

Current Treatment of Tuberculosis

Patil JS*

V. T's Shivajirao S Jondhle College of Pharmacy, Thane, Maharashtra, India

*Corresponding author: Jagadevappa S Patil, V. T's Shivajirao S Jondhle College of Pharmacy, Asangoan, Thane-421 601, Maharashtra, India, Tel: +91-9448816812; E-mail: pharmajspatil@gmail.com

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Editorial

Introduction

In the latter half of the 20th century because of immigration, HIV/AIDS, and the neglect of tuberculosis (TB) control programmes, the incidence of tuberculosis declined in North America and Western Europe [1,2]. One vital factor in curbing the increase of tuberculosis is the instigation of proper treatment that not only encompasses an effective regimen but also ensures compliance with and response to treatment. This review highlights current treatment recommendations for tuberculosis.

Historical Background of TB

TB has co-evolved with humans for many thousands of years and is one of the most ancient diseases of mankind [3]. The oldest known molecular evidence of TB was detected in a fossil of an extinct bison (Pleistocene bison), which was radiocarbon dated at $17,870 \pm 230$ years [4]; and in 9000, year old human remains which were recovered from a Neolithic settlement in the Eastern Mediterranean [5]. Although as early as 1689, it was established by Dr. Richard Morton that the pulmonary form was associated with "tubercles," due to the variety of its symptoms, TB was not identified as a single disease until the 1820s and was eventually named "tuberculosis" in 1839 by J. L. Schönlein [6]. In 1882, the bacillus causing tuberculosis, *Mycobacterium tuberculosis*, was discovered by Robert Koch; and for this discovery, he was awarded Nobel Prize in physiology or medicine in 1905 [7].

In spite of newer modalities for diagnosis and treatment of TB, unfortunately, millions of people are still suffering and dying from this disease. TB is one of the top three infectious killing diseases in the world [8]. Even though tubercle bacilli was identified nearly 130 years ago, a definitive understanding of pathogenesis of this disease is still deficient [9,10]. Although it can affect people of any age, individuals with weakened immune systems, e.g., with HIV infection, are at increased risk. Since the immune system in healthy people walls off the causative bacteria, TB infection in healthy people is often asymptomatic. This bacterium lives and multiplies in the macrophages, thus avoiding the natural defense system in the patient's serum.

Treatment of TB

The history of TB can be traced back to Vedic period and Ayurvedic scripts revealed about it. Fight against TB in India can be broadly divided into two major periods: early period, before the invention of diagnostic tools such as X-ray and chemotherapy, post-independence

period, during which, ongoing WHO-assisted TB control program was initiated nationwide [11].

During the early period, due to the absence of chemotherapeutic agents and diagnostic tools such as X-ray facilities, a popular rationale for sanatoria was identified as a regimen that includes sufficient rest, good nutrition, open fresh air and high altitude offered the best chance to improve the immune system of TB sufferers. In 1906, the first open air sanatorium was established in Rajasthan for the treatment and isolation of TB patients followed by this first TB dispensary in the year 1917 in Bombay [12]. During 1925, chest radiology started playing role in detection of deep-seated area of TB lesions. Next, in 1948, BCG (Bacillus of Calmette and Guérin) a vaccine production was started in Madras (now Chennai) in support of WHO and UNICEP. India started a mass BCG campaign in 1951 to control the TB infection. This was the first nationwide campaign against TB [13]. Post independence period can be conveniently mentioned with two phases; Direct TB program and short-course chemotherapy. Indian government started District TB program in 1961 in Andhra Pradesh state with the aim at integration of TB control schemes with the existing health services [14,15]. After establishing the district TB program, in the year 1962; Indian government launched the National TB Control Program (NTCP). Between the period of 1944 to 1966 the effective drugs such as streptomycin (1944), Para amino salicylic acid (1946), Thiacetazone 91950), Isoniazide (1952) and Rifampicin (1966) against TB started becoming available [15]. The TB Research Center (TRC) in Madras was established by Indian government in 1956 under the auspices of Indian Council for the Medical Research (ICMR), The local government, the WHO and the British Medical Research Council (BMRC) followed by establishment of National Tuberculosis Institute (NTI) in 1959 at Bangalore [16]. Revolutionary changes in the treatment of TB were appeared in the 1970's owing to availability of two well-tolerated and highly effective drugs, Rifampicin and Pyrazinamide. These drugs allowed short course chemotherapy by simplified treatment and its duration.

Current TB Treatment as Per WHO

In 1992, Government of India, together with the WHO and the Swedish International Development Agency (SIDA), reviewed the national program and concluded that it suffered from managerial weaknesses, inadequate funding, over-reliance on x-ray, nonstandard treatment regimens, low rates of treatment compliance and completion and lack of systematic information on treatment outcomes [17]. Around the same time, in 1993, WHO declared TB to be a global emergency and devised the DOTS strategy and recommended that all countries adopt this strategy.

Challenges Ahead

Even today in India, two deaths occur every three minutes from TB. Major challenges to control TB in India include poor primary health-care infrastructure in rural areas; unregulated private health care leading to widespread irrational use of first-line and second-line anti-TB drugs; spreading HIV infection; poverty; lack of political will; and, above all, corrupt administration. A collaborative effort is in progress between NTCP and National Rural Health Mission (NRHM), which is a reform initiative of which the goal is to improve primary health care in rural areas. In addition to this, NTCP has established several initiatives in coordination with the private sector and the Indian Medical Association (IMA) to improve TB care. Surprisingly, in India, people are still under the impression that TB is a disease of poor people, mostly of those living in slums. The rich and affluent persons need to know that their cooks/servants/drivers can be asymptomatic carriers of this deadly disease, right in their mansions, and hence they can potentially get infected with TB even without stepping into these slums.

Conclusion

As is evident from the above discussion and to make this planet TB free, with the present effort we have come a long way in our fight against this deadly disease, we still have miles to go. As per the vision of WHO through its "STOP TB" strategy, planning eliminate TB as a public health problem from the face of this earth by 2050 [18]. It is very much essential to intensify our fight against TB, we need to further strengthen our surveillance programs to accurately estimate the burden of all kinds of TB. There is dire need to regulate the rational use of first- and second-line anti-TB drugs. They should absolutely not be sold as *over the counter* (OTC) drugs. The immediate challenges for the control of tuberculosis include developing curative regimens that are shorter or that require patients to take drugs less frequently. Ideally, future regimens would have both features- that is, a once weekly regimen requiring that patients be treated for only four months. Such regimens would greatly facilitate monitoring compliance [19].

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