

# Scenario of Immunotherapy in Cancer Treatment with Special Referance Lung Cancer in India

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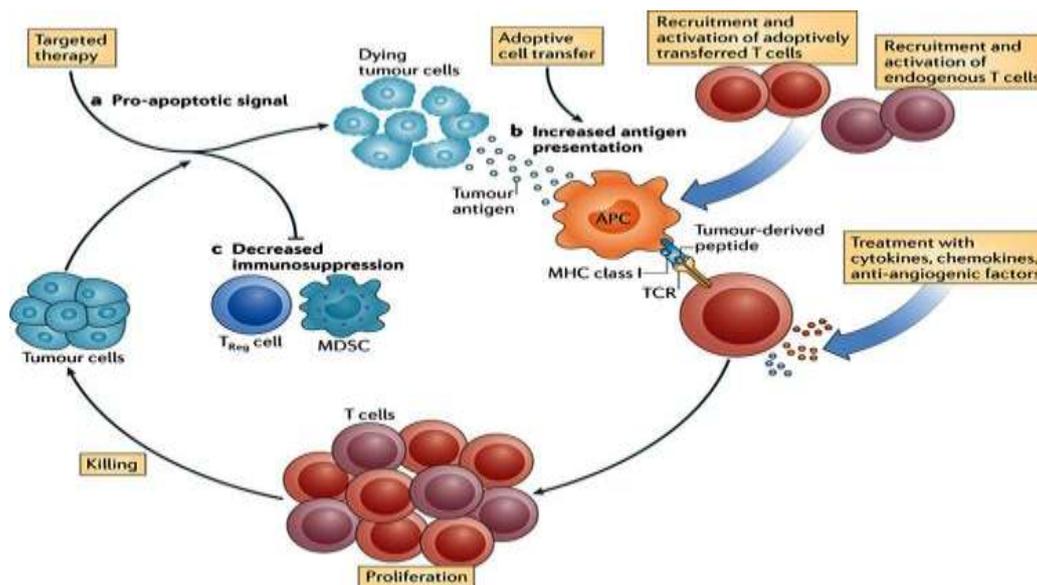
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In India, non-communicable diseases (NCDs) are estimated to account for 63% of all deaths and cancer is one of the leading causes (9%) based on 2016 statistics, published by World Health Organization (WHO). Again WHO also states that India has a cancer mortality rate of 79 per 100,000 deaths and accounts for over 6 percent of total deaths. According to the National Cancer Registry Programme Report 2020, Cancer causes in India are likely to increase the nearest 15.6 lakhs by the year 2025, that may be regarded as 12% increase from current estimated cases, based on current trends. Antibody Drug Conjugates (ADC) shows increasing trend over time 9.5% of all lung cancer in 2008 to 36.4% in 2017 and 35.9% in first quarter of 2018 (Mohon A. et al. ,2020). In India, Lung Cancer constitutes 6.9% of all new cancer cases and 9.3% of all cancer related death in both sexes (Malik P.S. et al. 2015).

In recent times, there are several treatment methods against cancer. Immunotherapy is new one to fight against cancer. Immunotherapy is very much effective in the cancer treatment especially in lung cancer which is able to give a great outcome in survival rate. It enables our own immune system to detect and fight against cancer through

strengthening our immune system. The ability of immune system to fight cancer can be 'boosted' using various technologies. This field of anticancer therapy is called 'cancer immunotherapy (Gupta V.G.). Cancer immunotherapy has become an effective procedure alone or along with other treatments like surgery, chemotherapy, radiation therapy etc for cancer patients through either boosting the host immune responses or counteracting signals produced by cancer cells which suppress immune responses (Chen G. et al., 2018). There are several types of immunotherapy used in cancer treatment in recent days like treatment vaccines, monoclonal antibodies, adaptive cell transfer, checkpoint inhibitors etc.

Cancer-immunotherapy was discovered in 1970s with the onset of bladder cancer therapy with BCG (Zdimerova H et al.) and IFN therapy in malignant melanoma. Various immune therapies such as IL-2 cytokine used in solid tumors like melanoma were discovered (Stanculeanu D.L. et al.). Non cell lung cancer, Hodgkin's lymphoma and renal cell sarcoma have shown encouraging response in patients undergoing immunotherapy treatment of this type.



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Testing for immunotherapy benefits has been launched in 2017 by Positive Bioscience laboratory, Mumbai in India. The Immuno-Oncology Society of India (I-OSI) was launched on February 24, 2018 and registered on November 2, 2018 to become the first legal entity in this regard in the country which promotes and advances scientific knowledge and research in immunology (journal of immunotherapy and precision oncology, 2019).

The Global Cancer Observatory (GLOBOCAN) report reflects that 5.9% in 2015, 5.9% in 2018 and 5.5% in 2020 lung cancer cases are found among all new reported cancer cases in India. This committee also demands that lung cancer occurrence in males is 15% and females is 14% among all cancer cases. Mortality of lung cancer is 31% in males and 26% in females among all cancer cases in India.

Lung Cancer Cases		
Sex	Occurrence	Mortality
Male	15%	31%
Female	14%	26%

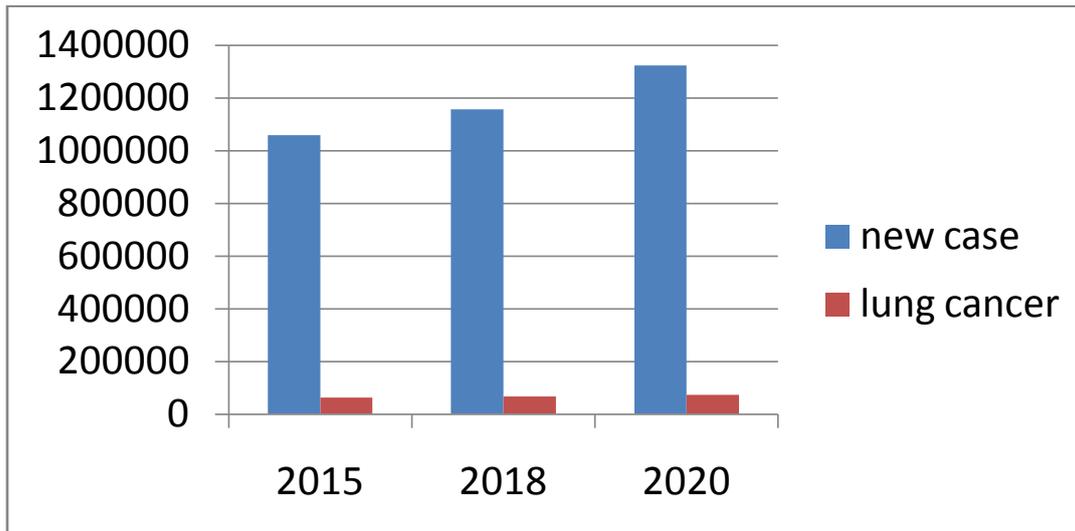
Source- GLOBOCAN 2020

Table : Showing the number of lung cancer cases against the total new cases in India			
Year	New case	Lung cancer case	Percentage
2015	1060889	62327	5.87
2018	1157294	67795	5.86
2020	1324413	72510	5.47

Source- GLOBOCAN

From the above table it is observed that, the new cases and lung cancer cases have increased over the years, but the percentage of lung cancer is

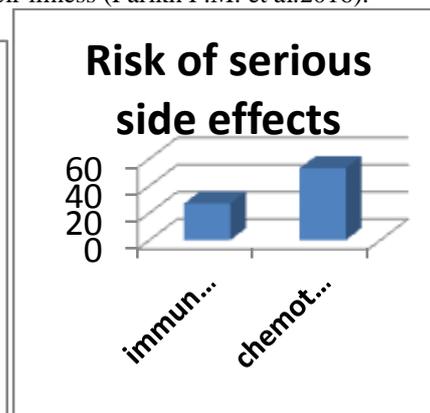
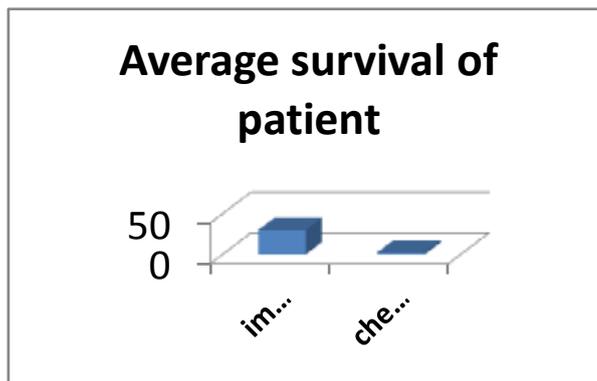
being decreased too much slightly. Figure in the above table are depicted in the following bar diagram.



In 2018, a study among sampled 606 people with advanced and untreated non-small cell lung cancer, patients were randomly chosen to receive chemotherapy with immunotherapy with a placebo. Among those who received immunotherapy, the estimated survival rate was 69.2% at 12 months (Biggers A. 2021).

The average survival rate of the patients under immunotherapy is more than double as compared to those who are under chemotherapy. At the same time, the risk of serious side effects was

almost half in the immunotherapy arm compared to the chemotherapy arm in a study with mutation-negative stage 4 lung cancer patients (Reck M. et al.2016) so we can say that immunotherapy is much more effective than chemotherapy. Over the last 10 years the survival in lung cancer has increased from a median overall survival of 11 months to an overall 5-year survival rate of 17.8% and even today, about 75% of lung cancer patients will still require chemotherapy at some time during their illness (Parikh P.M. et al.2016).



Source- Gandhi L. et al., 2018

### Immunotherapy in India – where are the challenges?

As developing nation, India still do not have the necessary momentum to push for the manufacturing or distribution of home-grown immunotherapy drugs. In India, manufacturing & distribution are yet to catch up to levels where it can enable result-oriented research – expecting immunotherapy to work flawlessly, is an illusion. Immunotherapy works really well but it does not work for every type of cancer, and it does not work

for every patient. Immunotherapy is effective for only 20-30% patient (Positive Bioscience 2019).

“The reality is, immunotherapy is incredibly valuable for people who can actually benefit from it, but there are far more people out there who don’t benefit at all” – Dr Vinay Prasad, oncologist at the Oregon Science and Health University

### What is the cost of immunotherapy in India?

Immunotherapy cancer treatment is too much expensive (near about Rs. 1crore per year) to Indian nations as per capita income of India nation is low. Again it is also proved that it is not necessarily very effective for every cancer patient.

The estimates from Global Burden of Disease (GBD) suggest that about 70 percent of all cancer deaths are now concentrated among low- and middle-income countries. Patient families will face great troubles to bear high expenses for immunotherapy treatment. Hope, the expenses against immunotherapy may decrease through the conditions development in the field of cancer-immunotherapy procedure, techniques and related or concerned matters.

Now this immune therapy is regarded as one of the last resort where conventional treatment like chemotherapy or any other means has failed, depending on the capacity to take the therapy.

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