Evolution of TB Treatment

TB is an infectious diseases caused by a bacterium, Mycobacterium tuberculosis. It spreads through the air by a person suffering from TB. A single patient can infect 10 or more people in a year. The causative agent of the disease was discovered by Sir Robert Koch way back in 1882. Since then TB treatment has seen different eras from only supportive treatment through sanatoria, monotherapy, combination therapy, domicillary treatment, long term (conventional treatment), short course treatment, intermittent and now finally to a now-a-days popular DOTS. As no drug was available against TB till middle of the 20th century, the main line of treatment was good food, open air and dry climate. Till the advent of adequate chemotherapy, treatment took a second place to diagnosis and prognosis. In 1939, the Tuberculosis Association of India recommended the Organized Home Treatment Scheme was the best compromise under the prevailing circumstances.

Pre Chemotherapy Era

- **Sanatorium Treatment**
- **Collapse Therapy**
- **Surgical Resection**

Sanatorium Treatment

The treatment was in form of supportive agents like calcium, cod-liver oil, heavy metal salts, that used to increase the body immunity to overpower TB bacteria. This was provided in the form of sanatorium treatment which were usually established in hilly open areas and fresh air environment wherein complete rest and good diet were thought to be effective. Some people thought, pollens from pine trees in hills were also having some therapeutic role, which later on proved to be a myth. About 50% of the patient in that era used to get cured by their own immunity. 25% used to die and the similar number used to continue as chronic carrier.

Collapse therapy

M.tb bacilli are aerobic and thrive in walls of cavities which get air from bronchi communicating with cavities. By collapsing the lung with cavities, the bacteria were deprived off oxygen and used to die. The methods used were reversible (artificial pneumothorax/ pneumo-peritoneum) or irreversible (phenic crush and thoracoplasty).

Even after availability of chemotherapy, the reversible collapse therapy was used in MDR cases to kill resistant bacteria or haemoptysis to collapse the cavities.
Surgical Resection

If there was long standing, thick walled cavities, which could not be collapsed by collapse therapy, surgical reaction in form of segmentectomy, lowbectomy and even pneumonectomy was also practiced.

Chemotherapy Era

- Monotherapy
- Combination therapy
- Conventional treatment
- Short Course Chemotherapy (SCC)
- DOTS

Monotherapy

The first drug found to be effective against TB was streptomycin discovered by Walksman in 1942, who used it as a single drug for management of TB meningitis for his own daughter. The drug demonstrated good initial response but the girl died later on due to development of resistance which led the researcher to use combination of drugs.

Combination therapy

After development of INH in 1952, SM and INH were tried and that too demonstrated failure in some cases leading to use of SM, INH and PAS in initial phase to overcome any natural resistant and use of INH and PAS in continuation phase.

Conventional treatment

This was for 18 to 24 months with three drugs in initial phase and two drugs in continuation phase. The treatment was on domiciliary basis i.e. patient used to collect monthly supply of drugs to be taken at home.

Short course chemotherapy (SCC)

Chemotherapy of TB underwent revolutionary changes in the seventies owning to the availability of two well-tolerated and highly effective drugs ◆ Rifampicin and
Pyrazinamide. Because of these drugs short course chemotherapy (SCC) was possible to simplify TB treatment and reduce its duration. Discovery of Rifampicin in 1967 is considered as one of the greatest achievements in the history of development of anti-TB drugs. After its discovery no new drug has been found so far.

Important studies conducted by East Africa, BMRC and TRC studies tried different combination of drugs for various duration and they concluded the use of Rifampicin + INH + Pyrazinamide for two months followed by Rifampicin and INH for four months was effective schedule. Other conclusions were Rifampicin has to be used for full duration and there can’t be any schedule of less than six months with the available drugs.

Later on, when drug resistance surveys were conducted, it was decided that in countries with INH resistance more than 10%, four drugs (H+R+Z+E) should be used in the initial phase.

**Intermittent therapy**

For the first time in 1950, TRC Chennai tried the use of streptomycin + INH twice a week for one year and found it was effective. This did not became popular at that time because drugs were given unsupervised and irregular patients used to develop resistance.

**The same intermittent schedule tried first time in India is now the basis of DOTS.**