USE OF XPERT MTB/RIF SYSTEM FOR RAPID DIAGNOSIS OF TUBERCULOSIS AND RIFAMPICIN RESISTANCE

Background

Earlier and improved tuberculosis (TB) case detection - including smear-negative disease often associated with HIV - as well as expanded capacity to diagnose multidrug-resistant tuberculosis (MDR-TB) are global priorities for TB control. MDR-TB poses formidable challenges due to its complex diagnostic and treatment requirements, while HIV-associated TB largely goes undetected due to the limitations of current diagnostic techniques. Alarming increases in MDR-TB, the global emergence of extensively drug-resistant TB (XDR-TB), documented institutional transmission, and rapid mortality in MDR-TB and XDR-TB patients with HIV co-infection have highlighted the urgency for rapid diagnostic methods. [1]

No single diagnostic test currently satisfies all the demands of 'quick', 'cheap', and 'easy'. Commercially available liquid culture systems and molecular line probe assays for rapid detection of MDR-TB have been endorsed by the World Health Organization (WHO); however, due to their complexity and cost, as well as the need for sophisticated laboratory infrastructure, uptake has been limited in many resource-constrained settings.[1]

The new rapid TB test – known as Xpert MTB/RIF- is a fully-automated diagnostic molecular test with the potential to revolutionize and transform TB care and control. The test is simultaneously detects TB and rifampicin drug resistance and provides accurate results in less than two hours so that patients can be offered proper treatment on the same day. Xpert MTB/RIF has minimal bio-safety requirements and can be housed in non-conventional laboratories.[2]

Based on WHO's recommendations Xpert MTB/RIF rapid test should be used as the initial diagnostic test in individuals suspected of MDR-TB or HIV/TB (strong recommendation) and may be used as a follow-on test to microscopy in settings where MDR-TB and or HIV is of lesser concern, especially in smear-negative specimens (recognizing major resource implications) (conditional recommendation).[2]

In December 2010, WHO recommended use of Xpert MTB/RIF and is monitoring the global roll-out of the technology to promote coordination. In December 2012, 77 countries around the world have procured 966 GeneXpert instruments and 1,891,970 Xpert MTB/RIF cartridges in the public sector under concessional pricing.[2]

Usage of Xpert MTB/RIF in Georgia is still limited. Currently this new technology is available only at central level in National Reference Laboratory and can be used for incomplete number of MDR-TB suspect and TB/HIV co-infected patients. For roll-out and countrywide implementation of Xpert MTB/RIF the consecutive activities are urgently needed. As the first step it is planned to pilot new technology. In July-August 2013, with support of FIND project (23/06/2010), 4 Gene
Xpert systems will be implemented. Two sets will be installed at the central level in Tbilisi at National Center for Tuberculosis and Lung Diseases, other two in Batumi (Adjara region) and Kutaisi (Imereti region) in regional

laboratories of National Center for Disease Control and Public Health. From 2014 usage of Xpert MTB/RIF will be enhanced and with support of Global Fund project in all TB laboratories of Georgia 12 Gene Xpert systems will be established. But only infrastructural development is not enough for effective utilization of the new technology. There is a need to train all TB physicians, especially from regional levels, in adequate use of recommended algorithms and correct interpretation of Xpert MTB/RIF test findings.

Considering the importance of rapid TB diagnosis, especially in smear negative forms with DR-TB risk, USIAD Georgia Tuberculosis Prevention Project plans to support educational activities and based on newly designed program will conduct trainings for countrywide implementation and utilization of Xpert MTB/RIF test.

Goal

The aim of the training course is to improve knowledge and skills of TB physicians necessary for adequate use of Xpert MTB/RIF algorithms, correct interpretation of test results and standard management of TB cases diagnosed by Xpert MTB/RIF.

Target Group

The training course is intended for all TB physicians who are responsible in selection of appropriate diagnostic tests for rapid TB detection and adequate treatment at different type of heath facilities.

Objectives

At the end of the training course participants will improve their knowledge and skills in rapid detection of TB cases, including smear negative and Rifampicin resistant forms, and will be able to:

- Introduce Gene Xpert MTB/RIF technology, understand methodology of real time PCR assay using of Molecular Beacon;
- Understand differences between Line Probe Assays, culture and Xpert MTB/RIF;
- Understand and operate in line with WHO's recommendations;
- Select individuals to test with Xpert MTB/RIF based on HIV status and DR-TB risk assessment;
- Choose and use an appropriate algorithm for Management of patients in accordance of theirs HIV status, DR-TB risk and type of health facility;
- Correctly interpret Xpert MTB/RIF results;
- Refer patients for further investigations and clinical management if TB is not detected;
- Register TB cases diagnosed by Xpert MTB/RIF;
- Ensure monitoring of TB cases diagnosed by Xpert MTB/RIF in line with current WHO guidelines;

List of the topics:

1. TB Epidemiology in the World and in Georgia;

2. Actuality of Xpert MTB/RIF test implementation;
3. Strengthening of TB Rapid Diagnosis by Using of Xpert MTB/RIF system;
4. Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance;
5. Case Definitions and Treatment Outcomes;
6. Selection of patients for XpertMTB/RIF testing and appropriate Algorithms;
7. Key actions necessary at country level for implementation of Xpert MTB/RIF assay

Duration of the trainings

One days training course, with duration of 8 hours, will be delivered in 10 small groups for 10-12 trainees in each group. The sessions of the course includes lectures presented as slide shows and followed by specially prepared practical session. At the end of the course participants will received printed protocol for standard use of Xpert MTB/RIF system (the detailed agenda of the training course see in table N1; the newest publications, based on which training course was prepared, see in references below-1-5).

Table N1

Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance

A g e n d a

Time	Session	Trainer
10:00 – 10:30	Pre-test	
10:30 – 11:15	TB Epidemiology in the World and in Georgia;	Marina Janjgava
11:15 – 12:00	Actuality of Xpert MTB/RIF test implementation;	Marina Janjgava
12:00 – 12:45	Strengthening of TB Rapid Diagnosis by Using of Xpert MTB/RIF system;	Rusudan Aspindzelashvili
12:45 -13:15	**Lunch**	
13:15 -14:00	Use of Xpert MTB/RIF System for Rapid Diagnosis of Tuberculosis and Rifampicin Resistance;	Rusudan Aspindzelashvili
14:00 – 14:45	Case Definitions and Treatment Outcomes;	Marina Janjgava

14:45 – 15:00	Selection of patients for XpertMTB/RIF testing and appropriate Algorithms;	Rusudan Aspindzelashvili
15:00 – 16:30	Practical Study;	Rusudan Aspindzelashvili
16:30 – 17:30	Key actions necessary at country level for implementation of Xpert MTB/RIF assay	Marina Janjgava
17:30 – 18:00	Post-Test	

References:

1. Rapid Implementation of the Xpert MTB/RIF diagnostic test; WHO, 2011 http://whqlibdoc.who.int/publications/2011/9789241501569_eng.pdf

2. Factsheet Xpert MTB/RIF test; WHO, February 2013 http://www.who.int/tb/features_archive/factsheet_xpert.pdf

3. Policy statement: automated real-time nucleic acid amplification technology for rapid and simultaneous detection of tuberculosis and rifampicin resistance: Xpert MTB/RIF system; WHO, 2011 http://whqlibdoc.who.int/publications/2011/9789241501545_eng.pdf

4. Checklist of prerequisites to country implementation of Xpert MTB/RIF and key action points at country level; WHO, 2011 http://whqlibdoc.who.int/hq/2011/WHO_HTM_TB_2011.12_eng.pdf

5. Systematic screening for active tuberculosis: principles and recommendations; WHO, 2013 http://apps.who.int/iris/bitstream/10665/84971/1/9789241548601_eng.pdf