

RESEARCH ARTICLE

Lung Cancer in Malabar Cancer Center in Kerala - A Descriptive Analysis

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Abstract

The burden of lung cancer in terms of mortality is the highest among all types of cancers globally. The present study aimed to evaluate lifestyle related habits, clinico-pathological profile and treatment details of lung cancer patients who were registered at Malabar Cancer Centre (MCC), Kerala, during the calendar year 2010. A retrospective evaluation was made from medical records to gather data from 281 registered lung cancer cases in 241 males and 40 females, with a male to female ratio of 6.03: 1. Approximately 89% of the cases were above 50 years of age. Among males about 91% of the cases were smokers and 62% of them had a chronic smoking habit. Adenocarcinomas, squamous cell carcinomas, non-small cell carcinomas and small cell cancers accounted for 10.7, 13.9, 17.0 and 5.7% respectively. Out of 281 cases around 67% were diagnosed with distant metastasis and the remainder had regional lymph node involvement. However, no statistically significant difference was observed for secondary site of tumor according to gender. As majority of the cases reported at MCC were in an advanced stage of the disease, histology of the secondary site from supraclavicular lymph nodes or liver was taken for diagnosis. Initiation of population based screening for early detection of cancer, and primary and secondary prevention strategies for reducing the prevalence of tobacco consumption are high priorities to reduce the lung cancer burden in Kerala.

Keywords: Lung cancer - prevalence - tobacco smoking - histology - prevention

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Introduction

Lung cancer is the commonest form of cancer diagnosed in the less-developed regions in the world. The burden of lung cancer in terms of mortality is the highest among all types of cancers globally (Globocan, 2008). It has been recently reported that there were 13 million new cancer cases and 8 million cancer deaths worldwide (Ferlay et al., 2010). The World Health Organization has made an estimate of 11.5 million deaths in 2030, comparable to our estimate of 12.9 million under the hypothesis of no increase in cancer death rates (WHO and IUAC, 2005). Lung cancer has the highest smoking-attributable fraction among all neoplasms induced by tobacco smoking, and although not all cancer at this site is caused by smoking. In Indian scenario also lung cancer is leading cancer among males with an incidence rate of 10.9 per 100000 males and mortality rate of 13.0 per 100,000 males (World Cancer Report, 2008).

Several studies carried out for identifying the factors related to lung cancer and the etiology related to various lifestyle factors has already been well established worldwide. Although smoking is considered as one of the major causes of lung cancer; most smokers will not develop lung cancer, indicating the role of additional cofactors for lung carcinogenesis (Thun et al., 2002).

Further the role of passive smoking as well as indoor and outdoor air pollution has to be well established.

The main histological types of lung cancer are squamous-cell carcinoma, adeno carcinoma, small cell carcinoma and large cell carcinoma. Over the last few decades, the proportion of squamous-cell carcinomas, which used to be the predominant type, has decreased and an increase of adeno carcinomas has taken place in both genders (World Cancer Report, 2008). According to the hospital based cancer registry report 2010 of Malabar Cancer Centre (MCC), Kerala, lung cancer stands first with approximately 20.1% cases among all the male cancers (HBCR, 2010). The main objective of the present study is to evaluate a few lifestyle related habits, clinico-pathological profile and treatment details of lung cancer patients who were registered at MCC, Kerala during the calendar year 2010.

Materials and Methods

A retrospective evaluation of case series from medical records was done among the lung cancer cases registered at the MCC during the year 2010. We identified 281 cases and their demographic, lifestyle habits, clinico-pathological profile and other relevant variables were recorded from medical records and reported through this

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study.

All confirmed cases of lung cancer patients registered at MCC during the year 2010 were included in this study. A semi-structured questionnaire was used to collect the information from patient's medical record about various characteristics under study. Information on demographic characteristics such as age, gender, marital status, religion, education and data on occupation were obtained. Details of few lifestyle characteristics such as smoking, alcohol and chewing habits and information of passive smoking and family history of cancer were also obtained. Distribution on histology of primary site of tumour, details of secondary site of tumour, if available, and diagnostic characteristics such as method of diagnosis, histology, differentiation, laterality and clinical extent of disease before treatment were obtained from patient's medical record and the characteristics were analyzed separately for males and females. Further performance status before treatment as per the Eastern Cooperative Oncology Group (ECOG) categorization was also obtained from records.

Qualitative variables were summarized using number and percentage. The association between qualitative variables was tested using chi-square test or Fisher's exact test, if the expected value of a cell was less than 5 for relevant variables (Armitage and Berry, 1994). Stratified analysis according to gender was done for relevant variables. The level of significance for statistical tests was fixed at 5%. Data were analyzed using SPSS statistical software, version 16.0 (SPSS, Chicago, IL).

Results

A total of 281 lung cancer patients were registered at MCC during the study period, which comprised of 241 males and 40 females with a male to female ratio of 6.03: 1. The demographic characteristics of patients were provided in Table 1. Approximately 89% of the cases belonged to above 50 years of age, with a major contribution in the ages between 51 and 70 years (74%). The distribution of marital status has shown that proportion of married and widowed patients were approximately 88 and 11 percent respectively. A significantly higher proportion of cases belong to Hindu religion (54%) followed by Muslim (38%). Distribution of education status showed that an increased proportion of cases received primary education, approximately 54%; whereas the percentage of illiterate cases was 11.4% only (Table 1).

Regarding the distribution of occupation, almost 38% of the cases were manual labourers/farmers, out of which 92.5% are having the smoking habits. There were approximately 28% of the cases were unemployed or not working after cancer diagnosis including house wives. However the percentage of professionals/government servants involved in this study category was around 6% only (Table 1).

The prevalence of smoking, chewing and alcohol habits of cases according to gender was provided in Table 2. Among males about 91% of the cases had smoking habit, whereas in females, it's only 12.5%. Moreover in the present study we found that 10% of the female cases were passive smokers. Further analysis among

Table 1. Distribution of Demographic Characteristics

Characteristics	(n= 281)	%
Gender :		
Male	241	85.80
Female	40	14.20
Age group:		
≤50	30	10.70
51-60	112	39.90
61-70	97	34.50
Above 70	42	14.90
Marital Status:		
Unmarried	4	1.40
Married	247	87.90
Widowed	30	10.70
Religion :		
Hindu	151	53.70
Muslim	106	37.70
Christian	24	8.50
Education :		
Illiterate	32	11.40
Literate	29	10.30
Primary	152	54.10
Middle	3	1.10
Secondary	55	19.60
College & above	10	3.60
Occupation:		
No occupation	78	27.76
Manual labourers	85	30.25
Farmer	21	7.47
Bidi maker	8	2.85
Professionals/ Govt. servants	16	5.69
Others	73	25.98

Table 2. Distribution of Family History of Cancer and Prevalence of Smoking, Chewing and Alcohol Habits of Cases According to Gender

Characteristics	Male (n=241) %		Female (n=40) %		Total (n=281) %	
	Family history of cancer:	(Chi square= 0.30, P value=0.59)				
Yes	51	21.2	10	25	61	21.7
No	190	78.8	30	75	220	78.3
Smoking	(Chi square=109.47, P value<0.001*)					
Yes	219	91.2	5	12.5	224	80
Passive	0	0	4	10	4	1.4
No	21	8.8	31	77.5	52	18.6
Chewing	(Chi square=0.18, P value=0.67)					
Yes	36	15.1	5	12.5	41	14.7
No	203	84.9	35	87.5	238	85.3
Alcohol consumption	(Chi square=19.56, P value<0.001*)					
Yes	113	47.3	4	10	117	41.9
No	126	52.7	36	90	162	58.1

* Statistically significant at 5% level of significance

smokers reported that 62% of the cases were chronic smokers. To examine the role of smoking in different occupation group shown that of the 38% of the cases with occupation as manual labourers/farmer and 92.5% of them were smokers. Among the occupation group bidi makers in the study all are having chronic smoking habit. Compared to smoking, prevalence of chewing habit was 15%, which seems to be very less among males. However the proportion of males and females consumes alcohol were 47.3 and 10 respectively, which was found to be statistically significant (Table 2). Family history of cancer is well accepted as an important risk factor for the development of several of the more common cancers (Offit and Brown, 1994). The distribution of family history of cancer shown that the proportion of male and female cases with history of cancer was 21.2 and 25% respectively.

Regarding the distribution of histological type of tumor according to gender, approximately 47% of cases, the histology of primary were unknown. Based on the information available on histology the proportion of adenocarcinoma, squamous cell carcinoma, non-small cell carcinoma and small cell cancers accounted for 10.7, 13.9, 17 and 5.7% respectively. Increased prevalence non-small cell carcinoma was observed among male (17%); whereas adeno carcinoma and non-small cell carcinoma was observed among female (17.5%). The category namely 'Others' consist of one sarcomatoid carcinoma, one neuroendocrine tumor and one male case with malignant histology and one female malignant mesenchymal tumor. However the association between histological types of primary tumor according to gender observed as not statistically significant.

Out of 281 cases, there were approximately 60% of the cases (168 cases) diagnosed with metastases. Among these cases, around 67% were diagnosed with distant metastasis and the rest with regional lymph nodes. However no statistically significant difference was observed for secondary site of tumor and gender.

The distribution of diagnostic characteristics such as diagnostic status at registration, method of diagnosis, laterality, clinical extent of disease before treatment, staging and performance status before treatment were provided. The diagnostic status at registration has shown that around 53% of individuals were suspected with lung cancer either microscopically or radiologically. Percentages of microscopically confirmed cases among male and female cases were 40.2 and 30.0 respectively. Report on laterality shown that the proportion of left and right lateral cases were 45.2% and 42.3% respectively. Two male cases had observed as bilateral involvement with no information on laterality. Among the 281 cases, approximately 50%, (140 cases) were reported at MCC with distant metastasis. Direct extension and direct extension with regional lymph nodes were observed in 12.8 and 22.4% of cases. More over 12 % of these cases (n= 34) were in too advanced condition. This means that early stage disease is very negligible. Staging was made in all these cases and clinical staging followed for almost 98% of cases. Only for two cases staging was not done because of unknown primary site of those cases.

Performance status before treatment shown a higher proportion (38.4%) of these cases were 'restriction in physically strenuous activity but ambulatory and able to carry out light work', where as the proportion of cases belong to 'ambulatory and capable of all self-care, but unable to carry out any work' is 35.2%. However the proportion of fully disabled cases among all is only 6%, with a percentage of completely disabled women cases as 7.5.

The distribution of treatment details according to gender were given. Above 75% of the cases reported to the centre with no prior treatment irrespective of the gender. Among the reported cases, around 72% of males and 90% of females were treated with the intension to treat as palliative/pain relief only/symptomatic. There were only 11.7% cases from both genders were treated with intension to treat as curative/radical. The number of cases with

treatment advised but not accepted and undergone partial treatment was 1.1 and 8.9 percent respectively. Those who received treatment at MCC, increased proportion received radiotherapy as well as chemotherapy among males, where as females received chemotherapy as the commonest modality of treatment with the intension to treat as palliative.

Discussion

Lung cancer is a preventable cancer as it is mainly acquired by avoidable habits a person inculcates during his life. This study reveals that the age range, in which lung cancer was most commonly affected, was sixth and seventh decades of life, although a significant number of cases were in the age group above 70 years. Increased number of cases in older age group especially in sixth and seventh decades of life reveals that lung cancer is an old age disease. Older adults carry the greatest burden of cancer, with over 74% of all cancers being diagnosed in 50-74 year olds.

Out of the 281 patients registered at MCC comprised of 85.8% males and 14.2% females with six fold incidence among males. Relatively high, but inconsistent male to female ratio were observed in a few studies (Thippanna et al., 1999; Prasad et al., 2004; Singh et al., 2010). High incidence of lung cancer in males could be due to high level consumption of tobacco in any form and the prevalence of tobacco habits among females is very low compared to males in Kerala. As per the cancer registry report of MCC 2010, lung cancer stands first among males with 38% of all tobacco related cancers (HBCR, 2010). The present study reveals that about 91% of the male cases had smoking habit; whereas among females smoking is comparatively less, but the influence of passive smoking is significantly remarkable. The increased proportion in smoking status correlates with the studies from other developing nations (Chandrasekhar et al., 2006; Hassan et al., 2010) and report from different parts of India (Gupta et al., 1998; Prasad et al., 2004; 2009; Khan et al., 2006; Rawat et al., 2009; Singh et al., 2010). Higher prevalence of tobacco use among male could be due to easiness in availability and cheaper cost of such items. Moreover several beedi manufacturing units are functioning in and around the Kannur district of Kerala. Hence the importance of tobacco cessation programmes in the community as well as mass education and awareness programme among adolescents should be strongly implemented. The proportion of lung cancer incidence among non-smokers is approximately 20%, which correlates with other studies conducted in India (Rajasekaran et al., 1993; Gupta et al., 1998; Prasad et al., 2004).

Although the role of hereditary factors in lung carcinogenesis is not so far established, in our study approximately one-fourth of the cases had family history of cancer in their spouses, first or second degree relatives. Reasons for this high proportion could be due to passive smoking or indoor air pollution mainly by the use of fire wood for cooking or due to influence of other confounding factors. However more genetic studies are required to establish the relation between family history of cancer in

first or second degree relatives and lung cancer.

Distribution of histological type of tumor according to gender has shown that the histology of primary were unknown among 47% of cases. As majority of the cases reported at our centre were in the advanced stage of the disease, histology of the secondary site from supraclavicular lymph nodes or liver was taken for diagnosis. In some cases, the treatment was initiated based on the imageology techniques such as MRI/ CT only as obtaining biopsy or specimen for cytology were considered to carry significant risk or based on patient refusal for invasive diagnostic procedures. The present study showed inconsistent results on the distribution of histologic type of cancer compared with the other studies conducted within India (Gupta et al., 1998; Thippanna et al., 1999; Khan et al., 2006; Prasad et al., 2009; Singh et al., 2010). However several studies have pointed out that majority of the lung cancer cases were diagnosed in the advanced stages of the disease (Thippanna et al., 1999; Prasad et al., 2004; Mohan et al., 2007).

Increased proportion of cases was diagnosed as non-small cell carcinoma cases among both gender groups. As per the pathologist's version, a histology reported as non- small cell carcinoma is a general term which can be adeno- or squamous cell carcinoma. Further biopsy would be necessary to specify the exact histology that has not been done for such cases. However among the diagnosed male cases, non-small cell carcinoma stands first which doesn't support the World Cancer Report (2008), where as in females it does.

More than fifty percent of the cases were suspected with lung cancer either microscopically or radiologically at the time of registration. Because majority of cases reported to the MCC by doctors working in various government/private hospitals/clinics with suspected lesion either in chest X-ray, or other imageology techniques or clinically.

Although majority of the people were diagnosed at advanced stages, there were a good number of cases reported that performance status before treatment with 'restriction in physically strenuous activity but ambulatory and able to carry out light work', as well as 'ambulatory and capable of all self- care, but unable to carry out any work'. However loss to follow up level was very high after the completion of treatment, there were no performance status information after the treatment.

Most of the cases among the reported cases irrespective of gender were treated with the intension to treat as palliative/pain relief only/symptomatic because of the advanced disease condition. There were around 12% cases only were treated with intension to treat as curative/ radical from both genders. There was no marked difference between those who received and didn't receive cancer directed treatment as those with advanced disseminated disease received only symptomatic treatment and those in metastatic stage were given palliative radiotherapy or chemotherapy.

In this study approximately 50% were reported with distant metastasis and 12% of cases were in too advanced stage. Moreover direct extension and direct extension with regional lymph nodes were observed in 12.8 and

22.4% of cases. This means that early stage disease is very negligible. Diagnosis at early stages where surgery could be offered is possible only in less than 5% of the cases in India whereas it is possible in 80% of all lung cancer cases in the western world (Behera, 2006). It is argued that delayed diagnosis of lung cancer is because symptoms are similar to 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 (Behera, 2006). Various cancer control and prevention strategies can be adopted for controlling the development of lung cancer. Treatment for lung cancer may be curative, if detected early, and can be achieved by educating people regarding signs and symptoms of lung cancer. Population based screening is the second strategy for early cancer detection among high risk group by applying simple tests (WHO, 2010). Lung cancer is not amenable for early detection as cases are often presented at later stage and hence primary and secondary prevention by reducing the prevalence of tobacco consumption is the most effective way of reducing lung cancer mortality (Sarin, 2005).

The median delay in commencement of treatment was 10 days with an inter quartile range of 15 days. Approximately 48% of the cases, the date of commencement of treatment is unknown as the patient reporting at the centre is in the advanced or disseminated stage, whether the treatment of choice is either pain relief only or symptomatic. Few patients reported at MCC, but not turned back for treatment after cancer diagnosis. The main reasons for delay in commencement of treatment are the following. Firstly, after getting opinion from MCC, people might have received treatment from other hospitals and return back for follow-up or palliative treatment. Secondly the general condition of patient may be very poor at the time of registration and not fit for any active cancer directed treatment. Once the patient's general condition improves, then only, initiation of the treatment is done. Third reason would be delay from patient's side for further evaluation and metastatic work up due to personnel or financial problems. Finally the patient's or their relatives would prefer other modalities of treatment such as ayurvedic, unani, homeopathic and naturopathic treatment and reporting back to MCC after failure of treatment.

There were few limitations involved in our study. As this is a retrospective analysis of case series based on medical records, important information regarding details about specific type tobacco products used for smoking, their frequency and duration were unavailable from medical records. The number of female cases involved in the study is comparatively small, which makes the generalization very difficult. Similarly no definite measure was used to quantify passive smoking. Another limitation of the present study is the percentage of cases with unknown histology is 47%. Reasons for this high proportion could be due to specimen for cytology was considered to carry significant risk or denial to undergo the invasive diagnostic procedures.

In conclusion, this study reveals that smoking can be treated as the single most important factor contributing

to lung cancer among males in Kerala. Furthermore analytical epidemiological research approaches need to be adopted to identify the role of other indoor and outdoor air pollutants for the development of lung cancer.

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