

AN AYURVEDIC APPROACH IN LUNG CANCER

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Received on: 25/05/2021

Revised on: 15/06/2021

Accepted on: 05/07/2021

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ABSTRACT

Lung cancer or bronchogenic carcinoma refers to tumors originating in the lung parenchyma or within bronchi. It is the leading cause of cancer death and is attributed to more than 25% of all cancer deaths. The estimated incidence of lung cancer in India was 70,275 in all ages and both genders. Primary lung cancer is typically divided into two main histopathological types: small cell lung cancer (SCLC) and non-small-cell lung cancer (NSCLC). NSCLC accounts for 85% of lung cancer cases, including three main subtypes, namely adenocarcinoma (ADC), squamous cell carcinoma (SCC), and large cell carcinoma (LCC). The treatments for lung cancer mainly include surgical resection and chemotherapy which have their own side effects. In Ayurveda many single & compound formulations have proved to have anti-cancerous effect by different researches carried out. Hence here an attempt is made to analyse the disease and its management through Ayurveda.

KEYWORDS: Anti- cancerous effect, Bronchogenic carcinoma, chemotherapy, Non-small-cell lung cancer (NSCLC), Small cell lung cancer (SCLC).

INTRODUCTION

Lung cancer, also known as lung carcinoma is a malignant lung tumour characterized by uncontrolled cell growth in tissues of the lung.

Risk factors for lung cancer include^[1]

Smoking, Exposure to Passive smoking, Exposure to radon gas, Exposure to asbestos and other carcinogens, Family history of lung cancer

Pathogenesis^[2]

The pathophysiology of lung cancer is very complex and incompletely understood. It is hypothesized that repeated exposure to carcinogens, cigarette smoke in-particular, leads to dysplasia of lung epithelium. If the exposure continues, it leads to genetic mutations and affects protein synthesis. This, in turn, disrupts the cell cycle and promotes carcinogenesis.

Signs and symptoms^[3]

Lung cancers don't cause symptoms until the disease has reached advanced stage

- A new cough that is persistent or worsens, or a change in an existing chronic cough
- Cough that produces blood
- Pain in the chest, back or shoulders that worsens during coughing, laughing or deep breathing

- Shortness of breath that comes on suddenly and occurs during everyday activities
- Unexplained weight loss
- Feeling tiredness
- Loss of appetite
- Lung infections such as bronchitis or pneumonia
- Hoarseness or wheezing

Metastatic lung cancer symptoms

Metastatic lung cancer symptoms depend on the part of the body to which the cancer has spread, as well as the size and location. Sometimes, metastatic disease may not cause any symptoms, though about 30 percent to 40 percent of people with lung cancer will have symptoms of metastasis.

- If the cancer has spread to the bones, it may cause bone pain, often in the vertebrae or ribs and fractures
- If the liver is affected, symptoms may include nausea, extreme fatigue, increased abdominal girth, swelling of the feet and hands due to fluid collection, and yellowing or itchy skin.
- If either the brain or spinal cord is affected, symptoms may include headache, blurred or double vision, difficulty with speech or seizures.
- Indicators of poor prognosis include the following:
- Relapsed disease

- Weight loss of greater than 10% of baseline body weight
- Hyponatremia

Complications^[4]

Multiple complications may be noted, depending on the site of metastasis or the metabolic factor that the tumour affects. Hypercalcemia could initially be asymptomatic but in late stages could lead to weakness, fatigue, and sleepiness, and in extreme cases to severe constipation and lethargy.

Investigations are performed to delineate the extent of disease and to assess organ function before therapy

Diagnosis^[5]

It is mainly based on medical history, symptoms and physical examination

Imaging Tests

These tests help to find lung cancer, to see if it has spread, to see if treatment is working or to find a relapse.

- Computed tomography (CT) scan
- Positron emission tomography (PET) scan
- Bone scan

Other procedures

- Bronchoscopy biopsy
- Endobronchial ultrasound (EBUS)
- Endoscopic oesophageal ultrasound (EUS)
- Mediastinoscopy and mediastinotomy
- Thoracentesis
- Thoracoscopy or video-assisted thoracoscopic surgery (VATS) biopsy
- Sputum cytology
- Fine needle aspiration (FNA) biopsy
- Open biopsy

Treatment^[6]

Treatment for lung cancer depends on the cancer's specific cell type, how far it has spread. Common treatments include palliative care, surgery, chemotherapy, and radiation therapy.

Ayurvedic perspective

Charaka,^[7] and Sushruta,^[8] samhitas describe cancer as inflammatory or non-inflammatory swelling and mention them as either Granthi (minor neoplasm) or Arbuda (major neoplasm). Ayurvedic literature defines three body-control systems, viz., Vata, Pitta and Kapha which mutually coordinate to perform the normal function of the body. In benign neoplasm (Vataja, Pittaja or Kaphaja) one or two of the three bodily systems are out of control and is not too harmful because the body is still trying to coordinate among these systems. Malignant tumours (Tridosaja) are very harmful because all the three major bodily systems lose mutual coordination and thus cannot prevent tissue damage, resulting in a deadly morbid condition. Cancer originates due to a metabolic crisis, i.e. aggravation of vata forces and suppression of

kapha forces, both interacting with one another resulting in proliferation.

Ayurvedic medicines can be given as additional therapy to the standard line of treatment for lung cancer. The aim of treatment is to control the lung cancer, prevent or reduce its spread to other parts of the body and improve overall survival.

Yogas which can be used are^[9]

- Rasa Sindura
- Sameera Pannaga Ras
- Chaturbhuj-Ras
- Hema-Garbha-Ras
- Laxmi-Vilas-Ras
- Karpuradi-Churna
- Kantakari-Avleha
- Bhallatak-Asava
- Vasavaleha
- Sitopaladi-Churna
- Talisadi-Churna
- Pippalyadi-Ghrut

To improve the immune status of body following yogas can be used^[9]

- Suvarna-Malini-Vasant
- Madhu-Malini-Vasant
- Vasant-Kusumakar-Ras
- Suvarna-Sameerpannag-Ras
- Ashwagandha (*Withania somnifera*)
- Suvarna-Bhasma
- Heerak-Bhasma
- Dashmooladi-Ghrut
- Haritaki-Avaleha
- Chyawanprash-Avaleha

Ekamoolika prayoga^[9]

- Kantakari (*Solanum xanthocarpum*)
- Bhruhat-Kantakari (*Solanum indicum*)
- Vasa (*Adhatoda vasaka*)
- Yashtimadhu (*Glycyrrhiza glabra*)
- Pippali (*Piper longum*)
- Vibhitaki (*Terminalia bellerica*)
- Bharangee (*Clerodendron serratum*)
- Kushtha (*Saussurea lappa*)
- Dhatura (*Dhatura fastuosa*)
- Pushkarmool (*Inula racemosa*)
- Haridra (*curcuma longa*)
- Guduchi (*Tinospora Cordifolia*)

Various studies done on single drugs and yogas in lung cancer are as follows

- *Nigella sativa* (N sativa), commonly known as black seed, has been used to treat lung cancer due to its antioxidant, anti-inflammatory, and antibacterial activities.^[10]
- Swarna Bhasma proved as anti-cancer in various types of cancers like rectal, lung, liver. Classical Ayurvedic formulations like Aarogyawardhini Shwaskuthar Ras, Sitopaladi Churna, Tribhuvankirti

Ras and Powder form of Ringani (*Solanum Surratenus*), Powder form of Sursa (*Ocimum tenuiflorum*), Srunga Bhasma (calyx of deer's horn), Powder of Tankan (Borax) with other proprietary medicines Hirak Rasayana, Vrushya Rasayana, Sindurbhushan Rasayana, Harital Rasayana showed clinically meaningful antitumor activity. Rasayana therapy can thus be considered as an effective therapeutic option in patients who fails to respond to conventional anticancer therapies.^[11]

- Navjeevan Rasayana (Swarna Bhasma – Bhasma (Calx) of Gold, Hiraka bhasma-calcinoid diamond, Abhrak Bhasma, -calcined Mica ash, Rajat Bhasma silver ash, Tamra Bhasma-copper ash Pravala Bhasma (Coral Calyx), Powder of Pippali, -Piper Longum, Yashtimadhu, -Glycerrhiza, Glabra, Karkatshrungi-Pistacia integerrima, ringani-Solanum Surratense proved as anti-cancer in various types of cancers like rectal, lung, liver etc.^[12]
- The antioxidant and anticarcinogenic effect of *W. somnifera* (L.) helps in immune dysfunction condition which has been found to be associated with cancer and chemotherapy.^[13]
- In vitro studies have shown that root extracts of *Withania Somnifera* exhibited cytotoxic properties against lung, colon, central nervous system, and breast cancer cell lines. Affects the immune system, the deleterious effects on the immune system is more reversible and more controllable by *W. somnifera*. These results show the immunomodulatory activity of *W. somnifera* (L.).^[14]
- Study found that found that girinimbine, a carbazole alkaloid from the roots of *M. koenigii*, can inhibit cell proliferation selectively in a dose dependent manner in A549 cells. It was found that the cell death induced by girinimbine exhibited a clear morphological sign of apoptosis, as this is an important property of a candidate anticancer drug.^[15]
- Curcumin has anti-metastatic potential by decreasing invasiveness of cancer cells. Moreover, this action was involved in the MEKK3, p-ERK signaling pathways resulting in inhibition of MMP-2 and -9 in human lung cancer A549 cells.^[16]
- Curcumin can be an effective adjunct in treating solid organ tumors due to its properties of regulating oncogenes like p53, egr-1, c-myc, bcl-XL, etc.; transcription factors like NF-kB, STAT-3, and AP-1; protein kinases like MAPK; and enzymes like COX and LOX.^[16]
- Anticancer activity of *Abhrak Bhasma* is positive for all the three considered cells lines. i.e. Lung, Leukemia and Prostate.^[17]

DISCUSSION

Lung cancer is a condition that causes cells to divide in the lungs uncontrollably. The body programs cells to die at a certain stage in their life cycle to avoid overgrowth. Cancer overrides this, causing cells to grow and multiply

when they should not. This overgrowth of cells leads to the development of tumours and the harmful effects of cancer. Identifying lung cancer in its earliest stages can be difficult because the symptoms may be similar to those of a respiratory infection, or there may be no symptoms at all. The staging of cancer indicates how far it has spread through the body and its severity. This classification helps clinicians. Treatments for lung cancer depend on its location and stage, as well as the overall health of the individual. Even though lung cancer is not curable, it is treatable. Hence an effort can be made through Ayurvedic medications to improve the Quality of life.

Various single drugs and compound formulations are researched to have an effect in the treatment of lung cancer. The probable mode of action of the drugs in the treatment of lung cancer has to be studied.

CONCLUSION

Despite the intensive research and development of several new targeted agents and immunotherapies, survival rates for lung cancer patients remain unsatisfactory. Early detection and treatment of these cancers may help in the improvement of patients' survival. Over 60% of lung cancer patients are in fact diagnosed at late stages of the disease, where current treatment modalities are unlikely to be effective. Reliable biomarkers are greatly needed to predict sensitivity to each therapeutic modality in thoracic malignancies that could support optimal selection of treatment on individual patient basis as well as for early detection of lung cancer that could improve its prognosis. Smoking cessation programs should remain an important aspect to reduce the incidence of lung cancer. Although various clinical trials to attenuate the progression of have been tried in modern medicine the results were disappointing. Thus concurrent use of Ayurvedic medicine assumes more importance to control lung cancer to improve quality of life and improve survival rate.

Though various formulations of Ayurveda are found in classical texts as well as few researches have been carried out on few of the drugs, there is a lot of scope for research in this area.

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