Multidrug resistant Tuberculosis: Can it be cured?

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Renowned Professor, Adrian Martineau from Queen Mary University stated: "Multi-drug resistant tuberculosis (TB) is on the rise globally." It requires exhaustive treatment and is very difficult to treat as compared to standard TB[1].

On 26th September, the United Nations inaugurated a plan to increment 13 billion US dollars per year in hopes to uproot Tuberculosis by the end of year 2030. After HIV, it stands as the most common contagious disease with 10 million emerging occurrences detected and 1.6 million deaths occurring in 2017[2]. In over 450,000 of the new cases, 25% were found to be antibiotic-resistant tuberculosis[3].

According to the published data in *The Lancet Infectious Diseases*, some South African species of Mycobacterium tuberculosis (the causative organism) have a certain combination of mutations leading to their resistance towards two basic antibiotics recommended in the DOTs regime: Rifampicin and Isoniazid. Researchers also detected that the mutations were probably also causing lowered affinity towards Bedaquiline, the prevailing remedy in use for cases of multidrug-resistant (MDR) tuberculosis[4].

However, recent studies show that multidrug-resistant TB can still be cured and points to potential effective treatment design. According to a global fundamental survey broadcasted in the journal *PLOS Medicine,* children suffering from multidrug-resistant tuberculosis (MDR-TB) are now curable.

"An estimated 32,000 children develop multidrug-resistant tuberculosis (resistant to the two main TB drugs, namely isoniazid and rifampicin), each year. Treatment for MDR-

TB is of a longer duration and requires drugs that are more toxic. These regimens are frequently hard to tolerate, particularly in children, due to the length of treatment, drug toxicity and the lack of child-friendly formulations," comments Prof. Anneke Hesseling of Desmond Tutu TB Centre, Faculty of Medicine and Health Sciences, Stellenbosch University. "To date, little has been known about the optimal treatment for these children. This review therefore gives vitally important information as to potential outcomes and some very good news for the TB field."

"Treatment was successful in only 56% of children with bacteriologically confirmed TB who were infected with HIV who did not receive any antiretroviral treatment during MDR-TB therapy," disclosed Hesseling, "compared to 82% in children infected with HIV who received ART during MDR-TB therapy."

"This highlights the urgent need for ART in these children, which should be a priority in our setting, where rates of HIV/TB coinfection are so high," she added on[5].

Another study displays the anticipation of Vitamin D utilization in the hope to prevent lethal TB infection. "Our study raises the possibility that vitamin D -- which is very safe and inexpensive -- could benefit this hard-to-treat group of patients by taking a novel approach to their treatment. By adding vitamin D to antibiotic treatment, we can boost the immune system to help the body clear TB bugs, rather than relying on antibiotics on their own to kill the bacteria directly."

As pointed by an article in the *European Respiratory Journal*, the survey party collected data from 1,850 TB patients who were currently involved in clinical trials occurring in eight countries (UK, Pakistan, Bangladesh, India, Indonesia, Mongolia, Republic of Georgia and Guinea Bissau). Then an investigation was run to

determine which group responds to Vitamin D administration.

When given with antibiotic regimes, vitamin D was found to quicken the TB clearance specifically in patients with MDR TB, although no stimulation of TB clearance was witnessed when observing the entire study population as a whole.

The vitamin D administration was also noticed to be safe at the amounts given, with no occurrence of major adverse events[6].

Conclusion:

Although the causative agent of tuberculosis is gaining much resistance to chemical therapies, new advancements are being made to counter this dilemma and all hope is not lost.

References

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