



## Change in trends in incidence and histopathology of lung carcinoma in a tertiary care centre in Kerala

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### Abstract

Patterns of histological types of lung cancer have changed over time. In the United States, adenocarcinoma has become the most commonly diagnosed type of lung cancer. By contrast, in Europe squamous cell carcinoma remains the most predominant cell type. Since changes in histological type of lung cancers may be indicative of changes in causal factors, it is important to identify whether any changes in histological subtypes are real or artefactual. Present study is done to analyse the change in trends in incidence and histopathology patterns of lung carcinoma in a tertiary care hospital in Kerala over a span of 10 years.

**Aims and Objectives:** Changes occurred in the frequency of lung carcinoma in Kerala over a period of 10 years from 2004 was observed. Histological pattern distribution according to demographic variables were analysed.

**Material and Methods:** Retrospective cohort study conducted in a tertiary care hospital during the period of 10 years from 2002. Comparison of cases of lung tumors diagnosed in the Department of Pathology, Government Medical College Kottayam in India during the period of 3 years from January 2002 to December 2004 to January 2012 to December 2014 was done. Age and gender distribution changes in occurrence and histopathology patterns was studied using the registers and histopathology slides available in the department.

**Statistical Analysis:** Data was analysed using SPSS. Descriptive statistics used to evaluate the changes in the histological pattern

**Results:** Of the 50 malignant tumours studied in 2002, 50% were Squamous cell carcinoma, whereas it was 35.8 % in the 80 cases studied in 2012. 30% of the tumors were Adenocarcinoma in 2002-2004 and 30.9 % in 2012-2014. 90% cases were males and 10% females in both the study period. Highest percentage of squamous cell carcinoma (64%) was seen in the 51-70 year age group and 46.7% of adeno carcinoma was found in the age group of 61-70 in the year 2002-2004. Age distribution of squamous cell carcinoma was found highest in the 51-60 years (42.9%) and adenocarcinoma prevalence was found high (52%) in the 61-70 year age group in 2014.

**Keywords:** Changes, histopathology, lung cancer.

## Introduction

Lung cancer is one among the top three killers in India.<sup>[1]</sup> The highest incidence rates have been reported in Karunagappally (19.4/100000 males).<sup>[2,3,4]</sup> The mortality rate of lung cancer was 8/100000 men and 2.5/1000000 among women in 1998.<sup>[5]</sup>

Lung carcinoma is the most common type of tumour throughout the world<sup>[6]</sup> and is the leading cause of cancer death in India.<sup>[7]</sup> Data from population-based registry under National cancer Registry Programme indicate that the common sites of cancer are oral cavity, lungs, esophagus and stomach among men and cervix, breast and oral cavity among women.<sup>[7]</sup> Malignant lung tumour was the most common cancer in males and fifth most common cancer in females, responsible for 50% of all cancer deaths in India<sup>[7]</sup>.

Patterns of histological types of lung cancer have changed over time. In the United States, adenocarcinoma has become the most commonly diagnosed type of lung cancer.<sup>[8]</sup> By contrast, in Europe squamous cell carcinoma remains the most predominant cell type.<sup>[9]</sup> Present study was done to analyse the change in trends in incidence and histopathology patterns of lung carcinoma in a tertiary care hospital in Kerala over a span of 10 years.

## Material and Methods

A retrospective cohort study was conducted in a tertiary care hospital during the period of 10 years from 2002. Comparison of cases of lung tumors diagnosed in the Department of Pathology, Government Medical College Kottayam in India during the period of 3 years from January 2002 to December 2004 to January 2012 to December 2014 was done. The specimens included pneumonectomies, lobectomies and segmentectomies. Histopathological typing was done. Data was analysed using SPSS. Descriptive statistics was used to evaluate the changes in the histological pattern. Age and gender distribution changes in occurrence and histopathology patterns was studied using the registers and histopathology slides available in the department.

## Observations

The incidence of malignant lung tumours during the period of 3 years is shown in Table -1. It is seen that squamous cell carcinoma formed 56% of the malignant lung tumours during the period 2002-2004 and during 2012-2014, 35.8 % of the malignant lung tumours were Squamous cell carcinoma. Adenocarcinoma accounted for 30.5% of the tumours during 2002-2005 and 30.9 % of the tumours during 2012-2015.

**Table 1:** Histological classification of Malignant Lung Tumours during 2002 and 2012

Epithelial tumours	2002-2004		Epithelial tumours	2012-2014	
	No.	%		No.	%
Squamous cell carcinoma	25	50	Squamous cell carcinoma	29	35.8
Small cell carcinoma	5	10	Small cell carcinoma	-	-
Adeno carcinoma	15	30	Adeno carcinoma	25	30.9
Large cell carcinoma	1	2	Large cell carcinoma	1	1.2
Pleomorphic carcinoma	1	2	Pleomorphic carcinoma	4	4.9
Carcinoid	2	4	Carcinoid	2	2.5
Melanoma	1	2	Malignant melanoma	-	-
			Adenoid cystic carcinoma	3	3.7
			Adenosquamous	2	2.5
			Atypical carcinoid	4	4.9
			Chondroid hamartoma	1	1.2
			Mets from GCT	1	1.2
			Mucinous cystadenoma	1	1.2
			PDCA	7	8.6
			PDCA METS	1	1.2
Total	50	100.0		81	100.0



Table 3b: Age distribution 2012-2014

Histology	Age						Total
	21-30	31-40	41-50	51-60	61-70	71-80	
Squamous cell carcinoma No.	0	1	6	12	9	0	28
%	.0	3.6	21.4	42.9	32.1	.0	100
ADENO CA No.	0	1	0	7	13	4	25
%	.0	4	.0	28	52	16	100
PDCA No.	0	0	2	2	2	1	7
%	.0	.0	28.6	28.6	28.6	14.3	100
PLEOMORPHIC CA No.	0	1	1	1	0	1	4
%	.0	25	25	25	.0	25	100
Atypical carcinoid No.	0	0	2	1	1	0	4
%	.0	.0	50	25	25	.0	100
ADENOIDCYSTIC CA No.	0	1	2	0	0	0	3
%	.0	33.3	66.7	.0	.0	.0	100
ADENOSQUAMOUS No.	0	1	0	0	1	0	2
%	.0	50	.0	.0	50	.0	100
Carcinoid No.	1	1	0	0	0	0	2
%	50	50	.0	.0	.0	.0	100
Chondroid hamartoma No.	0	0	0	1	0	0	1
%	.0	.0	.0	100	.0	.0	100
LARGE CELL CA No.	0	0	0	0	0	1	1
%	.0	.0	.0	.0	.0	100	100
MUCINOUS CYSTADENOMA No.	0	0	0	0	1	0	1
%	.0	.0	.0	.0	100	.0	100
Mets from GCT No.	1	0	0	0	0	0	1
%	100.	.0	.0	.0	.0	.0	100
PDCA METS No.	0	0	0	0	0	1	1
%	.0	.0	.0	.0	.0	100	100
All No.	2	6	13	24	27	8	80
%	2.5	7.5	16.2	30	33.8	10	100

## Discussion

The main histological types of lung cancer diagnosed in the present study were squamous cell carcinoma and adenocarcinoma during both the study periods of 2002-2004 and 2012 -2014. This pattern is similar to the types of cancers reported from Finland and other European countries.<sup>[10]</sup> There were 5 cases of small cell carcinoma during the study period 2002-2004 but not a single case of small cell carcinoma was diagnosed during the study period 2012-2014. The reason must be that current treatment for small cell carcinoma diagnosed by bronchoscopic biopsies is radiotherapy and chemotherapy. Since our study included only pneumonectomies and lobectomies small cell carcinoma was not seen. Squamous cell carcinoma was found in highest frequency in both the periods of study (50 & 35.8%). This observation is in conformity with studies from

Europe.<sup>[11,12,13,14]</sup> The pattern of occurrence of adenocarcinoma in the present study is exactly similar to that of USA as it accounts for 30% of all lung cancers.<sup>[15]</sup> Though the incidence of adenocarcinoma was found to be more among females than males in Finland there is a male predominance for the incidence of this type of tumor in this study.<sup>[16]</sup> Regarding the gender wise distribution of cases, incidence of squamous cell carcinoma among males and females are higher than the figures reported from Finland.<sup>[10]</sup> The incidence of squamous cell carcinoma is higher among males than that of females in the present study which is in conformity with the reports from Finland.<sup>[10]</sup> Adenocarcinoma incidence is more among males than that of Finland whereas the incidence among females is lower in the present study than that of Finland.<sup>[10]</sup> These results show that the most frequent type of cancer in this study

is Squamous cell carcinoma and their occurrences are higher among males and females when compared to the figures reported from Europe and USA.<sup>[17]</sup> This study clearly indicates that the incidence of squamous cell carcinoma is more frequent in men than in women, which is in conformity with reports from Finland, USA and the Metro Health System.<sup>[17]</sup>

The results of the present study during both the periods show that majority (60%) of the lung cancer cases have occurred in the age group of 51-70 years similar to case reports from Finland.<sup>[10]</sup>

The total number of lung tumors during the period of 3 years from 2002 to 2005 was 50 whereas the number of lung tumors during the period 2012 to 2015 was 81. There was an increase in the number of cases from 2002 to 2012. In 2002 - 2005 period it is seen that 50 percent of the malignant lung tumors were squamous cell carcinoma. There was a decrease in number of squamous cell carcinoma cases from 2004 to 2014.

Several investigators have reported on time trends. Vincent *et al* found adenocarcinoma and squamous cell carcinoma to be the more common histologic types among lung cancer patients presenting to the thoracic surgery department of Roswell Park Memorial Institute between 1962 and 1975.<sup>[19]</sup> There was an increase in cases of Adenocarcinoma from 17.6 percent of the total cases in 1962 to 29.8 percent by 1975, while squamous cell carcinoma decreased to 25.5 percent in 1975 from 48.6 percent in 1962.

Devesa *et al.*, reported on changing patterns of lung cancer by histologic type for the period 1969-1986.<sup>[17]</sup>

In this study Squamous cell carcinoma is still the most common type among men. However, adenocarcinoma is the most common histological type in women.<sup>[17]</sup>

Travis *et al* reported analyses of Surveillance, Epidemiology, and End Results (SEER) Program data on lung cancer for the period 1973-1987.<sup>[31]</sup> The percentage of Adenocarcinoma (32 %) surpassed Squamous cell carcinoma making it the

most frequently occurring histologic type. Squamous cell carcinoma, however, continues to constitute a large proportion (29 percent) of lung tumors.<sup>[13]</sup>

### Conclusion

Squamous cell carcinoma and adenocarcinoma are the most frequent types of lung carcinoma in this study of which Squamous cell carcinoma is the most common histological type. This was in agreement with most of the studies reported worldwide. Incidence of lung carcinoma is significantly higher among males than females. Though the highest occurrence of lung carcinoma is seen in the age group of 51-70 years, a good percentage of lung carcinoma are seen in the young age group of less than 50 years. Incidence of squamous cell carcinoma among males and females are higher than the figures reported from European countries. A number of studies have shown an increase in incidence of adenocarcinoma but in our study Squamous cell carcinoma was the common histological type even after a time gap of 10 years.

Most lung tumors can be classified by light microscopic criteria. But therapy has changed over time with molecular testing of lung cancer playing a significant role and targeted therapy being effective in management of lung cancer.

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