

## ORIGINAL ARTICLE

## OUTCOME OF CHEMOTHERAPY IN LUNG CANCER: OUR EXPERIENCE AT A RURAL TERTIARY CARE HOSPITAL IN CENTRAL INDIA

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## ABSTRACT

**Background:** It is well known that lung cancer is one of the leading causes of mortality worldwide. In the treatment of lung cancer, chemotherapy has become a generally accepted and widely applied therapeutic modality. In present study we find out the outcome of chemotherapy, variations in outcome due to various factors, its effect on quality of life of patients, common complications due to it and various reasons of default among these patients.

**Materials & Methods:** A total of 42 cases diagnosed histopathologically as lung cancer and treated with chemotherapy over the year were analyzed.

**Results:** A total of 42 patients were included in the study. There were a total of 24 males (57.2%) and 18 females (42.8%) among them. 7(16.6%) patients were below the age of 50 years and 35(83.4%) were more than 50 years in age. A total of 16(38%) patients diagnosed with lung carcinoma were smokers and the rest (62%) were nonsmokers. NSCLC was found to be more common than SCLC in non-smokers, while SCLC was more common among smokers. Only 30.95% of patients completed the full course of chemotherapy and thus were assessed for improvements in quality of life following chemotherapy treatment. It was found that SCLC patients showed more improvement in scores than NSCLC patients. 29 (69.05%) of the total patients left chemotherapy in between. The main reason for this was found to be financial problems followed by switching to alternate forms of medicine.

**Conclusions:** Lack of funds to procure chemotherapy was the major factor responsible for default among patients. In patients completing the chemotherapy, significant improvements were seen in Quality of Life.

**Key words:** Lung cancer, Chemotherapy,

## INTRODUCTION

Worldwide, lung cancer is one of the most commonly diagnosed oncological diseases and the leading cause of cancer-related death in men. In women, lung cancer ranks number four with regard to incidence but number two in terms of mortality.<sup>1</sup>

There are two major types of lung cancer: non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC). Non-small cell lung cancer is much more common and accounts for 85% of all lung cancer cases (2). There are three main types of NSCLC, which are named for the type of cells in which the cancer develops: squamous cell carcinoma, adenocarcinoma, and large cell carcinoma. Only 17.3% of the people who develop non-small cell lung cancer survive for 5 years.<sup>2</sup>

Small cell lung cancer also called "oat cell cancer," accounts for 14% of all lung cancers.<sup>2</sup> This type of lung cancer grows more quickly. Small cell lung cancer is mainly attributable to smoking. Only 6.2 % of the people who develop small cell lung cancer survive for 5 years.<sup>2</sup> Only 20-30% of patients present

with an operable disease, while most of the patients present in an advanced stage II and III.

According to demographic data available from various Indian studies the ratio of small cell carcinoma to non small cell carcinoma was 2.7:1 in India (1986-2001).<sup>3</sup> Most patients are diagnosed at an advanced stage without curative treatment options. In this situation, systemic palliative treatment has only limited effect on survival. Consequently, to maintain or improve patients' quality of life (QOL) represents a main treatment goal.<sup>4</sup>

**Chemotherapy for non-small cell lung cancer**

Depending on the stage of non-small cell lung cancer (NSCLC), chemo may be used in different situations:

- 1) Before surgery (sometimes along with radiation therapy) to try to shrink a tumor. This is known as neoadjuvant therapy.
- 2) After surgery (sometimes along with radiation therapy) to try to kill any cancer cells that may have been left behind. This is known as adjuvant therapy.

3) As the main treatment (sometimes along with radiation therapy) for more advanced cancers or for patients who aren't healthy enough for surgery.

Chemotherapy cycles generally last about 3 to 4 weeks. It is often not recommended for patients in poor health, but advanced age by itself is not a barrier to getting chemotherapy.<sup>5</sup>

Most often, treatment for NSCLC uses a combination of two chemo drugs. If a combination is used, it often includes either cisplatin or carboplatin plus one other drug. Sometimes combinations that do not include these drugs, such as gemcitabine with vinorelbine or paclitaxel, may be used.

For people with advanced lung cancers who meet certain criteria, a targeted therapy drug such as bevacizumab or cetuximab may be added to treatment.

For advanced cancers, the initial chemo combination is often given for 4 to 6 cycles. If the initial chemo treatment for advanced lung cancer is no longer working, the doctor may recommend second-line treatment with a single drug such as docetaxel or pemetrexed. Again, advanced age is no barrier to receiving these drugs as long as the person is in good general health.<sup>5</sup>

### Small cell lung cancer chemotherapy

Chemotherapy is usually the main treatment for small cell lung cancer (SCLC). Doctors give chemo in cycles, with a period of treatment (usually 1 to 3 days) followed by a rest period to allow the body to recover. Each cycle generally lasts about 3 to 4 weeks, and initial treatment is typically 4 to 6 cycles. It is given as a combination of 2 drugs at first. If the cancer progresses (get worse) during treatment or returns after treatment is finished, other chemo drugs may be tried. The choice of drugs depends to some extent on how soon the cancer begins to grow again. If cancer returns more than 6 months after treatment, it might respond again to the same chemo drugs that were given the first time, so these can be tried again.

### Drugs/combinations used in treatment of lung cancer

Drugs used in NSCLC	Drugs used in SCLC
Cisplatin	Cisplatin and etoposide
Carboplatin	Carboplatin and etoposide
Paclitaxel	Cisplatin and irinotecan
Albumin-bound paclitaxel	Carboplatin and irinotecan
Docetaxel	
Gemcitabine	
Vinorelbine	
Irinotecan	
Etoposide	
Vinblastine	
Pemetrexed	

If the cancer comes back sooner, or if it keeps growing during treatment, further treatment with the same drugs isn't likely to be helpful. If further chemo is given, most doctors prefer treatment with a single, different drug at this point to help limit side effects. Topotecan, which can either be given into a vein (IV) or taken as pills, is the drug most often used, although others might also be tried.

### Aims and objectives

The objectives of this research were to study the outcome of chemotherapy in histopathologically diagnosed lung cancer patients; to assess and compare the variations among them in relation to age, sex, histological type, staging of carcinoma & no. of chemotherapy cycles; to study the outcome of chemotherapy in form of Survival & Quality of life; to study the pattern of complications among these patients; and to find out cause of default of chemotherapy.

### METHODOLOGY

The study was conducted at Acharya Vinobha Bhave Rural Hospital, Sawangi (Meghe) in indoor patients of Lung Cancer. This was an interventional, prospective, longitudinal study. The data was collected from patients receiving chemotherapy at AVBRH from September 2013 to September 2014.

**Inclusion Criteria:** All histopathologically diagnosed patients of lung cancers who had taken at least one cycle of chemotherapy and patient who has given consent to participate in the study were included in the study.

**Exclusion Criteria:** Patient unwilling for chemotherapy and not fulfilling inclusion criterias were excluded from the study.

The patients with lung cancer in inpatient department of AVBRH, SAWANGI who took at least one cycle of chemotherapy and the patients who were histologically diagnosed cases of lung cancer and had been advised chemotherapy by Institutional Tumor Board Committee (comprising of Oncophycian, Oncosurgeon, Oncoradiotherapist) were included in this study.

Patients included in this study were evaluated after each chemotherapy cycle for improvements in general condition. Routine blood investigations & radiological investigations i.e Xray & CT scans were performed after each cycle to assess the progress after chemotherapy. FACT-L (4) questionnaire was used to measure Qol (Quality of life) in patients who completed the course of chemotherapy.

Exclusion criteria consisted of cooperation problems and lack of consent. The sample size for this study included all patients subjected to chemotherapy during the period September 2013 to September 2014.

## RESULTS

Among 42 patients included in the study, 24 were males (57.2%) and 18 were females (42.8%). 7(16.6%) patients were below the age of 50 years and 35(83.4%) were more than 50 years in age. A total of 16(38%) patients diagnosed with lung carcinoma were smokers. 32(76.2%) were having non small cell carcinoma of lung while 10(23.8%) were having small cell carcinoma of lung.

Out of 32 patients of NSCLC, 16(50%) were males and 16(50%) were females. 10 patients who were diagnosed with SCLC had 8(80%) of male patients and 2(20%) were female patients.

In NSCLC 5(15.6%) of patients were below the age of 50 years. 27(84.4%) were above age of 50 years. Patients with SCLC had 2(20%) below the age of 50 years and 8 (80%) patients above the age of 50 years

NSCLC group had 9 patients (28.1%) who were smokers and the rest 23(71.9%) were non smokers. Patients with SCLC included 7(70%) patients who were smokers and 3(30%) who were non smokers.

**ECOG performance score:** In patients with NSCLC, majority of patients i.e 26(81.2%) had an ECOG Performance score between 0-2, and 6(18.8%) patients scored between 3 to 5. 9(90%) patients of SCLC had an ECOG performance score between 0-2, only 1(10%) had performance score between 3-5. A total of 13(30.95%) patients completed full course of chemotherapy while rest of 29 (69.05%) were defaulters and dropped out of chemotherapy before completion.

Among those who completed chemotherapy, 8(61.53%) patients were of NSCLC, and 5(39.47%) were of SCLC. In NSCLC group 3(37.5%) were males and 5(62.5%) were females, while in SCLC group 3(60%) males and 2(40%) females completed the treatment.

**Reasons for default:** Out of 29 patients who defaulted chemotherapy, 24(82.8%) were cases of NSCLC and 5(17.2%) were cases of SCLC. The main reasons for default in NSCLC patients were financial problems in 13(54.2%), switching to alternate medicine in 5(20.8%) & non tolerance of side effects in 6(25%). Among the SCLC patients, the reasons for default were switching to alternate medicine in 2(40%), intolerable side effects in 2(40%) and financial problem was seen in 1(20%) patient.

**Quality of life:** As observed by changes in FACT-L score before and after chemotherapy, NSCLC patients showed an average improvement of 22.6%, with males showing 23% and females showing 22.2% improvement in QOL. Among SCLC patients showed an average improvement of 27.59%, with males showing 26.48% and females showing 28.71% improvement in QOL.

**Table 1: Demographic features of the study participants**

Demographic Feature		NSCLC (%) N=32	SCLC (%) N=10
<b>Sex</b>	Male	16(50.0)	8(80.0)
	Female	16(50.0)	2(20.0)
<b>Age</b>	<50	5(15.6)	2(20.0)
	>50	27(84.4)	8(80.0)
<b>Smoking</b>	Smoker	9(28.1)	7(70.0)
	Non smoker	23(71.9)	3(30.0)
<b>ECOG</b>	ECOG0	8(25.0)	2(20.0)
	ECOG 1	7(21.9)	4(40.0)
	ECOG 2	11(34.3)	3(30.0)
	ECOG 3	6(18.8)	1(10.0)
	ECOG 4	0(0)	0(0)
	ECOG 5	0(0)	0(0)

**Table 2: Distribution of patients completing chemotherapy**

Gender	NSCLC (%) N=8	SCLC (%) N=5
<b>Male</b>	3(37.5)	3(60.0)
<b>Female</b>	5(62.5)	2(40.0)

**Table 3: Distribution of patients according to reasons for default**

Reasons For Default	NSCLC (n=24)(%)	SCLC (n=5)(%)
Financial Problem	13(54.2)	1(20.0)
Switching To Alternate Medicine	5(20.8)	2(40.0)
Non Tolerance Of Side Effects	6(25.0)	2(40.0)

**Table 4: Fact-L score, before & after chemotherapy**

Characteristics	Mean Fact-L Score		% Improvement In Qol
	Before Chemo	After Chemo	
<b>NSCLC*</b>			
Male	56	88	23.0
Female	59.28	89.36	22.2
<b>SCLC*</b>			
Male	57	93	26.48
Female	55	94	28.71

Only 13(30.95%) patients completed the course of chemotherapy. An increase in Qol score was seen in these patients. 29 patients (69.05%) dropped out of chemotherapy during the treatment.

## DISCUSSION

In the treatment of lung cancer, chemotherapy has become a generally accepted and widely applied therapeutic modality. Since the majority of patients with this disease are not cured by surgery or radiotherapy and many cases present with advanced stages of disease, chemotherapy is regarded as the most promis-

ing approach to the ultimate control of lung cancer. In small cell tumors, significant advances in therapy have produced striking results.<sup>6,7</sup> The non-small cell tumors, however, have remained relatively refractory to treatment.<sup>8,9</sup>

In this study 42 cases diagnosed as lung cancer and treated with chemotherapy over the year were analyzed. Majority of patients belonged to age group above 50 years as was also reported in previous Indian studies.<sup>10</sup> NSCLC was found to be more common than SCLC in nonsmokers, while SCLC was more common among smokers. 70% of patients with small cell carcinoma were smokers. This association has been proved in recent studies.<sup>11</sup>

Only 30.95% of patients completed the full course of chemotherapy and thus were assessed for improvements in quality of life following chemotherapy treatment. FACT-L questionnaire has been developed as a part of FACIT measurement system. On measuring the scores on FACT-L before and after the course of chemotherapy, it was found that SCLC patients showed more improvement in scores than NSCLC patients. NSCLC patients showed an average improvement of 22.6% while SCLC patients showed an average improvement of 28% showing that chemotherapy is more beneficial in small cell carcinoma patients 29 (69.05%) of the total patients, left chemotherapy in between. The main reason for this was found to be financial problems. Majority of patients in India who are diagnosed with lung carcinoma usually belong to lower socioeconomic group and are thus unable to afford chemotherapy. With a per capita income of Rs 50,000, many Indians cannot afford high prices of chemotherapeutic agents. Another reason for default was switching to alternate forms of medicine. This may be partially attributed to high cost of chemotherapy and the associated side effects. Partly this can be due to high rates of illiteracy and lack of awareness among patients. About 25% of patients left chemotherapy because of non-tolerance of side effects. This can be avoided by educating the patient about the side effects that may occur and preparing the patient for treatment.

Side effects of chemotherapy range from mild, like non-specific tiredness to life-threatening as in neutropenic fever. They can be classified into haematological, gastrointestinal, dermatological, renal, pulmonary, cardiac, neurological, hepatic and gonadal toxicities. It is important that doctors and nurses are knowledgeable regarding the drugs' adverse effects and expected time of occurrence, and know how to prevent, minimize and manage them. Patients and families' education is also important, as many side effects will occur when the patient is at home. In managing side effects, assessment for patient's tolerance to the prior dose and early intervention play a

pivotal role in a patient's outcome. To minimize or prevent toxicity, chemotherapy should only be administered if there is adequate baseline blood picture, renal and liver functions, no contraindication with regard to underlying medical conditions, and for certain chemotherapeutic agents, further chemotherapy is discontinued if cumulative doses have reached tolerance levels.<sup>12</sup>

## CONCLUSION

Lack of funds to procure chemotherapy was the major factor responsible for default among patients. In patients completing the chemotherapy, significant improvements were seen in QoL. In past few years, little progress has been made in treatment of lung cancer patients in form of increased survival. As a result, the effect of chemotherapy on QoL becomes important while discussing the benefits of treatment with patients.

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