Short Communication

Doxycycline- A new tool in the armamentarium against the oldest known infection to mankind

Sankalp Yadav[1],*, Gautam Rawal[2]

[1]Dept. of Medicine & Tuberculosis, Shri Madan Lal Khurana Chest Clinic, Moti Nagar, NDMC, New Delhi, India
[2]Dept. of Respiratory Intensive Care, Max Super Specialty Hospital, Saket, New Delhi, India

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The developing world is having a number of issues related to healthcare.[1] The situation in some of these countries is so grave that the population at large is lacking access to basic healthcare facilities.[2] The diseases that have been commonly responsible for such situations are tuberculosis (TB), HIV, malaria, etc.[3] TB is a public health problem.[4] The disease is known to mankind for a long time and the first reports of this bacterial infection date to three million years ago.[5] Globally the disease causes large-scale morbidity and mortality.[4] The WHO global report of the year 2020 estimated that ten million people developed active TB disease in 2019, with 1.4 million mortalities.[6] The highest burden lying in WHO regions of South-East Asia, Africa, and the Western Pacific.[6]

The disease as detailed in the medical literature is a contagious, infectious disease, due to the bacterium Mycobacterium tuberculosis and has always been a major challenge over the course of human history, due to its severe social implications.[5] The management of TB involves the use of drugs that are associated with multiple adverse effects and the treatment regimen is usually six months.[7] The high pill burden, adverse drug reaction, social stigma, etc. are some of the common issues associated with TB management.[8] The development and inclusion of newer drugs like Bedaquiline, Pretomanid, and Delamanid have given a ray of hope for the national TB elimination programs to end TB by 2030.[9,10] However, with the development of mutations leading to resistance in the bacteria and poor tolerance of these drugs added up by dismal patient compliance and psychosocial support, the goal of ending TB by 2030 looks like a distant dream.

Recently reports of a common antibiotic Doxycycline being proposed in the management of TB have come.[11] In this research on 210 TB patients, it was found that there were higher levels of enzymes called matrix metalloproteinases (MMPs).[11] It's known that most infectious TB patients had very high MMP levels.[12] These high MMP levels ultimately caused severe lung damage.[12] As these MMP digest the collagen, a major structural protein in the body that is responsible for maintaining the lung structure.[12] Further, based on studies on human cell and animal models they proposed that the use of Doxycycline in these patients who were given the drug along with the standard TB regimen could have less lung damage as the levels of MMP might be less due to the inhibitory action of the Doxycycline on the MMP enzymes.[11] The loss of collagen leads to the development of lung cavities, which harbors the bacteria and common anti-TB drugs do not fully reach these cavities thereby resulting in poorer outcomes.[13] The latest findings could be a boon to the researchers working towards a better and more effective anti-TB treatment. However, as mentioned earlier the study lacks complete clinical trials and until the same is achieved

* *Corresponding author.*
E-mail address: drsankalpyadav@gmail.com (S. Yadav).

we could only hope for a more effective anti-TB treatment.

The use of host-directed adjunctive therapies which could help modulate the host immune response to make the anti-TB drugs more effective is the need of the hour and the latest reports of Doxycycline, a tetracycline antibiotic, being one of such drug has raised hopes. Doxycycline is a cheap, safe, and widely available drug throughout the developing world, and thus could be a potential new drug in the management of TB especially in underprivileged countries.

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Author biography

Sankalp Yadav, GDMO-II

Gautam Rawal, Attending Consultant