LUNG CANCER CARE AND PREVENTION

LUNG CANCER

Lung cancer can originate from a variety of cell types within the lungs and is differentiated into non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC). NSCLC accounts for 85% to 90% of lung cancers and includes squamous cell lung cancer, adenocarcinoma, and large cell carcinoma. SCLC grows more quickly and has often metastasized by the time of diagnosis.[1]

Lung cancer is the second most common cancer and the leading cause of cancer death in both men (28%) and women (26%). It is the leading cause of cancer-related death in Veterans, and the most preventable cancer in the world.[2] Smoking is the leading cause of lung cancer while radon gas exposure is the second. Environmental carcinogen exposure to asbestos, arsenic, chromium, nickel, tar, mineral oils, mustard gas, silica, diesel exhaust, ionizing radiation, and bis(chloromethyl)ether also increase risk.[3]

Symptoms of lung cancer include a cough that is persistent or worsens, coughing up blood, shortness of breath or wheezing, chronic pneumonia or bronchitis, weight loss, and fatigue. Diagnosis is confirmed through history, X-ray, computerized tomography (CT), sputum, and biopsy. Lung cancer is primarily treated with surgery, and at times with chemotherapy and radiation depending on the type of tumor and extent of metastases.[1]

SMOKING

Tobacco use accounts for 30% of all cancer deaths, causing 87% of lung cancer deaths in men and 70% of lung cancer deaths in women. Each year, about 3,400 non-smoking adults die of lung cancer as a result of breathing secondhand smoke.[2] Squamous cell carcinoma and SCLC are most commonly associated with smoking. The risk declines with smoking cessation, reaching the risk level of nonsmokers after 20 to 25 years. The major lung carcinogens found in tobacco smoke are polycyclic aromatic hydrocarbons. Additionally, nicotine induces lung cancer cell line proliferation, promotes angiogenesis, and promotes resistance to apoptosis induced by chemotherapy.[4]

The United States Preventive Services Task Force (USPSTF) recommends annual lung cancer screening with a low-dose CT scan in adults aged 55 to 80 years who have a 30-pack per year smoking history and who currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery (Grade B recommendation).[5]

Significant positive effects of smoking cessation on the health of lung cancer patients include decreased lung cancer risk, increased survival time, decreased postoperative complications, increased efficacy of chemotherapy, decreased radiation therapy
complications, and improved quality of life. Immediate benefits of smoking cessation include improved oxygenation; lowered blood pressure; improved smell, taste, circulation, and breathing; increased energy; and improved immunity. Lung cancer patients who quit smoking derive the same benefits plus decreased fatigue and shortness of breath; increased level of activity and performance; and improved appetite, sleep, and mood. This is especially important as lung cancer patients have a greater symptom burden than other cancer patients.[4]

Refer to “Tobacco Use Disorders” for more information on working with patients who smoke.

**NSAIDS AND ASPIRIN**

The evidence for aspirin and non-steroidal anti-inflammatory drug (NSAID) use preventing lung cancer is mixed. An early meta-analysis found an inverse relationship between NSAID use and the risk of lung cancer, but no causality was established.[6] A meta-analysis of 15 studies concluded that there was no relationship between aspirin use and lung cancer risk, since a significant protective effect was only seen in low-quality studies.[7] A recent larger meta-analysis concluded that aspirin use with a dose of seven tablets per week could significantly reduce lung cancer risk, whereas NSAIDs are not chemopreventive. The beneficial effects were not seen in smokers.[8] It is not recommended to use aspirin or NSAIDs daily to prevent lung cancer, as the side effects may outweigh the benefits.

**NONPHARMACOLOGICAL THERAPIES FOR THE PREVENTION AND TREATMENT OF LUNG CANCER**

**FOOD AND DRINK**

**FRUITS AND VEGETABLES**

A European prospective trial found that a 100-gram per day increase in the consumption of vegetables and fruits (about 1 to 2 servings) significantly reduced the risk of lung cancer, including in current smokers.[9] Three other studies confirm that the intake of fruits and vegetables, particularly those rich in carotenoids, reduces lung cancer risk.[10-12] Carotenoid-rich produce includes sweet potatoes, carrots, butternut squash, cantaloupe, sweet red peppers, apricots, peas, broccoli, spinach, and romaine lettuce.

The “Selected Vegetables” soup (or “Sun’s Soup”) is a mixture of herbs and vegetables that is being studied as a treatment for cancer. It contains soybean, shiitake mushroom, mung bean, red date, scallion, garlic, leek, lentils, hawthorn fruit, onion, ginseng, angelica root, licorice, dandelion root, senega root, ginger, olive, sesame seed, and parsley and is sold as a dietary supplement. An ongoing randomized clinical trial of patients with stage IIIB or stage IV non-small cell lung cancer is comparing the survival of patients receiving Selected
Vegetables/Sun’s Soup with patients receiving a placebo. Both groups are receiving treatment with radiation therapy, surgery, or palliative care.

PROTEIN

Adequate protein intake is very important for patients with lung cancer since this type of cancer carries a high risk of cachexia. Their protein requirements can exceed 80 grams per day. The best dietary sources of protein are cold-water fish, legumes, lean meats (chicken and pork), nuts, and seeds.[1]

SOY

Soy foods consist of soybeans, tofu, tempeh, miso, and soymilk and are a common part of the Asian diet. A 2013 meta-analysis suggests a borderline reduction in lung cancer risk with daily soy protein intake, with a significant inverse association in nonsmokers.[13] The correlation is more apparent in women, with a significantly better overall survival.[14,15] These studies were conducted in Asian populations.

OBESITY

Obesity is linked to the increased risk of many chronic diseases and cancers. However, according to a recent meta-analysis, being overweight or obese serves as a protective factor against lung cancer, especially in current and former smokers.[16] BMI is inversely correlated with the level of urinary 8-hydroxydeoxyguanosine, an indicator of oxidative DNA damage in smokers, suggesting that it may serve as an independent factor for host susceptibility to smoking-related cancers. Smokers should improve their nutritional status and maintain a suitable body weight.

ACRYLAMIDE

A large case-cohort study conducted in The Netherlands found an inverse association between acrylamide intake and lung cancer in women, but not in men. Acrylamide is a carcinogen that is produced when starchy foods (French fries, potato chips) are heated with frying or baking, but not boiling. Cigarette smoking and coffee are also significant sources of acrylamide.[17]

DIETARY SUPPLEMENTS

Note: Please refer to the Passport to Whole Health, Chapter 15 on Dietary Supplements for more information about how to determine whether or not a specific supplement is appropriate for a given individual. Supplements are not regulated with the same degree of oversight as medications, and it is important that clinicians keep this in mind. Products vary greatly in terms of accuracy of labeling, presence of adulterants, and the legitimacy of claims made by the manufacturer.
BETA-CAROTENE AND VITAMIN A

Beta-carotene is a vitamin A precursor. Two large meta-analyses conducted in the 1990s, the Alpha-Tocopherol Beta-Carotene Cancer Prevention (ATBC) trial and the Beta-Carotene and Retinol Efficacy Trial (CARET), found that supplemental beta-carotene increases the risk of cancer in current and former smokers.[18,19] This risk persisted after discontinuing the supplement.[20] Two recent reviews confirmed this finding with a 24% higher risk seen in smokers who took beta-carotene supplements.[21,22]

The carcinogenic effect of beta-carotene stems from its ability to exacerbate DNA oxidative damage and modify p53-related pathways of cell proliferation and apoptosis, leading to the development of cancer. Long-term use of individual beta-carotene supplements was associated with elevated SCLC risk. The vitamins and lifestyle (VITAL) study concluded that a longer duration of retinol use was associated with a significantly higher risk of NSCLC and total lung cancer.[23] Smokers should be advised to avoid beta-carotene and vitamin A supplementation. As discussed earlier, fruit and vegetable consumption with carotenoids is beneficial.

VITAMIN B

The European Prospective Investigation into Cancer and Nutrition (EPIC) trial, which investigated the role of vitamin B in lung cancer, observed over 500,000 subjects from 10 countries during 12 years. Higher levels of vitamin B6 and methionine were strongly associated with a reduced risk of lung cancer in people who never smoked, those who quit, and current smokers. Folate, combined with above-average levels of vitamin B6 and methionine, was associated with a two-thirds reduction in lung cancer risk.[24] The intake of foods rich in B6, including cereal grains, legumes, vegetables, meat, fish, and eggs, is encouraged in current and former smokers.

FISH OIL

A randomized controlled trial found that NSCLC patients taking 2.5 grams of EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) per day during chemotherapy had a significantly increased response rate (35%) and a 40% greater clinical benefit.[25] Another randomized controlled trial found that stage III NSCLC patients receiving two cans of a protein supplement containing 2.02 grams EPA and 0.92 grams DHA per day had significantly improved quality of life, physical and cognitive function, global health status, and social function after 5 weeks compared to the control group, which received only the protein supplement.[26] Fish oil has anti-inflammatory and antioxidative benefits and can be used to treat cachexia, a common problem in lung cancer patients.[27]

MELATONIN

Melatonin is a hormone secreted by the pineal gland that regulates the sleep cycle. Many studies have shown that lung cancer patients have disrupted melatonin secretion. A dose of 20 mg per day used by patients with metastatic NSCLC receiving chemotherapy results in a
更高的整体肿瘤消退率和5年生存率。[28] 它也可以在较低剂量下用于帮助那些经历失眠的人。

**OTHER**

根据当前的证据，维生素C、D和E无法降低肺癌风险。

**MOVING THE BODY**


**POWER OF THE MIND**

**BREATHING EXERCISES**

呼吸练习在肺癌患者中起作用，可以纠正呼吸错误，重新建立正常的呼吸模式，增加膈肌活动，改善肺泡通气，减少能量消耗，并减轻呼吸短促。简单的呼吸练习包括拉长和减慢吸气和呼气，让肺癌患者采取更深的呼吸，增加他们的氧摄入量，而不是只利用肺的上半部分。最近的一项元分析结论表明，呼吸练习可以显著改善肺癌患者的术后肺功能和生活质量。在干预前和后，自我护理在日常生活、社交活动，以及抑郁和焦虑症状方面的差异具有显著性。[31]

**REFLEXOLOGY**

反射疗法涉及在脚、手或耳朵上应用压力，使用拇指、手指和手的特定技术，无需使用油或乳液。一项《科克伦回顾》的两篇小研究发现，反射疗法可能对肺癌患者在短期内有一些益处。[32]

**SUMMARY**

肺癌是一个可预防的疾病，第一步是帮助患者戒烟。改进饮食，包括水果和蔬菜，也可以降低肺癌的风险，尤其是吸烟者。肺癌患者应接受个性化补充剂、运动和呼吸技巧的指导，以改善其生存率和生活质量。推荐美国预防服务工作组的成人55至80岁，每年吸烟30包，且目前吸烟或在15年内戒烟的低剂量CT扫描肺癌筛查。
RESOURCES

- [American Lung Association](#)
- [Lung Cancer Foundation of America](#)
- [CancerCare®](#)
- [Lung Cancer Alliance](#)
- [Lung Cancer Research Foundation](#)

AUTHOR(S)

“Lung Cancer Care and Its Prevention” was written by [Srivani Sridhar](#), MD (2014).

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REFERENCES


