

## **Prevalence of Neurological Manifestations of Lung Cancer among Adult Sudanese Patients**

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### **Abstract:**

**The objective:** is to study the prevalence of neurological manifestations among adults Sudanese patients with lung cancer seen in the Radiation and Isotope Centre in Khartoum.

**Methods:** This is a prospective cross sectional hospital based study, conducted at Radiation and Isotope Centre in Khartoum. Sample of 52 adults Sudanese patients with lung cancer were included in the study. The period of the study was from February 2006 to July 2006. Data were collected by self administered questionnaire; this was constructed in sections to address the different aspects of the study as follows: personal data, presentation, physical examination, and investigations.

**The results:** showed that 41 patients were males. Most of the patients were above 50 years of age. Fifty percent of our patients' were from Khartoum state. All of our patients had chest findings except one. The most common symptoms observed were of cranial nerves involvement, headache, limb weakness, numbness, and sphincteric disturbance. More than half of the patients were smokers. Other extrapulmonary manifestations noticed include: clubbing, lymph node enlargement, bone metastasis or fracture, gynaecomastia, superior vena cava obstruction, hepatomegaly, and ascites. Chest X-ray abnormalities showed pleural effusion, consolidation, hilar lymphadenopathy, collapsed lung, and fibrosis in the majority of patients. Most of our patients had adenocarcinoma, followed by squamous cell carcinoma, poorly differentiated carcinoma, and small cell carcinoma.

**Conclusion:** The common neurological manifestations of lung cancer were found to be cranial nerves palsies, followed by lower limbs weakness, numbness, and sphincteric disturbances.

**Key words:** Cerebellar, numbness, neuropathy, convulsion.

**L**ung cancer is the leading cause of cancer-related mortality in both men and women<sup>1</sup>. The prevalence of lung cancer is second only to that of prostate cancer in men and breast cancer in women. Lung cancer recently surpassed heart disease as the leading cause of smoking-related mortality<sup>2</sup>. Most lung carcinomas are diagnosed at an advanced stage, conferring a poor prognosis. The need to diagnose lung cancer at an early and potentially curable stage is obvious. In addition, most patients who develop lung cancer smoke and have smoking-related damage to the heart and lungs, making aggressive surgical or multimodality therapies less viable options. Small cell lung cancer (SCLC) is considered distinct from the other lung cancers, called non-small-cell lung cancers (NSCLCs), because of their clinical and biologic

characteristics. SCLC exhibits aggressive behavior, with rapid growth, early spread to distant sites, exquisite sensitivity to chemotherapy and radiation, and frequent association with distinct paraneoplastic syndromes. Surgery usually plays no role in its management, except in rare situations (<5% of patients) in which it presents at a very early stage as a solitary pulmonary nodule. Even then, adjuvant chemotherapy after surgical resection is recommended, since SCLC always should be considered a systemic disease<sup>3-4</sup>. A variety of poorly understood neurological syndromes may occur in lung cancer, and affect 4 to 5% of patients. The following neurological manifestations were observed among patients with lung cancer including, cranial nerves palsies, lower limbs weakness and numbness due either to cord compression or peripheral neuropathy, cerebellar lesion, sphincteric disturbances and convulsion due to brain

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secondary or part of manifestations of paraneoplastic syndrome<sup>5,6</sup>.

**Objectives:** To study the prevalence of neurological manifestations among adult Sudanese patients with lung cancer, seen in Radiation and Isotope Centre- Khartoum, Sudan.

**Methods:** This a prospective cross sectional hospital based study, conducted in Radiation and Isotope Centre (Khartoum), which is a tertiary hospital located in the centre of Khartoum. Samples of 52 adult Sudanese patients with lung cancer were included in the study after taking informed consent. The period of the study was from February 2006 to July 2008.

**Inclusion criteria:** 1) Sudanese nationality 2) Age 18 years and above.

**Data collection:** Data were collected by self administered questionnaire. It was constructed in sections to address the different aspects of the study as follows: 1) Personal

data 2) Presentation 3) Physical examination 4) Investigations.

**Patients' assessment:** This was done in classical manner by history, examination and investigations. Investigations included: Urinalysis, FBC, Chest-X-R (CXR), blood urea and electrolytes, chest CT scan, bronchoscopy and biopsy, nerve conduction study, EMG, MRI brain, and CT brain when they were needed.

**Data Entry and Analysis:** All collected data were analyzed using statistical package program for social science (SPSS). The results were expressed as figures, tables and graphs.

**Results:** The study showed that out of 52 patients with lung cancer, 41 (78.8%) were males. The age distribution ranged between 27–76 years with a mean  $56.27 \pm 12.18$ . Maximum number [18 (34.61%)] were found between 50–59, and the least number [1 (1.92%)] between 19 – 29 years of age.

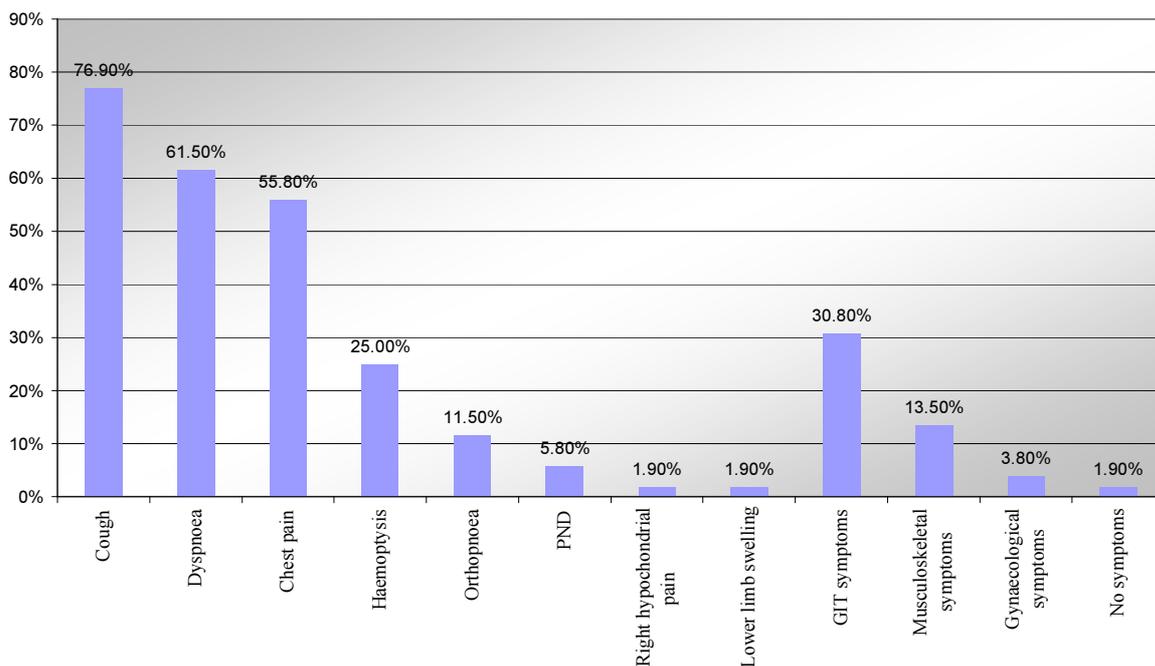


Fig 1 shows the non- neurological symptoms in our patients

The highest number of patients [27(51. 92%)] were from Khartoum state, followed by Western states [10 (19.23%)], 4 (7.6%) from Eastern states, 4 (7.6%) from Northern states, and 1(1.92%) from White Nile state. The main non neurological symptoms related to

the chest were cough which was observed in 40 (76.9%) patients, dyspnoea in 32 (61.5%), chest pain in 29 (55.8%), haemoptysis in13 (25%). 16 (30.8%) patients had GIT symptoms in form of, nausea, vomiting, weight loss, and poor appetite. (Fig. 1)

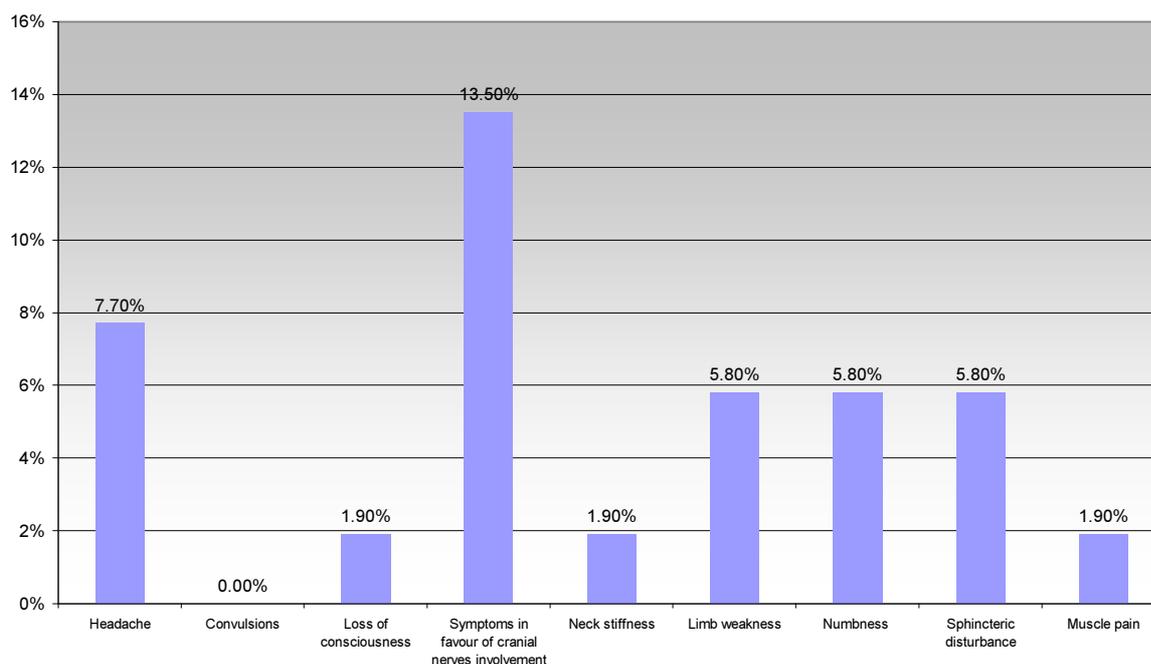


Fig 2 shows the neurological symptoms in our patients

Regarding the neurological symptoms four patients(7.7%) had headache, loss of consciousness was seen in one patient(1.9%). Fig2. It was found that twenty nine patients (55.8%) were smokers. Almost all patients had findings on examining the chest, forty two (80.8%) had impaired tactile vocal fermitus Table1.

Table (1) shows chest examination findings in patients with lung cancer.

Chest Examination Findings	No. of Patients (%)
Chest contour	15 (28.8)
Scars or swelling	9 (17.3)
Dilated veins	3 (5.8)
Abnormal movement	35 (67.3)
Abnormal position of the trachea	12 (23.1)
Impaired TVF	42 (80.8)
Impaired percussion	38 (73)
Abnormal breath sounds	41(78.9)

P = 0.177

Extra-pulmonary examination findings were shown in table 2. Clubbing was the commonest one.

Table (2) shows extra-pulmonary examination findings.

Extra-pulmonary Findings	No. (%)
Clubbing	9 (17.3)
Gynaecomastia	1 (1.9)
Lymph nodes enlargement	7 (13.5)
Bone tenderness & fracture	7 (12.9)
Superior vena caval obstruction	1 (1.9)
Jaundice	1 (1.95)
Hepatomegally	5 (9.6)
Ascites	4 (7.7)

CNS examination showed that two patients (3.85%) had higher function impairment. Table3.

Table (3) shows CNS findings

CNS Examination Findings	No. (%)
Higher functions impairment	2 (3.85)
Cranial nerves involvement	7 (13.5)
Motor signs	3 (5.8)
Sensory signs	4 (7.7)
Cerebellar signs	1 (1.9)

Chest x-ray abnormal findings were detected in 48 patients (92.3%) it included: pleural effusion in 26 (50%) patients, consolidation in 20 (38.5%), hilar lymphadenopathy in 3 (5.8%), collapsed lung in 2 (3.8%), and fibrosis in one patient (1.9%). Histological classification showed that 19 patients (36.5%) were diagnosed as having adenocarcinoma, 9 (17.3%) as squamous cell carcinoma, 7 (13.3%) as poorly differentiated, 4 (7.7%) as small cell carcinoma, 3 (5.8%) as malignant cell, 1 (1.9%) as synovial, 1 (1.9%) anaplastic and 1 (1.9%) as mucus secretory carcinoma.

### Discussion:

The study showed that 55% of our patients were smokers, most of them were males (78.8%). This differs from the study done by Scagliotti G.<sup>7</sup> The difference is due to the fact that smoking is the most common risk factor, and in our community- unlike the developed countries<sup>8</sup>- incidence of smoking among males is far more common than among females. Like other cancers the incidence increases with age, which explains prolonged exposure to carcinogenic materials. Most of our patients were from Khartoum state where the study had been conducted.

The non-neurological symptoms in this population was found to be similar to what was mentioned in the literature.<sup>9-10</sup> <sup>11</sup>Symptoms of cranial nerves involvement were similar to that reported by Dellatre et al. but it differs from Adams and Vectors findings.<sup>12-13</sup> Cranial nerves involvement are either part of false localizing signs as in case of six nerve palsy or may be due to increased intracranial pressure (ICP) as in case of papilloedema resulting from metastasis to the brain.<sup>14-15</sup> Other neurological symptoms including headache, lower limbs weakness, numbness, and sphincteric disturbance were similar to the observation of Grippi MA and different from that of Hyde<sup>16-17</sup>. Limbs weakness and numbness can occur as a manifestation of cord lesion secondary to metastasis or as a part of paraneoplastic syndrome. Very rare manifestations include muscle pain as a part of clinical picture of

dermatomyositis. Neck stiffness was detected in one patient (1.9%) and it was due to meningeal irritation secondary to opportunistic infections, which is a well known complication that tends to occur in immunocompromised patients. Loss of consciousness can occur in patients with lung cancer either due to brain metastasis, paraneoplastic manifestations of the tumor, associated hyponatraemia as a manifestation of SIADH or may be due to opportunistic infections like *Cryptococcus neoformis*.<sup>18-19-20</sup>

Most of our patients showed abnormal findings on examination of the chest, the most common was pleural effusion, followed by consolidation and collapse, this can be explained by the late presentation of our patients, and it was supported by the increased incidence of abnormal findings on extrapulmonary examination like clubbing, lymphadenopathy, bone tenderness and fractures, hepatomegaly, and ascites.<sup>21-22-</sup>

<sup>23</sup>There is strong relation between abnormal chest findings, extrapulmonary findings, and CNS findings most of the patients who had cranial nerves involvement showed abnormal findings either in form of consolidation, collapse or pleural effusion. Upper and lower limb weakness were detected in 5.8% of our patients, this is similar to what was mentioned in the literature, it is either due to cord compression, nerve damage or muscle disease.<sup>24</sup> Sensory disturbances were detected in 7.7% of our patients, this is similar to what was mentioned by Wilkinson and it differed from what was reported by Parker, it is either part of manifestations of cord compression or paraneoplastic manifestations.<sup>25-26-27</sup> Out of the seven patients who had cranial nerves palsies, three had adenocarcinoma. Sensory and motor signs were detected in patients with squamous cell carcinoma.

In spite of delay in presentation of our patients only 6.8% had an element of higher function impairment which is similar to what was reported by Feinstein AR but differed from what was mentioned by Merchut.<sup>28-29</sup>

Only one patient had cerebellar sign as apart of manifestation of paraneoplastic syndrome similar to the finding of Brain WR.<sup>30</sup>

The histological type of lung cancer in our patients agreed with what was mentioned in the literature.<sup>31-32</sup>

**Conclusions:** Most of our patients were from Khartoum state. Males dominated our studied population as the adenocarcinoma. As expected there is a strong relationship between smoking and lung cancer and also between abnormal chest findings, extra-pulmonary findings, and CNS findings. A variety of neurological manifestations were observed among our patients including, cranial nerves palsies, lower limbs weakness, numbness, cerebellar lesion, and sphincteric disturbances. Half of the patients with cranial nerves involvement had adenocarcinoma, while sensory and motor signs were detected in patients with squamous cell carcinoma.

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