Lung Cancer

Biomedical Engineering - URJC

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Understanding Lung Cancer: A Comprehensive Overview

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2 Etiology

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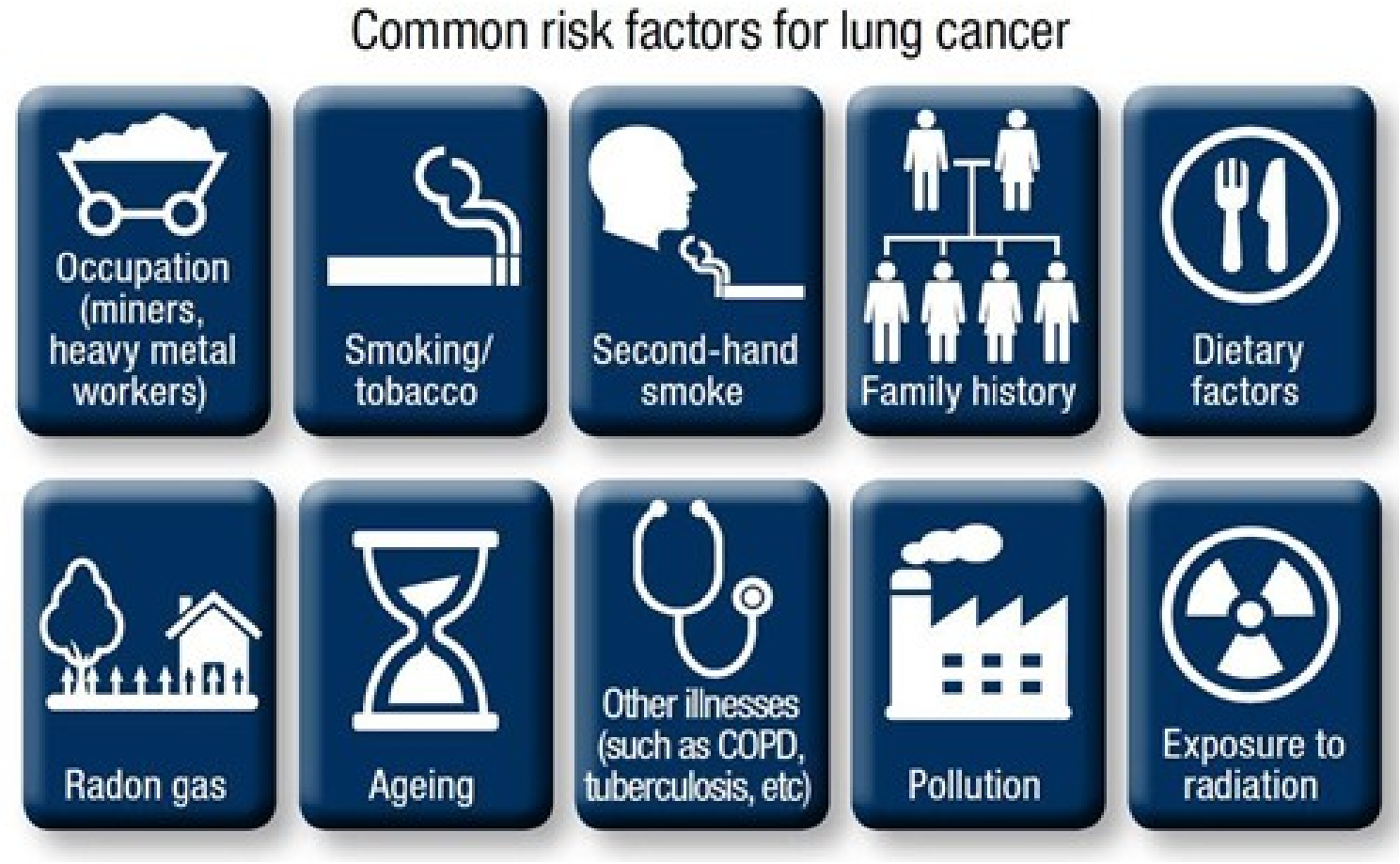
Introduction

- Lung cancer refers to tumors in lung parenchyma or bronchi.
- Most commonly diagnosed cancer globally, leading cause of cancer-related deaths.
- Dramatic rise linked to increased smoking.

Etiology

- Smoking: 90 % of cases, higher risk in males.
- Other risk factors: asbestos, radon, exposure to certain metals.
- Complex interplay with environmental and genetic factors.

Pneumothorax



Pathophysiology

- Repeated exposure to **carcinogens**, especially cigarette smoke, leads to dysplasia.
- Genetic mutations (e.g., MYC, BCL2, p53, EGFR) disrupt cell cycle, promoting carcinogenesis.
- Histopathological classification based on cellular and molecular subtypes (*next slide*).

Histopathological Classification

- **Small Cell Lung Cancer** (SCLC) and **Non-Small Cell Lung Cancer** (NSCLC).
- SCLC more responsive to chemotherapy but difficult to cure.
- NSCLC includes adenocarcinoma, squamous cell carcinoma, and large cell carcinoma.

Histopathological Classification

Small Cell Lung Cancer

- 15 % of bronchogenic carcinomas.
- At the time of diagnosis, only 30 % of patients with SCLC have tumors confined to the hemithorax of origin.
- SCLC is more responsive to chemotherapy and radiation therapy
- A cure is difficult to achieve because SCLC has a greater tendency to be widely disseminated by the time of diagnosis.
- SCLC is early methastasic.

Histopathological Classification

Non-Small Cell Lung Cancer

- NSCLC is any type of epithelial lung cancer other than SCLC.
- The most common types of NSCLC are:
  1. Squamous cell carcinoma (associated with cigarette smoke)
  2. Large cell carcinoma
  3. Adenocarcinomas may be found in patients who never smoked.
- NSCLC accounts for more than 80 % of all lung cancers.
- Squamous (epidermoid) cell carcinomas are the most common in Spain.

Clinical Presentation

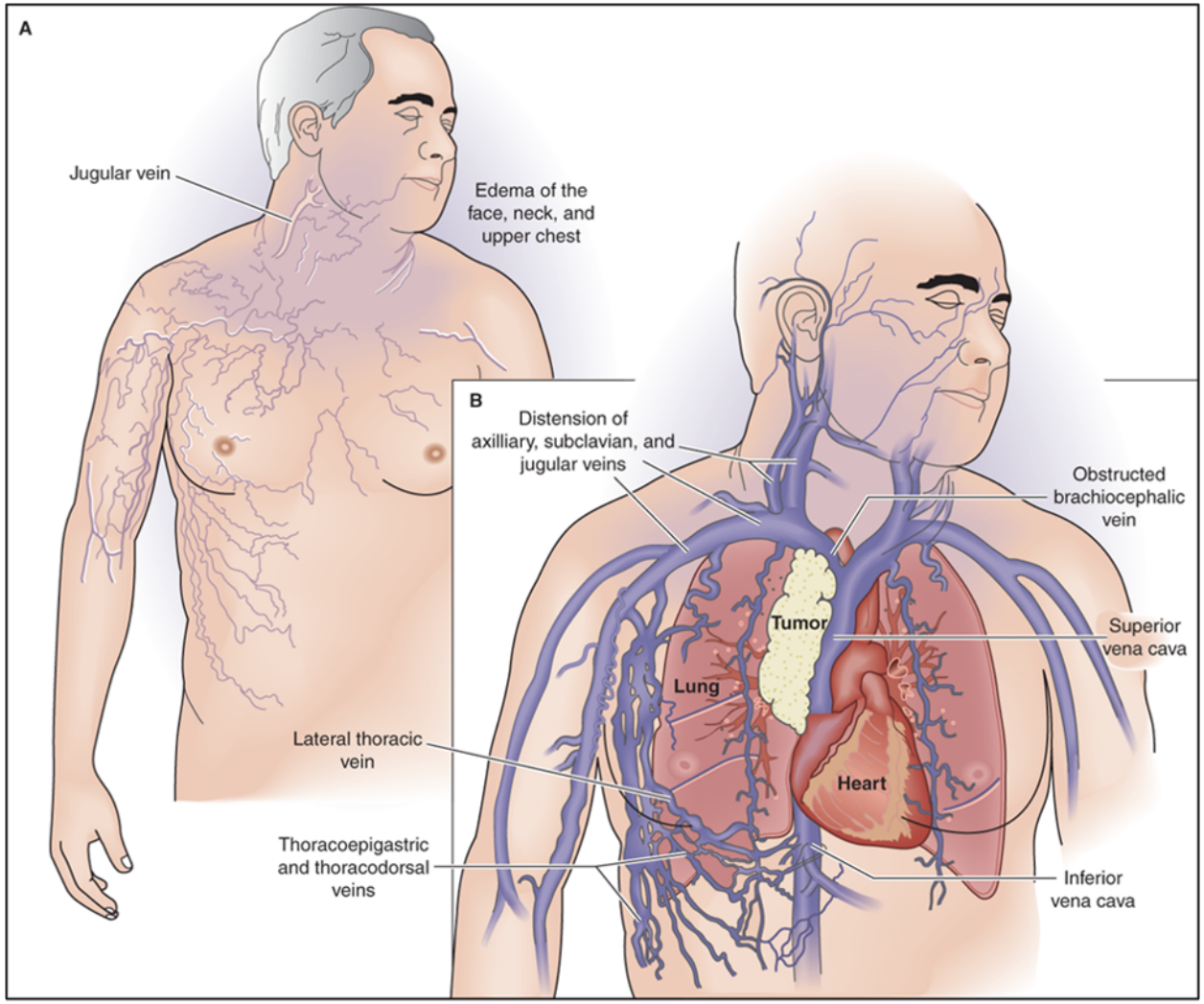
- Key features: persistent cough, haemoptysis, weight loss in smokers over 50.
- Incidental findings: mass on chest x-ray or CT.
- Distant metastasis common, affecting lungs, liver, brain, bone, adrenal glands.

Clinical Presentation

Symptoms related with metastasis

- **Pleural effusion**
- Facial and upper extremity swelling, distended neck veins, and dilated collateral vessels on the chest or abdominal wall may indicate **compression of the superior vena cava**
- If the brachial plexus is invaded, the tumour can cause weakness and/or atrophy of the intrinsic muscles of the hand, and paraesthesias and pain in the arm, and affects the sympathetic chain, causing **Horner's syndrome**

Compression of the superior vena cava



Source: R.S. Dieter, R.A. Dieter Jr., R.A. Dieter III:
Venous and Lymphatic Diseases, www.cardiology.mhmedical.com

Diagnosis

Investigations focus on confirming diagnosis and determining disease extent.

- History and physical examination.
- Routine laboratory evaluations.
- Chest x-ray.
- Chest CT scan with infusion of contrast material.
- Biopsy (bronchoscopy, sputum cytology, transthoracic needle biopsy).

Treatment

- Treatment based on histology, stage, and patient's health.
- Surgery for non-metastatic, early stages; chemotherapy for all types.