**TB immunization**

 The threat of TB has rampaged over the globe for more than a millennium and still is the major public health problem worldwide. Although efficacious drugs are available for cure of TB, increasing incidence of drug resistance, concurrent HIV infection & diabetes render the treatment options less satisfactory, thus hindering the progress of national TB programmes.

 TB control measures require a multipronged approach with a combination of better drugs, rapid and accessible diagnostic services and vaccines or immunization.

 Vaccination strategies against TB have been predicted by mathematical models to accelerate the path to TB Elimination more rapidly.

 Till date, we have a single approved TB Vaccine since 1921, the BCG Vaccine which has its own demerits than merits in high TB prevalence areas of the world. Paradoxically, TB vaccine development has not shifted gears over the last 140 years in contrast to the COVID 19 wherein more than a dozen approved vaccines with documented efficacy have been developed in a span of two years!

 As we commemorate the 100th anniversary of introduction of BCG vaccine, it is essential that the scientific community focuses its attention to the development of more efficacious next generation vaccines.

**An ideal TB vaccine should achieve either of the following:**

1. **Prevention of infection**: Vaccine does not allow the bacteria to establish itself in the host.
2. **Prevention of disease:** Vaccine contains the bacteria and prevents reactivation after infection.
3. **Prevention of recurrence / relapse:** Vaccine prevents relapse after cure from TB disease.

Vaccines can be broadly grouped as:

**Pre exposure vaccines**: Which prevent infection like the BCG vaccine administered at birth.

**Post exposure vaccines**: There are the need of the hour as nearly ¼th of global population is already exposed to TB infection.

 The history of TB vaccination development is traced back since the discovery of TB bacilli in 1882. Various scientists & microbiologists made futile attempts to develop a safe and immunogenic vaccine against TB, until in 1921, when Calmette and Guerin established a live, attenuated stable vaccine called ‘BCG’. It was targeted primarily at newborns to reduce childhood mortality.

With increasing deployment of BCG vaccine, it soon proved its value for neonatal vaccination yet, later its drawbacks became increasingly clear. The current position of BCG vaccine will be fair to say that it protects against EPTB in infants but is inefficient against pulmonary disease in all age groups.

 Hence BCG vaccination has little impact on incidences of TB morbidity and mortality. The scientific community was well aware of this, yet the interest to develop next generation vaccines was not aroused because of negligible funding.

 Fortunately, amidst this challenge, we have a light of opportunity shown by COVID 19 vaccine R&D strategies. It is hoped that the successful R & D platforms and the virtually unlimited funding for COVID 19 vaccines will provide helpful guidance for improved TB R&D from preclinical to clinical studies followed by accelerated deployment.

 Thus, towards the end of this decade, some of the vaccine platform in TB include: Subunit vaccines, killed and viable whole cell vaccines, viral vectored vaccines, Recombinant BCG booster vaccine etc. Of these ‘VPM 1002’ is a genetically modified BCG, currently in phase III trials across centers in India and marketed by Serum Institute of India, Pune. Also, a dozen other vaccines are entering clinical trial assessments, making the TB immunization / vaccination scenario brighter than before. Yet, the goal of TB elimination remains challenging.

I would like to quote the statement by the ‘Independent panel 2021’ reports on behalf of WHO: *‘our message for change is clear: No more pandemic. If we fail to take this goal seriously, we will condemn the world to successive catastrophes. The ask is large and challenging but the price is even larger and more rewarding! With so many lives at stake, now is the time to resolve’.*

Although this message was for COVID 19, the admonition should not be restricted to the newly emerging diseases but extended to the current glooming threats of Drug resistance TB as well. Thus, the medical and scientific community, researchers, public health specialists, corporate sponsors, philanthropists and the world governments should join hands in TB vaccinations development so as to END TB by the turn of the century at least!

**Thank You!**

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