Tuberculosis has been a scourge of humankind since ancient times. There is hardly any other disease that has inflicted so much misery in terms of suffering and morbidity. Unfortunately, India today has the largest population of TB patients in the world, with an estimated 2.2 million new cases getting registered annually. Thousands die every day in the country due to TB.

The emergence of drug-resistant (DR) TB is compromising efforts to control the global epidemic. There are at least two forms of DR-TB: the multidrug-resistant tuberculosis (MDR-TB) and extensively drug-resistant tuberculosis (XDR-TB). The later form is highly fatal form because not many good therapeutic options are available. Once population of such resistant strains are developed in one patient, these strains spread frequently in the society, further adding to the global threat of TB.

The challenges in controlling tuberculosis in India span the entire spectrum, from diagnosis to detection of drug resistance to treatment. Nevertheless, in recent years new and more effective diagnostic tests, with or without simultaneous detection of resistance, have been commercialized. Both non-molecular and molecular assays have been developed.

Acid fast bacilli (AFB) culture is widely considered the gold standard for laboratory diagnosis of TB, but a large number of Indian mycobacteriology labs still depend on the conventional Lowenstein and Jensen (LJ) media for culture. This has its own limitations in terms of the time required and frequently negative results with few bacilli specimens. The use of liquid culture has shortened the time required for detection of bacteria, improving the overall recovery of patients. Molecular methods are also gaining popularity in the diagnosis of TB by directly detecting bacteria in the specimen. With the help of these, a large number of specimens can be processed at the same time, ensuring standardization and quality assurance due to automation of methodology.

Recently, a cartridge-based nucleic acid amplification technology called GeneXpert got introduced in India. It is a rapid, two-hour DNA test endorsed by WHO which can diagnose TB with great accuracy. It can also detect cases with drug resistance to Rifampicin. However, the
need for testing other drugs for confirmation of MDR and diagnosis of XDR still remains. More recently several newer biomarkers have been developed and several more are in pipeline. All these advances will be discussed.

References:

Rufai SB, Kumar P, Singh A, Prajapati S, Balooni V, Singh S.

High degree of multi-drug resistance and hetero-resistance in pulmonary TB patients from Punjab state of India.
Kumar P, Balooni V, Sharma BK, Kapil V, Sachdeva KS, Singh S.

Incidence and prevalence of tuberculosis among household contacts of pulmonary tuberculosis patients in a peri-urban population of South Delhi, India.
Singh J, Sankar MM, Kumar S, Gopinath K, Singh N, Mani K, Singh S.

Singh S, Kumar P, Sharma S, Mumbowa F, Martin A, Durier N.
Singh S, Kumar P, Sharma S, Mumbowa F, Martin A, Durier N.

Singh S, Kumar P, Sharma S, Mumbowa F, Martin A, Durier N.

Molecular characterization of Mycobacterium tuberculosis isolates from North Indian patients with extrapulmonary tuberculosis.
Sankar MM, Singh J, Diana SC, Singh S.

Brief Biography of Prof. Sarman Singh
Dr. Singh is a professor at the All India Institute of Medical Sciences, New Delhi for the last 25 years and presently heads the Division of Clinical Microbiology & Molecular Medicine. Dr. Singh’s major research interests are Tuberculosis, HIV/AIDS, HIV-TB co-infection, and Leishmaniasis. He has several awards and honours to his credit. He is Fellow and member of various national and international scientific and academic bodies.

He is member of various advisory and expert committees of DBT, DST, ICMR and various other Government organizations in India and abroad. He has written 6 books, 40 book chapters and more than 300 research papers in various national and International journals. Dr. Singh has 7 patents to his credit. He has made significant contribution in the field of disease diagnostics in the field of infectious diseases, especially the Tuberculosis. His team was first to identify the threat of XDR-TB in India in 2007 and advocated upscaling of anti-TB drug susceptibility testing facilities in the country. Recently his studies on high rate of rifampicin heteroresistance in Punjab and on comparing the performance of Xpert MTB/RIF and line probe assay have been highlighted nationally and internationally.

Prof. Sarman Singh,
Head,
Division of Clinical Microbiology & Molecular Medicine.
All India Institute of Medical Sciences,
New Delhi -11029
Email: sarman_singh@yahoo.com