Lung Cancer in Non-small cells: Its Epidemiology, Risk Factors, Treatment, and Survivorship

P. Padmavathi[1], D.Srinivasa Rao[2], Uppala Radhakrishna[3]

[1]*Department of Zoology,* [2]*Department of Biotechnology*
Acharya Nagarjuna University, Guntur, A.P., India,

[3]*Department of Obstetrics and Gynecology, Beaumont Research Institute*
Royal Oak, MI 48073, USA

***Abstract:-*Lung cancer arises from abnormal *epithelial cells* in the airways of the lungs. Epithelial *cells* cover all free surfaces in the body including the airways. It is the most common cause of cancer-related death worldwide, owing to its metastatic spread at the time of diagnosis. Disease symptom management in patients with advanced non-small cell lung cancer (NSCLC) is a critical aspect of therapy. The main objective of our study was to assess degree of risk factors, epidemiology, treatment and survivorship of the non-small cell lung cancer (NSCLC).**

I. INTRODUCTION

Lung cancer is a leading cause of cancer deaths in developed countries and is also rising at alarming rates in developing countries. This is the single most devastating cause of cancer-related deaths with approximately 1.5 million cases worldwide. Lung cancer is responsible for about one million deaths per year at present and it will rise to three millions per year by the year 2010. About 9 out of 10 cases of all lung cancers are the non-small cell type. Based on how the cells look under the microscope, NSCLC is usually one of 3 sub-types a) Squamous cell carcinoma b) Adenocarcinoma and c) Large cell (undifferentiated) carcinoma. A risk factor is anything that affects a person's chance of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors like smoking can be changed (1). Others like age and family history can't be changed. However, everyone does not get the disease even having one or more risk factors. But having a risk factor or even many risk factors, does not mean that you will get the disease. And some people who get the disease may have few or no known risk factors (3). Incidence and mortality from lung cancer in females is rising while it is declining in the males. Currently, lung cancer accounts for 20% of all cancer related deaths in females. Of all newly diagnosed cases of lung cancer approximately 80% are non-small cell lung carcinoma (NSCLC). Young patients are very likely to be symptomatic having have adenocarcinoma and present with advanced disease. There is a changing trend of higher incidence of adenocarcinoma in young patients especially females who develop lung cancer at an earlier age. In addition to smoking, occupational exposure to carcinogens, indoor air pollution, dietary factors and a family history of cancer have recently been implicated in the causation of lung cancer. Even if a person with lung cancer has a risk factor, it is often very hard to know how much it may have contributed to the cancer. Several risk factors are likely to develop lung cancer such as smoking tobacco in the form of Smoking tobacco – including cigarettes, cigars and pipes Secondhand smoke (breathing in the smoke of others), Radon and Asbestos. Some people who get lung cancer do not have any clear risk factors (2).

II. EPIDEMIOLOGY

Lung cancer is a leading cause of mortality among men and women and accounts for 28% of all cancer deaths. Non-small cell lung cancer represents 80% of all lung cancers and has a grave prognosis (6). Disease prevalence rates are increasing rapidly during this century following the widespread adoption of cigarette smoking. Lung cancer mortality in females is increasing due to changing smoking habits (3).

The global burden of cancer continues to increase largely because of the aging and growth of the world population alongside an increasing adoption of cancer-causing behaviors, particularly smoking in economically developing countries. About 70% of all cancer deaths occurred in low- and middle-income countries. Deaths from cancer worldwide are projected to continue to rise to over 13.1 million in 2030. Lung cancer has become one of the world's leading causes of preventable deaths with high ratio in both males and females with incidence rates declining in both men and women from 2004-2008 (4). From 2004 to 2008, lung cancer incidence rates have decreased by 1.9% per year in men and by 0.3% per year in women (5). Gender differences in lung cancer mortality patterns reflect historical differences between men and women in the uptake and reduction of cigarette smoking over the past 50 years. India has a National Cancer Control Programme which was

established in 1975–76. This has contributed to the development of Regional Cancer Centres (RCCs), oncology wings in medical colleges and support for purchase of teletherapy machines. Indian Council of Medical Research's (ICMR) latest data on the 10 leading sites of cancer in Delhi shows that prevalence of breast cancer among women in Delhi stands at almost 27%, followed by cervix, whose recurrence is almost half of breast cancer cases at 14.6%. Among men, lung cancer is the most common at 10%, while 7% of all cancers are of the prostate (6).

III. RISK FACTORS

Lung cancer is a multifactorial disease –- that is, many factors work together to either cause or prevent cancer. Between 80 and 90% of lung cancers are due to smoking, yet 10% of men and 20% of women who develop the disease have never smoked. On the other side of the equation, many people who smoke do not develop lung cancer. Globally, lung cancers (including trachea and bronchus cancers) are the most common cause of death from cancer among men. This is also the case in five of the seven regional groupings including South East Asia. In India trachea, bronchus, lung cancers are the most common cancers found in men. At a rate of 85 age-adjusted DALYs per 100,000 population, lung cancer accounts for 7% of otal cancer DALYs in India (7). Deaths due to lung cancer are more than those due to colorectal, breast and prostate cancers put together. Incidence and mortality from lung cancer in females is rising while it is declining in males in developed countries.

Smoking is the most important contributory factor in the causation of lung cancer. In India, smoking of tobacco is mainly in the form of bidi, followed by cigarette, hukah, chillum and chutta. Bidis account for three quarter (77%) of the market of smoking tobacco and 48% of the whole tobacco market. According to National Family Health Survey carried out during 2005-06, prevalence of tobacco use was 57% in men and 10.8% in women. One third of men (33.4%) and 1.4% of women were cigarette/ bidi smokers. The number of adult current daily smokers is reported to be higher in the rural areas (31.3%) as compared to urban areas (21.5%). In addition, daily consumption of all forms of tobacco use was higher among the lower income quintile (41.8%) compared to higher income quintile (15.5%) and in the elderly population (43.9% among 65+ age group) compared to younger age group (14.7% among 18-24 age group) (8) . The relative risk of developing lung cancer is 2.64 for bidi smokers and 2.23 for cigarette smokers with 2.45 as the overall relative risk. Hukah smoking has also been associated with lung cancer with an odds ratio (OR) of 1.94 (95% confidence interval 0.85-4.44).

There is strong evidence of involuntary smoking and lung cancer risk in never-smokers, especially spouses of smokers. A meta-analysis of 41 studies in 2000 indicated that the relative risk of lung cancer for ever being exposed to environmental tobacco exposure at work was 1.16 (95% confidence intervals ((CI) 1.05–1.28)) in non smoker males and 1.2 (95% CI 1.12-1.29) in non smoker females exposed to their husband smoke. Risk increases with increase in exposure (9). An Indian study conducted in Chandigarh among non smoker, showed that environmental tobacco smoke exposure during childhood is strongly associated with the risk of later development of lung cancer OR of 3.9 (95% CI 1.9-8.2), the effect being mostly from cigarette smoke.The excess risk was observed with either a smoking father or mother. An increasing risk was found with increasing number of smokers and duration of exposure.

Certain occupations have shown to increase exposure to lung cancer. High risks were also observed among ship and dockyard workers OR of 2.87 (95%; 0.8-10) and hand wood workers OR of 2.88(95% ; 0.9-9.6) after adjusting for smoking (10).

Other risk factors of developing lung cancer include exposure to radon gas, asbestos, radioactive ores such as uranium, inhaled chemicals or minerals like arsenic, beryllium, cadmium, vinyl chloride, nickel compounds, chromium compounds, coal products, mustard gas, and chloromethyl ethers, diesel exhaust, air pollution. Prior history of lung cancer in the family increases its risk. The debilitated patients with compromised immune system and elderly over the age of 65 yrs are more prone to the disease (11).

IV. TREATMENT

The failure of early diagnosis is the major reason why lung cancer has the highest mortality rate among all cancers. Survival rate for patients with lung cancer is poor, only 15% of patients survive for 5 years after diagnosis (Cancer facts and figures, 2008). The prognosis of lung cancer refers to the chance for cure or prolongation of life (survival) and is dependent upon where the cancer is located, the size of the cancer, the presence of symptoms, the type of lung cancer, and the overall health status of the patient. Accurate staging of the disease is an important part of the management as it provides estimation of patient's prognosis and identifies treatment strategies (12).

Lung cancer has usually fatal consequences and unfortunately, management guidelines for lung cancers are provided in the developed world but not developing countries like India. In India, lung cancer is rarely detected at its early stages and it is often diagnosed at an advanced stage. Diagnosis at early stages where surgery could be offered is possible for 80% of all lung cancer cases in the western world where as it is only for less than 5% in India. It is argued that delayed diagnosis of lung cancer is because of the symptoms very similar to those of pulmonary tuberculosis (which is common in India) and most patients

receive anti-tubercular therapy for a varying time periods before a definite diagnosis of lung cancer can be made. O'Rourke and Edwards have shown that 21% of potentially curable lung cancer patients became incurable whilst waiting for treatment in UK (13). The median delays between the diagnostic and planning CT scans was 54 days, between the first hospital visit and starting treatment was 94 days and between the date of radiotherapy request and starting the treatment was 44 days (14). Moreover, should lung cancer be presumed, diagnostic facilities like fiberoptic bronchoscopy and fine needle aspiration cytology /biopsy are not available uniformly throughout India. For example: diagnostic facilities for cytology are available in less than ten rural areas in India. Surgery, radiotherapy and chemotherapy are the three treatment options available for the management of lung cancer. In the early stages of Non-Small Cell Lung Carcinoma (Stage I to IIIA), surgery if feasible is the treatment of choice (15). The five-year survival rate after surgery is as follows: Stage I: 60%-70%, Stage IA: 80%, Stage II: 35-40%, Stage IIIA: 10-15%.

CONCLUSION

Recent studies have suggested that among patients with NSCLC, a higher burden of lung cancer-related symptoms may adversely affect both response to treatment and overall survival. There is a need of new drugs with a biologically-based approach for drug development with to more efficacious agents which, alone or in combination with established therapy would result in more durable and prolonged survival times for non-small cell lung cancer (NSCLC) patients.

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