Original Article

Delay in diagnosis amongst carcinoma lung patients presenting at a tertiary respiratory centre

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ABSTRACT

Objective: To determine time delay from the onset of initial symptoms to diagnosis of primary lung cancer. **Materials and Methods:** Selected information was captured from 49 consecutive pathologically proven cancer lung patients presenting to a tertiary respiratory centre during 1st January to 30th June 2012 using semi-structured interview schedule. All patients underwent suitable protocol based diagnostic work-up and referral. **Results:** Background profile of patient was as follows: Male:Female = 7.1:1; mean age was 61.2 (±9.7) years; Nine out of 49 (18.4%) patients were illiterate; Forty-three out of 49 (87.8%) belonged to rural native place; Forty-three out of 49 (87.7%) were smokers with 25 years as median pack-years. Histological profile showed that adenocarcinoma (40.8%) was the predominant form followed by small cell carcinoma (32.7%). Time (median) delay in diagnosis was 3.0 days (home remedies/quack therapy), 60.0 days (primary/secondary level) and 8 days at tertiary level. Twenty seven of 49 patients (55.1%) presented in stage-IV. Higher proportion of patients residing outside the district of study institute had longer delay in diagnosis but did not reach statistical significance ($P > 0.05$). The most important patient reasons for the delay in diagnosis was procrastinate/did not took symptoms seriously (19/49, 38.7%); no-body to escort (13/49, 26.5%), long distance (5/49, 10.2%), financial constraints (4/49, 8.1%), preferred local practitioner (2/49, 4.0%), family commitment/marriage (2/49, 4.0%), fear of death (1/49, 2.0%) and no reason cited (3/49, 6.1%). Three patients were inadvertently diagnosed as tuberculosis and hence the delay. **Conclusion:** Patient presented at a higher stage within a short span of time; however, there is scope of increasing health system capacity at primary/secondary level including sensitization training, health communication and appropriate referral to higher center.

Key words: Behavior, health system, neoplasm, pathology, primary, secondary, smoking, social, time, tumor, tobacco

INTRODUCTION

Globally, there were 14.1 million new cancer cases, 8.2 million cancer deaths and 32.6 million people living with cancer in 2012. Nearly 57% (8 million) of new cancer cases, 65% (5.3 million) of the cancer deaths and 48% (15.6 million) of prevalent cancer cases occurred in the less developed regions of the world (WHO). Highest incidence of cancer in men was lung (16.7%) followed by prostrate (15.0%), colon-rectum (10%) and stomach (8.5%) while in female it was breast (25.2%) followed by colon-rectum (9.2%), lung (8.8%) and cervix-uteri (7.9%).[1] Overall prevalence of cancer in term of age-standardized rate (ASR)/100,000 population in India was 146.6 (males) and 262.5 (female). In our country, there were 53,748 and 16,547 incident cases of lung cancer amongst males and females with ASR of 11 and 3.1 respectively.[2]

Lung cancer unfortunately is recognized late in natural history of the disease. In addition, there is patient, social or health system related factors contributing to delay in diagnosis and management. There are limited studies in Indian setting documenting delay in diagnosis amongst cancer lung patients and keeping this in background a descriptive study was undertaken to determine time delay from the onset of symptoms to pathological diagnosis amongst patients with primary lung cancer.

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MATERIALS AND METHODS

Study setting

The study was carried out in a multi-specialty referral Government Medical College Hospital of North India (state of Haryana) located in Rohtak district. It caters to an average daily out-patient attendance of 5000 patients of rural and urban background mainly lower/middle socio-economic strata of the society; and supported by 1750 in-patient beds with more than 80,000 annual admissions. The hospital is equipped with 10-bedded intensive care unit along with computed tomography, magnetic resonance imaging and bronchoscopy facility and houses government of India recognized Regional Cancer Centre. It is a teaching and training center for MBBS, dental, pharmacy, nursing, physiotherapy in addition to post-graduate courses.

Data collection and analysis

Considering feasibility, all consecutive patients presenting to chest department with clinical features suggestive of primary cancer lung during the reference period from 1st January to 30th June 2012 were considered. At the time of presentation to this institution, none of them were previously diagnosed to be having cancer. They underwent suitable protocol based diagnostic work-up and clinical management. Data collection was carried out prospectively by investigators using semi-structured interview schedule capturing selected information after obtaining informed consent.

Study variables included were age, gender, literacy, occupation, residence, number of children, family income/month, smoking status, clinical features, symptoms, health seeking behavior, mode of admission, diagnostic investigation, pathology findings, time delay in diagnosis and causes thereof. A total of 60 consecutive patients were admitted with the suspicion of lung cancer, however only 49 were confirmed on pathological diagnosis. Data management was undertaken using software statistical package (SPSS version 16) and tabular assessment undertaken keeping residence of patient (within or outside the district of location of study institute) in background. Descriptive statistics, Chi-square test was taken up for categorical, t-test for continuous variables and considered significant at $P < 0.05$.

RESULT

Socio-demographic profile

The socio-demographic profile of 49 pathological proven carcinoma lung patients is as follows: male (43, 87.8%); age (61.2 years ± 9.7); current/former occupation: agriculture (36.7%), laborer (26.5%), house-wife (12.2%) and others (24.4%); 09 (18.4%) patients were illiterate; 43 (87.8%)

belonged to rural native place and 38 (77.6%) resided outside the district of location of study institute but within the state; 40 (81.6%) were married and living together with spouse; 31 (63.3%) patients were living in a joint family system; median family income was Rs. 5000; 43 (87.7%) were smokers with 25 pack-years (median); however, none of the female smoked. Details are shown in Table 1.

Clinical features

Clinical presentation amongst patients was: cough (40, 81.6%), chest pain (39, 79.5%), dyspnea (38, 77.5%), anorexia and weight loss (32, 65.3%), hoarseness of voice (21, 42.8%), hemoptysis (14, 28.5%), fever (4, 8.1%), superior vena cava syndrome (3, 6.1%) and backache (2, 4.0%). In 36 (73.4%) and 21 (42.8%) patients there was presence of four and five symptoms respectively.

Diagnostic work-up and histological profile

Histologically, predominance of adenocarcinoma (40.8%) was observed followed by small cell carcinoma (32.7%) and poorly differentiated (18.7%). Twenty seven of 49 patients (55.1%) presented in stage-IV; higher (23 [60.5%]) proportion of patients residing outside study district than within Rohtak ([04 (36.3%]) presented in stage-IV but overall difference did not reach statistical significance ($P > 0.05$) as shown in Table 2.

Time delay in diagnosis

Delay in diagnosis (mean) from the onset of initial symptoms to histological confirmation could be attributed to home remedies/quack: 27.4 days (95% CI: 15.3-39.4); primary/secondary level (Primary Health Center/Community Health Center/District hospital/Private Practitioner/Nursing Home): 68.0 days (95% CI: 49.5-86.5) and tertiary level (study institute): 5.5 days (95% CI: 7.1-10.2) with

Table 1: Socio-demographic profile of carcinoma lung patients			
Variable	Residence of patient		Total (*n*=49)
	Within study district (*n*=11)	Outside district (*n*=38)	
Age (years)	61.8 (55.7-67.9)	61.0 (57.7-64.3)	61.2 (58.4-64.0)
No. of children	3.6 (2.6-4.6)	3.9 (3.4-4.3)	3.8 (3.4-4.2)
Family income/month in Rs.	6754 (2905-8453)	6605 (4828-8382)	6638 (5082-8195)
Smoking (pack-years)	33.5 (17.21-49.7)	20.8 (15.8-25.7)	23.6 (18.4-28.8)
Mode of admission			
OPD	7 (63.6)	24 (63.2)	31 (63.3)
Casualty	4 (36.4)	14 (36.8)	18 (36.7)
Sex			
Male	9 (81.8)	34 (89.5)	43 (87.8)
Female	2 (18.2)	4 (10.5)	6 (12.2)
Education			
Illiterate	2 (18.2)	7 (18.4)	9 (18.4)
Literate	9 (81.8)	31 (81.6)	40 (81.6)

Mean (95% CI), *n* (%), *P*>0.05. OPD: Out-patient department, CI: Confidence interval

overall delay of 104.0 days (95% CI: 83.7-124.3) as shown in Table 3. Similarly, overall time delay in diagnosis was found to be higher in-patients residing outside study district but again did not reach statistical significance (*P* > 0.05). Apparently, medical college delay was found to be slightly higher amongst patient residing within study district as these patients after seeking admission to hospital take discharge on request and present themselves later as per convenience.

Reasons for patient delay

The most important patient reasons for the delay was procrastinate/did not took symptoms seriously (19, 38.7%); no-body to escort (13, 26.5%), long distance (5, 10.2%), financial reason (4, 8.1%), preferred local practitioner (2, 4.0%), family commitment/marriage in family (2, 4.0%), fear of death (1, 2.0%) and no reason cited (3, 6.1%). Three patients were diagnosed as tuberculosis, put on anti-tubercular therapy (ATT) and apparently which led to late presentation.

DISCUSSION

Our study on delay in diagnosis amongst carcinoma lung patients has shown median delay as 3.0 days (home remedies/quack therapy), 60.0 days (primary/secondary level) and 8 days (tertiary level). In this study, 55.1% patients presented with stage-IV. The natural course of cancer lung is considered to be very rapid and patients tend to present in stage-IV within a short time span along with poor prognosis.

In order to diagnose lung cancer at a pre-symptomatic stage, four randomized controlled trials on lung cancer screening were conducted in high-risk population of male cigarette smokers[3-7] but none of them succeeded in demonstrating a reduction in overall mortality. Screening is still considered a controversial subject in lung carcinoma; however, existing evidence from the studies support the conclusion that periodic chest radiographs may lead to increase detection of early-stage disease, increase rates of resectability and thereby may lead to improvement in cancer-specific survival.[8] For other malignant tumors, it is known that cancer metastasis increases with tumor size.[9,10] However, in human studies it has not been possible to determine when a lung cancer begins to metastasize.[11] Until such technological advancement occur, early action rest on clinical suspicion and timely recognition.

A retrospective study (*n* = 203) on lung cancer from Uttarakhand (India) reported similar findings with male:female ratio of 8.2:1; smoker: 81.7%; cough (72.9%) was the most important symptom however squamous cell ca (44.8%) was the predominant form followed by adenocarcinoma (19.7%). The authors reported higher

time delay of 4-6 months in seeking treatment[12] without further elaboration. Another study (*n* = 607) from Eastern India (Kolkata) showed high predominance of squamous cell ca (35.0%) followed by adenocarcinoma (30.8%) and small cell ca (16.4%).[13] In contrast, a study (*n* = 238) from South India (Chennai) showed a predominance of adenocarcinoma (42.6%) followed by squamous cell ca (15.6%) with 53% of patients presenting in stage-IV, findings similar to our study.[14] Over the past four decades, there has been a shift in the pathological distribution of non-small cell cancer. Initially, squamous cell carcinoma was the most common histological type, however, lately there has been a dramatic increase in the incidence of adenocarcinoma, making it the predominant type.[15]

With regard to delay in diagnosis, a Chandigarh based study documented 32.6% lung cancer patients presented within

Table 2: Diagnostic yield, staging and histological profile of carcinoma lung patients

Variable	Residence of patient		Total (*n*=49) (%)
	Within study district (*n*=11)	Outside district (*n*=38)	
Diagnostic investigation			
Endobronchial	4 (36.4)	15 (39.5)	19 (38.8)
Ultrasound guided FNAC	6 (54.5)	8 (21.1)	14 (28.6)
Pleural biopsy	1 (9.1)	10 (26.3)	11 (22.4)
FNAC lymph node	–	4 (10.5)	4 (8.2)
CT guided FNAC	–	1 (2.6)	1 (2.0)
TNM staging			
IIa/IIb	2 (18.1)	3 (7.8)	5 (10.2)
IIIa/IIIb	5 (45.4)	12 (31.5)	17 (34.69)
IV	4 (36.3)	23 (60.5)	27 (55.1)
Histopathology			
Adeno-carcinoma	8 (72.7)	12 (31.5)	20 (40.8)
Small cell carcinoma	3 (27.3)	13 (34.2)	16 (32.7)
Poorly differentiated	–	7 (18.4)	7 (18.4)
Squamous cell carcinoma	–	6 (15.7)	6 (15.7)

n (%), *P*>0.05. FNAC: Fine needle aspiration cytology, CT: Computed tomography, TNM: Tumor node metastasis

Table 3: Delay in diagnosis (days) amongst carcinoma lung patients

Level	Residence of patient		Total (*n*=49)
	Within study district (*n*=11)	Outside district (*n*=38)	
Patient attributed delay			
Home remedies/ quack	19.0 (5.0-43.0)	29.8 (15.4-44.1)	27.4 (15.3-39.4)
Health system delay			
Primary/secondary level	55.3 (8.1-102.6)	71.7 (51.0-92.4)	68.0 (49.5-86.5)
Tertiary level	12.3 (6.1-18.6)	7.6 (6.5-8.7)	5.5 (7.1-10.2)
Health system delay	67.7 (20.4-115.0)	79.3 (58.3-100.4)	76.7 (58.1-95.4)
Total delay	86.7 (43.8-129.6)	109.0 (85.2-132.9)	104.0 (83.7-124.3)

Mean (95% CI), *P*>0.05. CI: Confidence interval

3 month, 3-6 months (46.4%) and 21% presented beyond 6 months of development of symptoms.[16] In Delhi, the median symptom-to-diagnosis delay was 143 days (range: 4-721). Delay in diagnosis was significantly higher in-patients who had received ATT initially ($P = 0.002$).[17] At international level, the waiting time from first symptom to referral to a regional cancer center in British Columbia for stage-III non-small cell lung cancer was approximately 3-4 months.[18] Another study from a Teaching Hospital at Havana (Cuba) reported higher delay in diagnosis at all three levels: primary (29.51 ± 4.5 days), secondary (24.45 ± 7.31 days) and tertiary level (18.23 ± 3.68 days) with patient attributed delay to 18.19 (±3.45) days.[19] Globally, overall length of diagnostic delay (mean) in lung cancer patients has been estimated at 60-90 days.[20] Our study reflected 104 (±70.7) days.

Most important patient related delay as highlighted in this study is procrastination and appears to reflect global literature. These patients may be asymptomatic at first; later, may ascribe respiratory symptoms (cough, coughing up phlegm, shortness of breath, chest pain, etc.) to smoking, a pre-existing broncho-pulmonary condition, acute respiratory disease, or even to lack of rest or aging.[21,22] In India, according to Global Adult Tobacco Survey, around one-third (35%) adults (47.9% males and 20.3% females) use tobacco in some form and 52% are exposed to second-hand smoke at home with rural area accounting for 58% and urban (39%) respectively.[5] Two-third of the households are using firewood/crop residue, cow dung cake/coal etc., as fuel in their kitchen (Census India, 2011). With this much enormous population base of risk exposure and simultaneous increased longevity of life (average age 32 years [1947] to current, 66.8 years) during last 60 years, sizeable population is now and will continue to manifest in large volume at health facilities with chest, cardiac, cancer and/or associated diseases. Our society including health system needs to be prepared and geared for such future challenge.

CONCLUSION

Considering present study findings in the light of small sample size, there is a possibility of reducing delay at primary/secondary level by building capacity, sensitization training, change in fatalistic attitude, counseling, intensive health education activities and appropriate referral to higher center. With such a large turnover of daily patients, services at tertiary level are already stretched beyond practical limits and in the current scenario there seems little possibility of further reduction of time delay at these centers, as appointment for special investigations runs in weeks to months. It may appear as a challenge in existing health care delivery system however requires earnest attention including effective tobacco control measures in the light of changing epidemiological profile of our country.

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