

Clinico-pathological Profile of Bronchogenic Carcinoma Among Females in North India

R. Prasad¹, A.N. Srivastava² and S.K. Verma²

Vallabhbhai Patel Chest Institute¹, Delhi and Department of Pulmonary Medicine, King George's Medical University², Lucknow (Uttar Pradesh), India

Abstract

Objective. The present study was undertaken to explore the clinico-pathological profile of bronchogenic carcinoma among females.

Methods. One hundred and twenty-four female patients with histopathologically proven bronchogenic carcinoma who were hospitalised in the Department of Pulmonary Medicine, King George's Medical University, Lucknow from July 1985 to February 2007 were retrospectively studied.

Results. Their mean age was 61 years; 12.9 % of these were less than 40 years of age. Of these, 79% of female patients of lung cancer were first regarded as pulmonary tuberculosis; 76% belonged to rural area. Use of biomass fuel and kerosene oil exposure was the predominant risk factors evident among the 116 non-smoker women. Adenocarcinoma was observed in 43.5%, followed by squamous cell carcinoma in 33.1% and the remaining 23.4% cases were small cell carcinoma. The majority (77.4%) of non-small cell lung cancer (NSCLC) patients had advanced stage disease (IIIb and IV) and 58 % of small cell lung cancer (SCLC) patients had limited disease and 42 % of SCLC patients had extensive disease at the time of diagnosis.

Conclusion. Adenocarcinoma was found to be the most common histopathological type of bronchogenic carcinoma among these females. [Indian J Chest Dis Allied Sci 2015;57:161-163]

Key words: Lung cancer, Adenocarcinoma, Squamous cell carcinoma, Small-cell carcinoma, Biomass fuel.

Introduction

Lung cancer is the leading cause of deaths in developed countries and also rising at alarming rates in developing countries.¹ The worldwide incidence of lung cancer is 14% whereas it constitutes 6.8% of all cancers in India.² Both incidence and mortality from lung cancer in females is also increasing while it is declining in males in developed countries.³ Lung cancer is the leading cancer seen in both genders in three of the Urban Cancer Registries (Bhopal, Delhi and Mumbai) in India.² Tobacco smoking is an important risk factor for lung cancer among females in India.⁴ Biomass fuel, kerosene and a mixture of these, has also been implicated as a risk factor for lung cancer in women.⁴⁻⁷ About 95% of the rural population in India still relies primarily on biomass fuels (dung, crop residues, and wood) for cooking.⁸ The present study was done to document the clinic-pathological features of female patients hospitalised with bronchogenic carcinoma in the region of Uttar Pradesh, India.

Material and Methods

One hundred and twenty-four female patients with lung cancer who were diagnosed in the Department of Pulmonary Medicine, King George's Medical

University, Lucknow from July 1985 to February 2007 were studied retrospectively. Only those patients in whom the diagnosis of lung cancer was confirmed on cytological or histological examination of the material obtained from the primary site or a metastatic lymph node/ pleural fluid with obvious primary lesion in the lungs detected radiologically were included. The records of all the 124 patients were analysed with respect to age, sex, clinical presentation, pathological characters and risk factors. The criteria used for diagnosis of adenocarcinoma were round to oval with large, round, hyperchromatic nuclei, often arranged in small acini or were lying scattered. No special stains were needed to confirm the diagnosis in these cases as all these were well differentiated. No immunohistochemistry (IHC) was done.

Results

A total of 816 cases of lung cancer were diagnosed in our hospital from July 1985 to February 2007. Of these 124 (15.1%) were females. Their age ranged from 30 to 68 years; 16 (12.9%) were <40 years and 108 (87.1%) were >40 years of age. Of the 124 women with lung cancer, 116 (93.5%) were non-smokers and 8 (6.5%) were smokers. All of the female smokers (n=8) smoked *bidi* exclusively; their smoking index was <150. Thirty-

[Received: September 17, 2013; accepted after revision: July 7, 2015]

Correspondence and reprint requests: Dr S.K. Verma, Professor, Department of Pulmonary Medicine, King George's Medical University, Lucknow-226 003 (Uttar Pradesh), India; E-mail: drskverma@rediffmail.com

six (29%) of the lung cancer patients had history of exposure to environmental tobacco smoke (passive smoking). Biomass fuel was the predominant fuel used for cooking in 46 (37%) followed by kerosene in 18 (14.5%) and mixed usage was evident in 16 (13%) of these patients.

The average duration of illness at the time of diagnosis was 8.4 months. Cough (94%) was the most common symptom, followed by chest pain (80%), breathlessness (70%), anorexia (89%), expectoration (60%), haemoptysis (40%), hoarseness of the voice (30%) and facial swelling (14%). Ninety (79%) female patients with lung cancer were first regarded as pulmonary tuberculosis and were given antituberculosis treatment. Peripheral lymphadenopathy was noted in 38%, anaemia in 42%, clubbing in 12% and superior vena cava syndrome in 11.8% of patients.

All patients had chest radiography that showed an abnormality in more than 90% of cases. The main diagnostic modality used was fiberoptic bronchoscopy followed by computed tomographic (CT) guided fine needle aspiration cytology (FNAC)/biopsy of intrathoracic mass, pleural fluid cytology, pleural biopsy and FNAC of peripheral lymph node.

Lung cancer was seen in 68% of patients on the right side and in 32% on the left side. Adenocarcinoma was observed in 43.5%, followed by squamous cell carcinoma in 33.1% and the remaining 23.4% cases were small cell carcinoma (Figures 1, 2 and 3). The majority (77.4%) of non-small cell lung cancer (NSCLC) patients had advanced stage disease (IIIb and IV) and 58% of small cell lung cancer (SCLC) patients had limited disease and 42% of SCLC patients had extensive disease at the time of diagnosis.

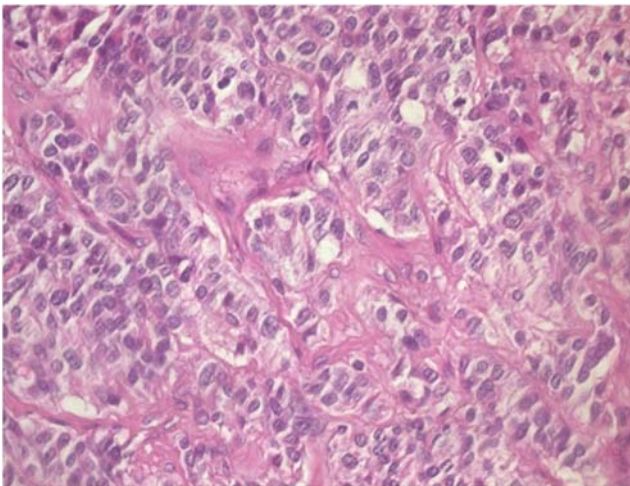


Figure 1. Photomicrograph showing nests of atypical cells separated by fibro-collagenous stroma. These atypical cells have high nucleo-cytoplasmic ratio, hyperchromatic nuclei, clumped chromatin, prominent nucleoli and moderate amphophilic cytoplasm. These features are characteristic of adenocarcinoma.

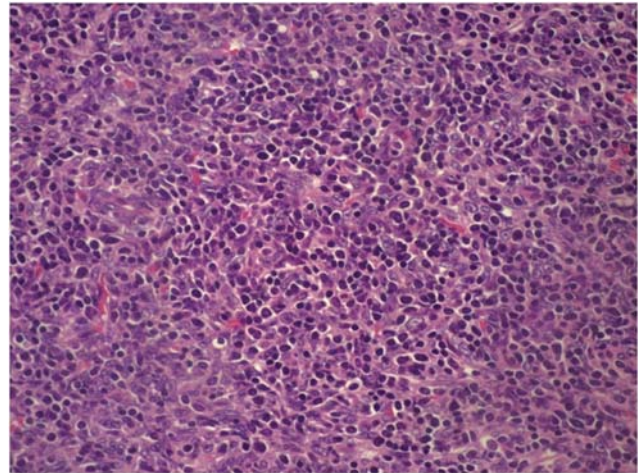


Figure 2. Photomicrograph showing sheets of atypical small round cells. These cells have high nucleo-cytoplasmic ratio, finely granular hyperchromatic nuclei, nucleoli are inconspicuous and scanty cytoplasm. These features are characteristic of small cell carcinoma.

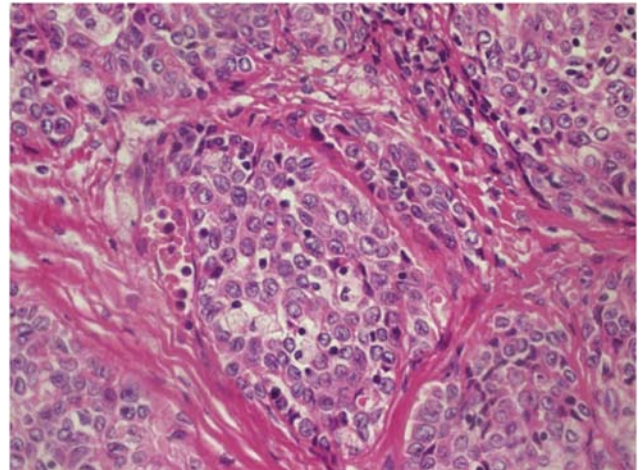


Figure 3. Photomicrograph showing sheets and nests of atypical cells. These cells have high nucleo-cytoplasmic ratio, hyperchromatic nuclei, clumped chromatin and abundant eosinophilic cytoplasm. Surrounding area shows fibro-collagenous stroma and haemorrhage. These features are characteristic of squamous cell carcinoma.

Discussion

Lung cancer is the most common fatal malignancy among men and women in most countries of the world and the gender difference is narrowing.⁹ In India, the incidence of lung cancer is increasing rapidly, mainly due to change in life style.¹⁰ According to the population and hospital based National Cancer Registry (1986) of the Indian Council of Medical Research (ICMR), primary bronchogenic carcinoma constitutes 8% of all cancers in men and less than 1% of all cancers in women in India.¹¹ The present study has explored the clinical profile, histopathological patterns and various risk factors of lung cancer in female patients in the region of Uttar Pradesh. The assessment

of risk factors in Indian patients revealed that *bidi* smoking is the major risk factor for lung cancer in India in contrast to the cigarette or cigar smoking in USA.¹² But majority of females in India are non-smokers. About two-thirds of the lung cancers were reported in non-smoking women in China,⁵ India¹³ and Mexico.¹⁴ The development of bronchogenic carcinoma in non-smokers can be attributed to certain environmental and occupational exposures that have been identified as pulmonary carcinogens. A recent study⁴ from Chandigarh showed biomass fuel exposure as a principal risk factor in the causation of lung cancer among women in addition of exposure to tobacco smoke.⁴

Our study showed that biomass fuel was the predominant fuel used for cooking (37%) followed by kerosene (14.5%) whereas tobacco smoking history was present only in 6.5% of these patients. In Taiwan, women who burned wood for cooking had a three-fold increase in the risk of lung cancer after adjusting for potential confounders.¹⁵ Additionally, a large multi-centre European case-control study recorded an adjusted 20%-30% increased risk of lung cancer in people who burned wood compared with people who never used coal or wood for cooking or heating.¹⁶ Studies in Japan¹⁷ and Mexico¹⁸ also found an increased risk of lung cancer in non-smoking women, which was related to their exposure to smoke from wood or straw. These studies suggest that exposure to smoke from wood combustion is associated with an increased risk of lung cancer; however, the results on exposure duration and intensity are difficult to interpret. Use of kerosene for cooking has also been seen associated with the development of lung cancer as reported in some studies.¹⁹

Present study revealed male to female ratio of 5.31:1, which is similar to other Indian studies.³ It was higher in Kashmir study²⁰, mainly due to progressive change in life-style. In 79% women, the diagnosis was first thought to be pulmonary tuberculosis and these were given antituberculosis treatment resulting delay in the diagnosis. This may be the reason for the advanced stage of lung cancer in majority of patients. In the present study, adenocarcinoma was most common histopathological types. This is in accordance with other investigators.

References

1. World Health Organization. Cancer in developed countries: assessing the trends. *WHO Chron* 1985;39:109-11.
2. Nanda Kumar A. Consolidated report of the population based cancer registries, incidence and distribution of cancer, 1990-1996. National Cancer Registry Programme. New Delhi: Indian Council of Medical Resesarch; 2001.
3. Behera D, Balamugesh T. Lung cancer in India. *Indian J Chest Dis Allied Sci* 2004;46:269-81.
4. Behera D, Balamugesh T. Indoor air pollution as a risk factor for lung cancer in women. *J Assoc Physicians India* 2005;53:190-2.
5. Gao YT. Risk factors for lung cancer among nonsmokers with emphasis on lifestyle factors. *Lung Cancer* 1996;14:S39-S45.
6. Du YX, Cha Q, Chen XW, Chen YZ, Huang LF, Feng ZZ, et al. An epidemiological study of risk factors for lung cancer in Guangzhou, China. *Lung Cancer* 1996;14:S9-S37.
7. Wu JM, Du Y-x. Overview and highlights of the panel discussion. *Lung Cancer* 1996;14:S3-S8.
8. Smith KR. National burden of disease in India from indoor air pollution. (Inaugural article). *Proc Natl Acad Sci USA* 2000;97:13286-93.
9. Bal S. Screening for lung cancer. *Hospital Today* 2001;6:609-11.
10. Majumdar SK Das, Nanda S, Goirola M. Brachytherapy in lung cancer. *Hospital Today* 2001;6:609-11.
11. National Cancer Registry. *Indian Council of Medical Research, Annual Report*. New Delhi: Indian Council of Medical Research; 1986.
12. Notani P, Sanghavi LD. A retrospective study of lung cancer in Bombay. *Br J Cancer* 1974;29:47782.
13. Gupta RC, Purohit SD, Sharma MP, Bhardwaj S. Primary bronchogenic carcinoma: clinical profile of 279 cases from mid-west Rajasthan. *Indian J Chest Dis Allied Sci* 1998;40:109-16.
14. Medina FM, Barrera RR, Morales JF, Echegoyen RC, Chavarria JG, Reborra FT. Primary lung cancer in Mexico city: a report of 1019 cases. *Lung Cancer* 1996;14:185-93.
15. Bruce N, Perez-Padilla R, Albalak R. Indoor air pollution in developing countries: a major environmental and public health challenge. *Bull World Health Organ* 2000;78:1078-92.
16. Mountain CF. Revisions in the International System for staging Lung Cancer. *Chest* 1997;111:1710-7.
17. Parkin DM, Bray F, Ferlay J, Pisani P. Global cancer statistics, 2002. *CA Cancer J Clin* 2005;55:74-108.
18. National Cancer Registry Programme. An epidemiological study. *Indian Council of Medical Research, Biennial Report, 1988-1989*. New Delhi: Indian Council of Medical Research.p.3-42.
19. Koo LC, Lee N, Ho J. Do cooking fuels pose a risk for lung cancer? a case-control study of women in Hong Kong. *Ecol Dis* 1983;2:255-65.
20. Khan NA, Afroz F, Lone MM, Teli MA, Muzaffar M, Jan N. Profile of lung cancer in Kashmir, India: a five-year study. *Indian J Chest Dis Allied Sci* 2006;48:187-90.