Small Cell (Oat Cell) Carcinoma

Lung carcinoma is typically divided into two categories: small-cell carcinoma and non-small-cell carcinoma. Non-small cell carcinoma subtypes include adenocarcinoma, squamous cell carcinoma, large cell carcinoma, and carcinoid tumor. Small Cell Lung Cancer (SCLC), formerly known as oat cell carcinoma, is a highly malignant cancer that is strongly correlated with smoking. It often arises in the central portion of the lungs and causes narrowing of the bronchial airways. SCLC is known to produce various paraneoplastic syndromes, including Cushing's disease via ectopic production of ACTH, syndrome of inappropriate ADH (SIADH), and Lambert-Eaton Syndrome. Histology shows Kulchitsky cells and the cells are chromogranin A positive and neuron-specific enolase positive. Chemotherapy and radiation are the mainstays of treatment.

PLAY PICMONIC

Characteristics

Aggressively Malignant
Aggressive Malignant-man
Small cell lung cancer (SCLC) is a highly malignant, aggressive form of lung cancer. In fact, the majority of patients present with metastatic disease. SCLC can be distinguished from non-small cell lung cancers because of its rapid growth and early development of metastasis.

Strong Correlation with Smoking
Strong-arm Smoking
Small cell lung cancer (SCLC) occurs almost exclusively in smokers. Heavy smoking is a risk factor for the development of all lung cancers but appears to be particularly related to SCLC.

Central Location
Central damage to lungs
Small cell lung cancer (SCLC) typically arises in the central portion of the lung. The most common presentation is a hilar mass with mediastinal adenopathy.

Amplification of Myc Oncogenes
Mickey-hat On-switch
Myc oncogenes are amplified in some cases of small-cell lung cancer (SCLC). The myc gene encodes a transcription factor that promotes cell proliferation by activating growth-promoting genes. Other mutations include the p53 and Rb tumor suppressor genes.

Signs and Symptoms

Narrowing of Bronchial Airways
Narrow Broccoli Airways
This cancer typically arises in the central airways. The most common presentation is a hilar mass with mediastinal adenopathy. The tumors generally grow around the bronchus, invading surrounding structures. This growth leads to cough, dyspnea, and weight loss. Hemoptysis is less common in SCLC than with squamous cell carcinoma.

Cushing's Syndrome
Cushion
Due to the high-grade neuroendocrine nature, paraneoplastic syndromes are common with small cell lung cancer (SCLC). SCLC can produce ectopic hormones such as ACTH. Excess ACTH stimulates cortisol overproduction in the adrenal glands and can lead to Cushing's Syndrome.

Ectopic ACTH
Egg-top AC
Small cell lung cancer (SCLC) can produce ectopic ACTH, leading to Cushing's Syndrome. It is important to note that because this production is ectopic, the cortisol levels will not be suppressed by low or high-dose dexamethasone suppression tests.

Syndrome Of Inappropriate Antidiuretic Hormone (SIADH)

Inappropriate Ant-tie on a Die-rocket

Syndrome of Inappropriate Antidiuretic Hormone (SIADH) occurs when antidiuretic hormone (ADH) is secreted in inappropriately increased amounts. ADH, or vasopressin, is normally released by the posterior pituitary gland and regulates water retention by the kidneys, but ectopic production by tumors like small cell lung cancer will cause SIADH. Patients with SIADH are usually asymptomatic until hyponatremia begins, and then the patient will experience symptoms like confusion, lethargy, and muscle weakness. First line treatment of asymptomatic SIADH is strict water restriction.

Lambert-Eaton Syndrome

Lamb-eating

About 1-3% of patients with small cell lung cancer (SCLC) will present with Lambert-Eaton Myasthenic Syndrome (LEMS). In these patients, the symptoms of LEMS are often the first symptoms of the lung cancer. LEMS is a neuromuscular disorder caused by antibodies against the presynaptic calcium channels, inhibiting the release of acetylcholine. Patients display weakness, which improves with repeated muscle use. This syndrome is different from myasthenia gravis, in which the weakness worsens with muscle use.

Diagnosis

Kulchitsky Cells

Cool-chips

As the name implies, small cell carcinoma cells are smaller than normal cells with little to no room for cytoplasm. Small, dark blue cells called Kulchitsky cells are typically visualized on histology. Kulchitsky cells, also known as enterochromaffin cells, are a type of neuroendocrine cell that has been implicated in the pathogenesis of SCLC.

Neuron-Specific Enolase Positive

Neuron Emo-lace Positive

These tumors frequently express markers of neuroendocrine differentiation, such as chromogranin A and neuron-specific enolase. Neuron-specific enolase is a protein present in high concentrations in neurons and neuroendocrine cells. This stain can also help identify carcinoid tumors.

Chromogranin A Positive

Chrome-granny (A) Apple Positive

These tumors frequently express markers of neuroendocrine differentiation, such as chromogranin A and neuron-specific enolase. Chromogranin A is a tumor marker used to detect the presence of tumors arising from neuroendocrine cells. This tumor marker is also elevated in carcinoid syndrome, pheochromocytoma, and pancreatic cancer.

Treatment

Chemotherapy and Radiation

Chemo-head-wrap and Radiation-radio

Since the majority of patients present with metastatic disease, surgical resection is often not indicated. Therefore, in the majority of patients diagnosed with SCLC, chemotherapy and radiation is the best treatment option.