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Insights into Development and Treatment of Multi-Drug Resistant Tuberculosis (Mdr-Tb)

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Resistance to Tb drug is a global challenge which creates an obstacle to effective Tb care and prevention. Mdr-Tb is defined as a resistance to the two principal drugs used in treatment of Tb- isoniazid and rifampicin- whether or not there is a resistance to other drugs. The main causes of developing mdr-Tb are- poor patient management, non-adherence to the prescribed regimen, a poor national program or some combination of these three causes. Mdr-Tb is multifactorial and is fueled by improper treatment of patients and airborne transmission of bacteria in public places. Mdr-Tb strains developing additional resistance to second-line drugs are described as extensively drug resistant Tb (Mdr-Tb), further compromising treatment options. This constitutes a major threat world-wide and in some settings up to one third of new cases are Mdr at first diagnosis.

the introduction of new diagnostic and treatment modalities for the management of drug resistant Tb has made a significant contribution to enable earlier diagnosis of mdr-Tb and more effective treatment in cases with limited therapeutic options. Yet, the programmatic management of mdr-Tb is still a major challenge and needs highly complex public health intervention.

The development of reliable and rapid molecular technologies particularly the GeneXpert MTb/rif assay since 2011 has revolutionised the management of mdr-Tb, providing a way to tailor appropriate drug regimen early in the treatment.

The sequencing of the genome of mycobacterium tuberculosis now provides us with perhaps the most important single piece of information to find new drugs, vaccines and diagnostic methods.

Until new drugs become available, the best hopes lie in a more rational approach to managing existing agents. If facilities are available, then culture and sensitivity can be done. The treatment of mdr-Tb should be supervised by an expert centre.

Mdr-Tb is difficult to treat requiring expensive 2nd line drugs for at least 18 months. Second-line drugs are less effective than first-line drugs, and are more likely to cause adverse effects. Cure rates of mdr-Tb varies 60% in Hongkong to as low as 5% in Russia. Similarly, there is a large variance in the incidence of mdr-Tb. Access to quality assured DST is a critical component of Mdr-Tb treatment. It is also important to be familiar with the prevalence of drug-resistance in new patients, as well as in different groups of retreatment cases. This data is often obtained from an analysis of a countries drug surveillance data [drs]. Bedaquiline and delamanid are the first drugs since the introduction of rifampicin in the late 1960s to be released specifically for the treatment of mdr-Tb.

As far as the risk factors are concerned, the highest rates of mdr-Tb are found in previously treated patients. HIV is the biggest risk factor for tuberculosis, increasing the risk of disease 100-fold. In the presence of HIV infection mdr-Tb has a very high mortality. This imposes a heavy strain on the health systems resulting in increased number of re-treatment cases causing an increase of drug resistance in the region.