?
- How about the new findings reported in the CECT?
- The need of TB Biomarkers?
- Is she going towards MDR?
Case 3
INTRODUCTION

• Name: AZH
• IC No: 02XXXXXXXXXX
• Referred from KK Kulai
• Immunocompetent.
• History of contact with her uncle who died of PTB in 2008.
• Form 1 Student at SMK Senai
HISTORY

- 13 years old malay girl previously well, active kid

- Presented with fever for 3 month, loss of appetite, loss of weight 2kg in 3/12, productive cough with greenish sputum

- Seen in klinik kesihatan Kulai, noted sputum AFB : positive

- Started on T akurit 4 2 tab daily and tablet pyridoxine 10 mg OD
- Following 1 month of antiTB, patient still had fever, cough and persistent increase of white blood cell count.

- Patient was covered with antibiotic (T. augmentin for 2/52.) but symptom was not resolved.

- Several investigation was done
  - Blood c&s : no growth
  - Urine c&s : no growth
  - PBF : Hypochromic microcytic anaemia likely secondary to infection
Makmal Tibi, Jabatan Patologi  
Hospital Sultanah Aminah, Johor Bahru  
Tel : 233166 ext : 2670

Requested No : 500096275  
Ward : K DADA  
Order Date : 21-04-2015 14:26

Name : XXX  
Department : DADA  
Sample Rec. Date :  

IC No : 06209703111292  
Hospital : HSAJB  
Validation Date : 24-06-2015 15:00

Sex : F  
Age : 13  
Lab ID : M 1375-15  
Validation Status : Validated

TIBI LAB - EXT 2870  
AUTHORIZED PERSONNEL : DATIN DR GAMEYNIE (CLINICAL PATHOLOGIST (MICRO), HEAD OF UNIT) EXT 2880

CULTURE REPORT

<table>
<thead>
<tr>
<th>Specimen Taken</th>
<th>Specimen Received</th>
<th>Specimen Process</th>
<th>Nature of Specimen</th>
<th>Specimen Status</th>
<th>Microscopy Date</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-04-2015</td>
<td>21-04-2015</td>
<td>Pagi 1</td>
<td>Satisfactory</td>
<td>--</td>
<td>--</td>
<td>MGIT C&amp;S</td>
</tr>
</tbody>
</table>

Culture Result : Growth

BACTEC : Culture identified as M. tuberculosis Complex (MKAK 6/6/2015)
LJ : Culture identified as M. tuberculosis Complex (MKAK 25/6/2015)
LJ DST : PZA (S), Fluroquinolones Group (S), Capreomycin (S), Amikacin (S), Kanamycin (S), Viomycin (S)

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<tr>
<td>29165028</td>
<td>Rifampin 1.0</td>
<td>R</td>
</tr>
<tr>
<td>29165028</td>
<td>Ethambutol 5.0</td>
<td>R</td>
</tr>
<tr>
<td>29165028</td>
<td>Isoniazid 0.1</td>
<td>R</td>
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<td>R, Amikacin</td>
</tr>
<tr>
<td>Rifampin</td>
<td>R, Ofloxacine</td>
</tr>
<tr>
<td>Pyrazinamide</td>
<td>Ciproflaxin</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>R, Cycloserine</td>
</tr>
<tr>
<td>Ethambutol</td>
<td>R, Kanamycin</td>
</tr>
</tbody>
</table>

Comment :  

Validated By : NQRA  
Printed On : 09/09/2015 11:12:17PM
Multidrug Resistant Tuberculosis
• Patient was started on:
  
  o IM kanamycin 350 mg OD
  o T Ethionamide 350 mg OD
  o T Cycloserine 250 mg BD
  o T Ofloxacin 400 mg BD
  o T pyrazinamide 750 mg OD

• Admitted to TB ward for isolation
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<tbody>
<tr>
<td>01-07-2015</td>
<td>01-07-2015</td>
<td>01-07-2015</td>
<td>Pagi 1</td>
<td>Satisfactory</td>
<td>--</td>
<td>MGIT C&amp;S</td>
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**Culture Result:** Growth

*LI*: Culture identified as M. Tuberculosis Complex (MIKAK 17/02/2015)

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<td>Streptomycin 1.0</td>
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<td>R Kanamycin</td>
</tr>
<tr>
<td>Ethionamide</td>
<td></td>
</tr>
</tbody>
</table>

**Date Report CAS:**

**Date Completing CAS:** 20150017

Comment:

Validated By: NORA

Printed On: 09/09/2015 12:23:17PM
Issue and Challenges

• Contact screening, are we doing enough?

• How long should I refrain her from school?
  - Treatment of MDR requires more toxic second-line drugs and more expensive and longer treatment courses.
  - In the treatment of patients with MDR-TB, an intensive phase of at least 8 months’ duration is recommended.
  - In the treatment of patients with MDR-TB, a total treatment duration of at least 20 months is recommended.
Issue and Challenges

• Is she going towards XDRTB?
  - The use of sputum smear microscopy and culture are recommended for the monitoring of patients with MDRTB during treatment.
  - She’s already received secondline antitb since 31.5.2015 and her sputum culture (July and September) were still positive.

• Is she going to respond to the current treatment?
  - The respond rate of MDR to medical therapy is about 60%.
Thank you