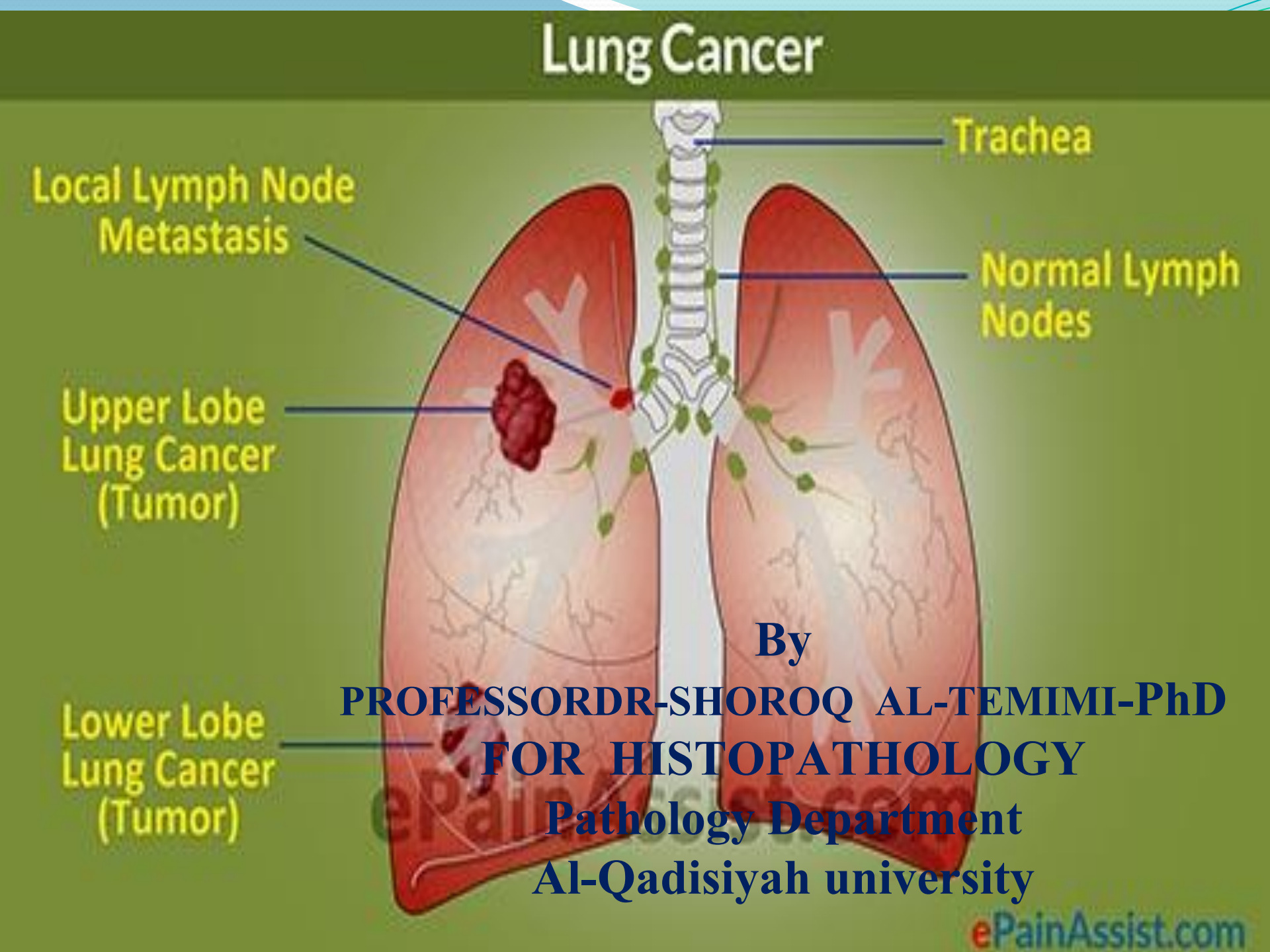

By
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objective of lecture

1- Histological type of bronchogenic carcinoma .
2- Spread of tumor .
3-clinical features of tumor .
4-Diagnosis of bronchogenic carcinoma .

A 50y old men has developed cough with blood –streaked sputum . A CXR reveals a 2 cm consolidated area near the LT hilum without L.N enlargement,

Bronchoscopy for lavage for cytological examination and tissue biopsy for histopathological Examination, showed malignant cells

Microscopic features of bronchogenic carcinoma

I-Squamous cell carcinomas

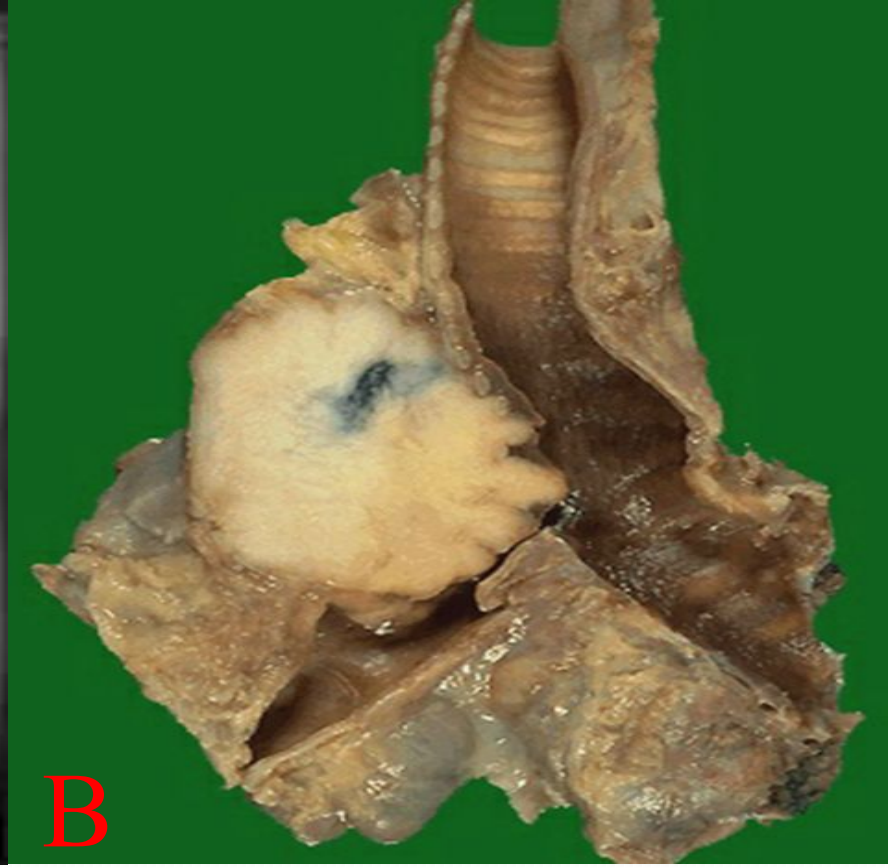
-Are often preceded for years by squamous metaplasia and then change to dysplasia in the bronchial epithelium, which then transforms to carcinoma in situ.

-These tumors range from

1-Well-differentiated(grade Ior low grade) showing nest of squamous cell with keratin pearls and intercellular bridges .

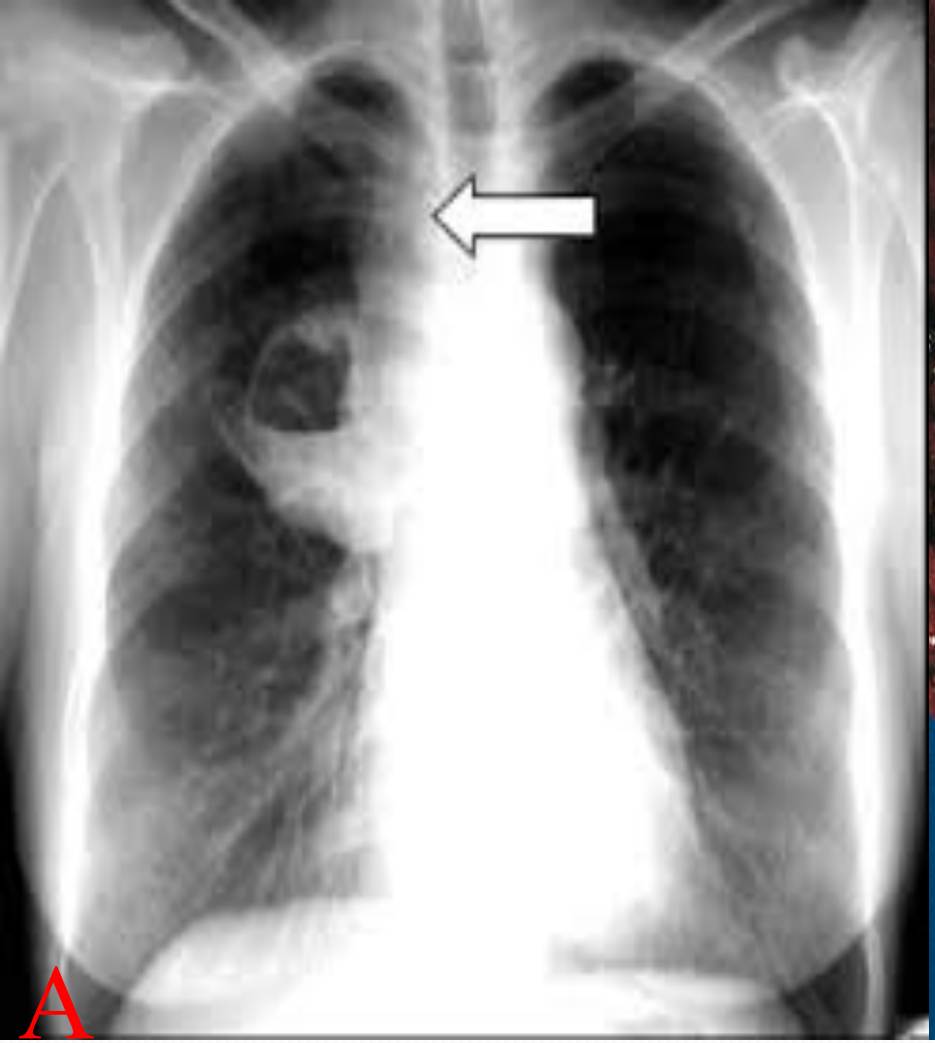
2-Modeated-differentiated(grade II or moderate grade)

3- Poorly differentiated (grade III or high grade)neoplasms having only minimal residual squamous cell features.



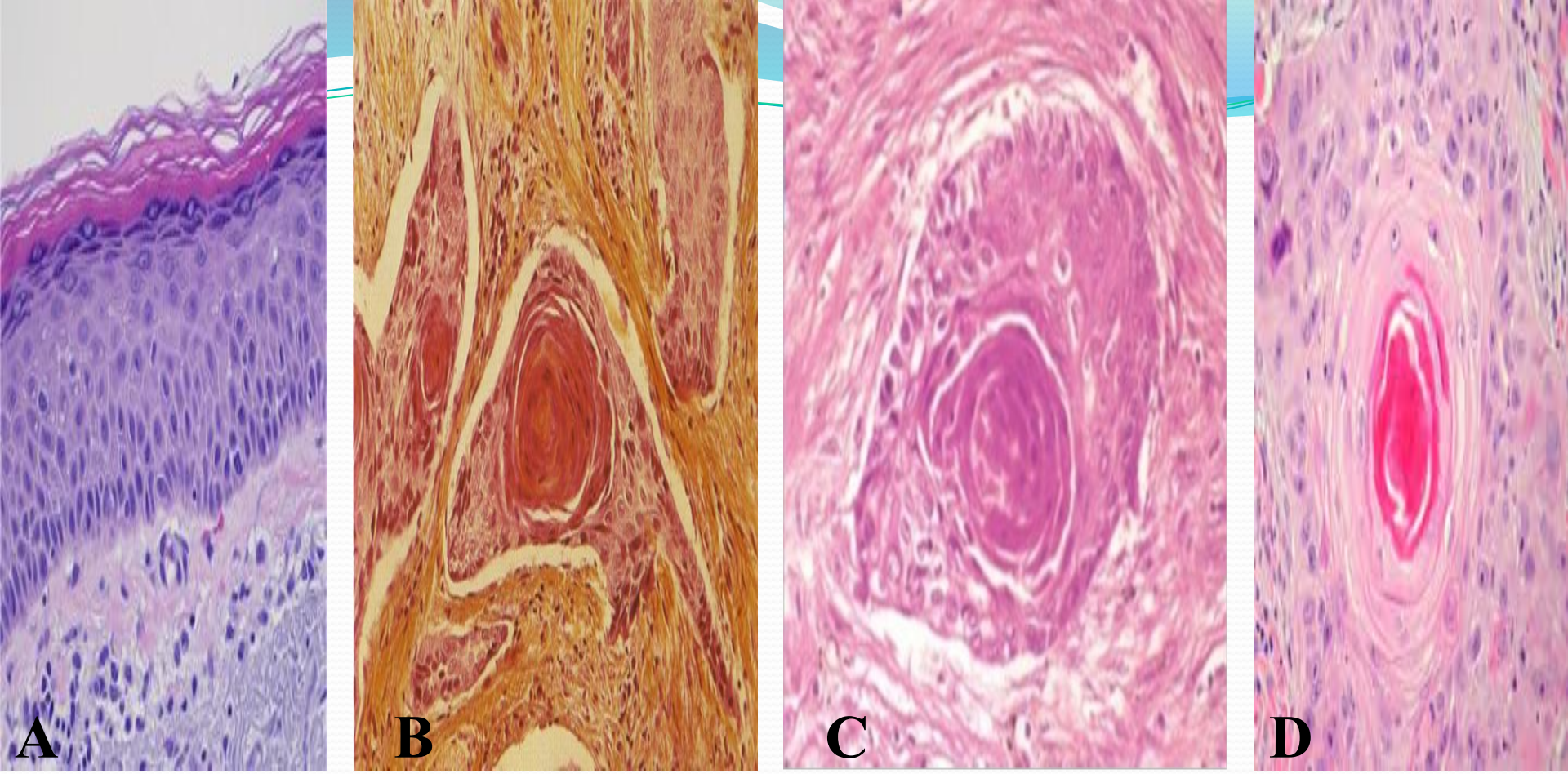
A- CXR demonstrates a large 5 cm diameter shadow area (consolidation) that is arising centrally in the right middle lobe.

B-Large pale white tumor is obstructing the right main bronchus, that is arising centrally in the lung most likely (squamous cell carcinoma of the lung) .



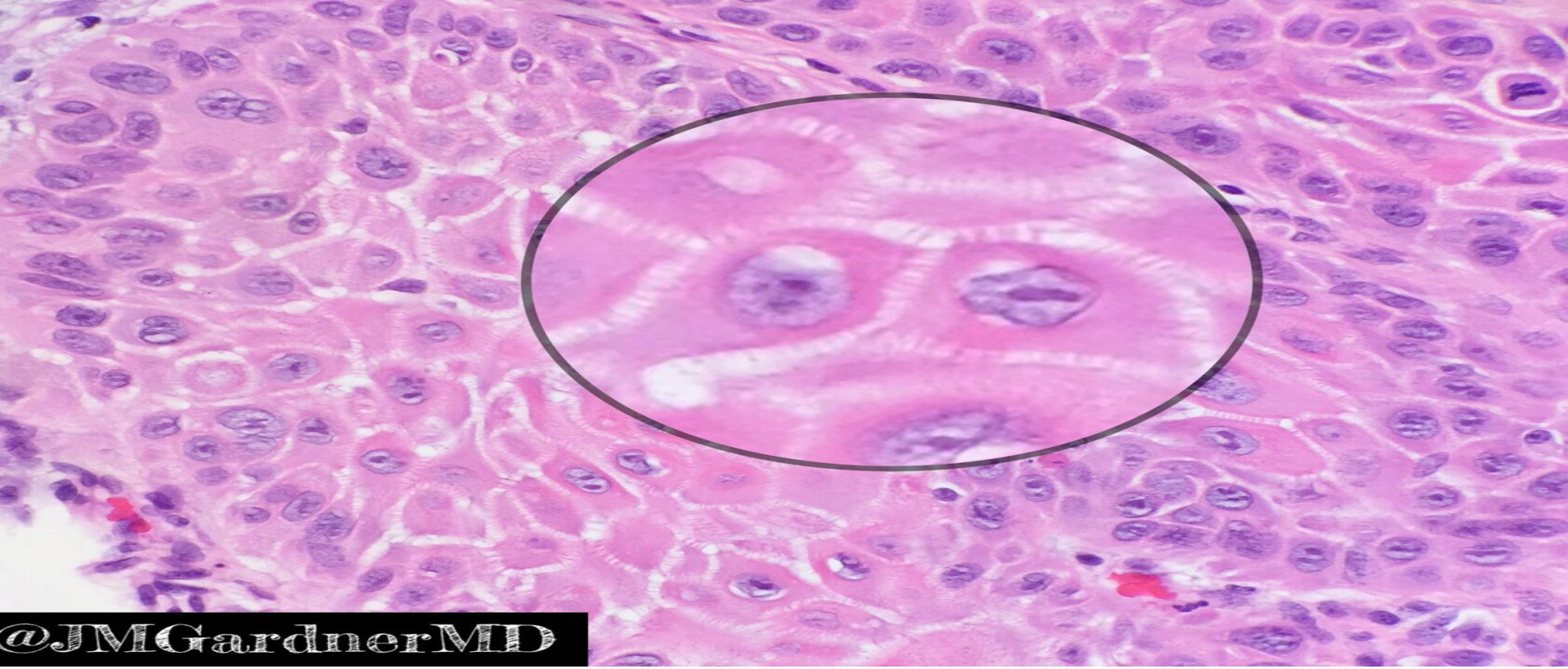
A-CXR demonstrates a large 5 cm diameter shadow area (consolidation) that is arising centrally in the right middle lobe with cavitation most likely squamous cell carcinoma

B- Tumor is obstructing the main bronchus, that is arising centrally in the lung most likely Squamous cell carcinoma showing large mass with central area of necrosis and cystic change.

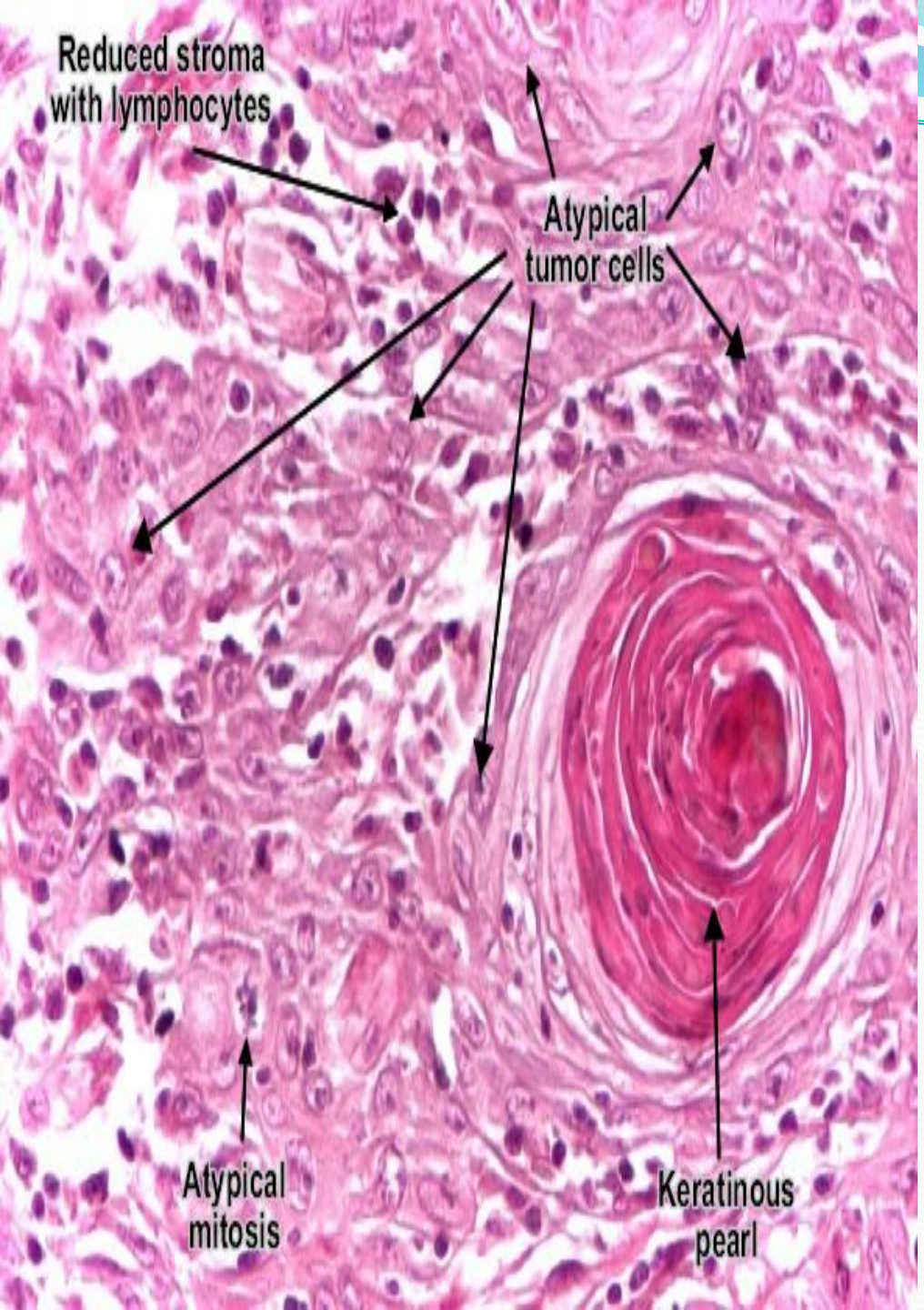


A-Normal squamous

B,C and D :- well-differentiated squamous cell carcinoma:- Nests of squamous cancer cells with keratin production . The pink cytoplasm with distinct cell borders and intercellular bridges characteristic for a squamous cell carcinoma , with feature of malignancy which include :-pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure .



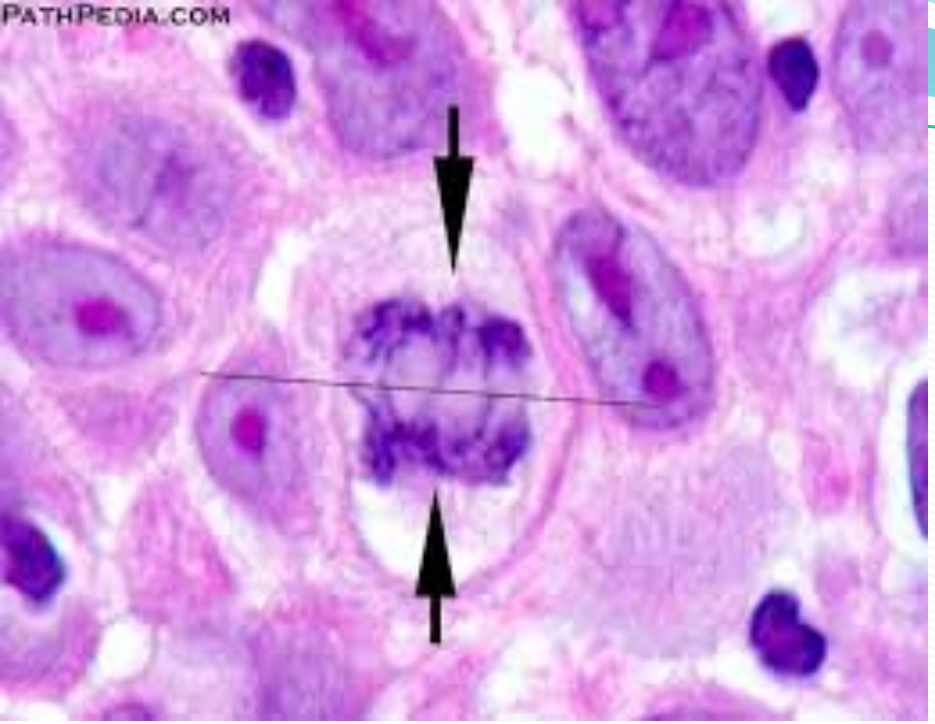
The pink cytoplasm with distinct cell borders and intercellular bridges characteristic for a squamous cell carcinoma with feature of malignancy which include :-pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure .

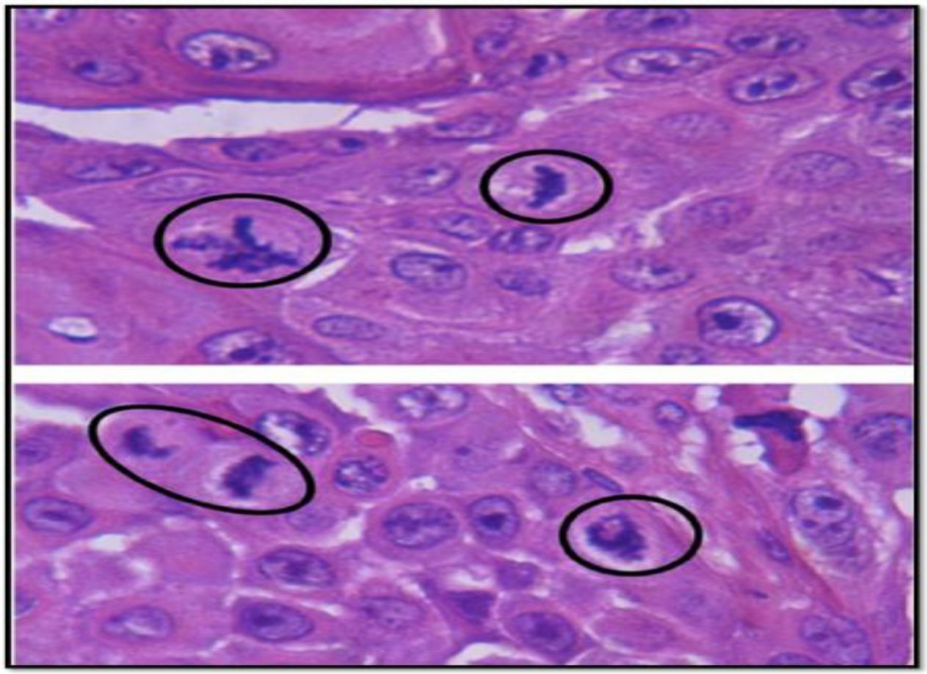


well-differentiated squamous cell carcinoma:- Nests of squamous cancer cells with keratin production.

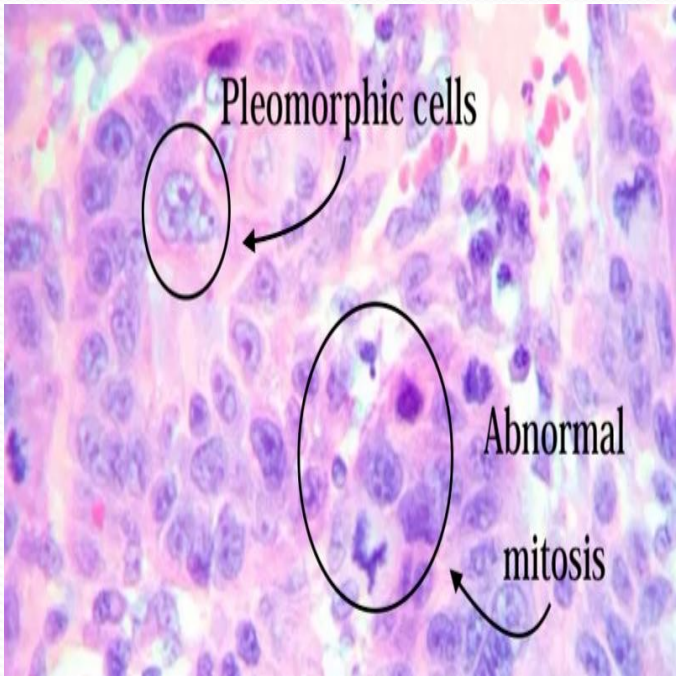
The pink cytoplasm with distinct cell borders and intercellular bridges characteristic for a squamous cell carcinoma , with feature of malignancy which include :-pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure .

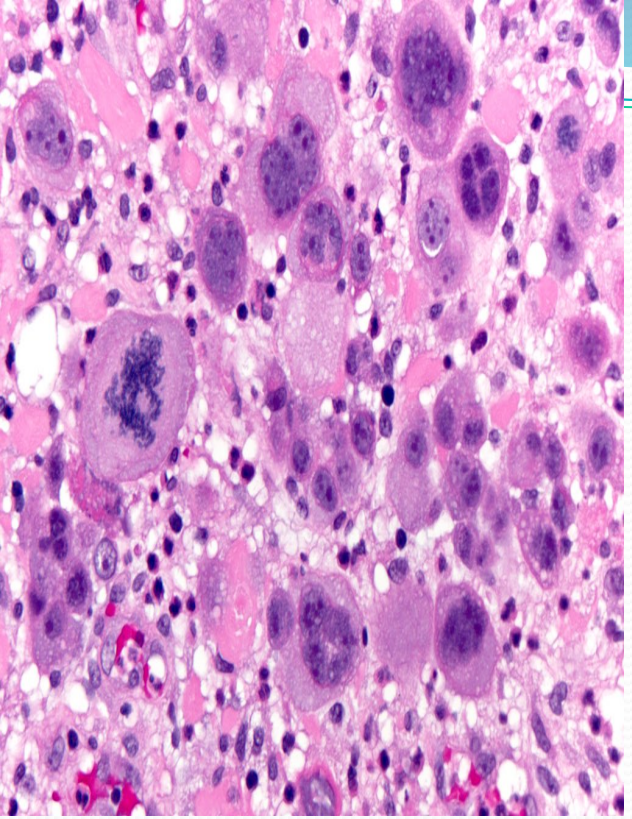
Normal mitosis bipolar

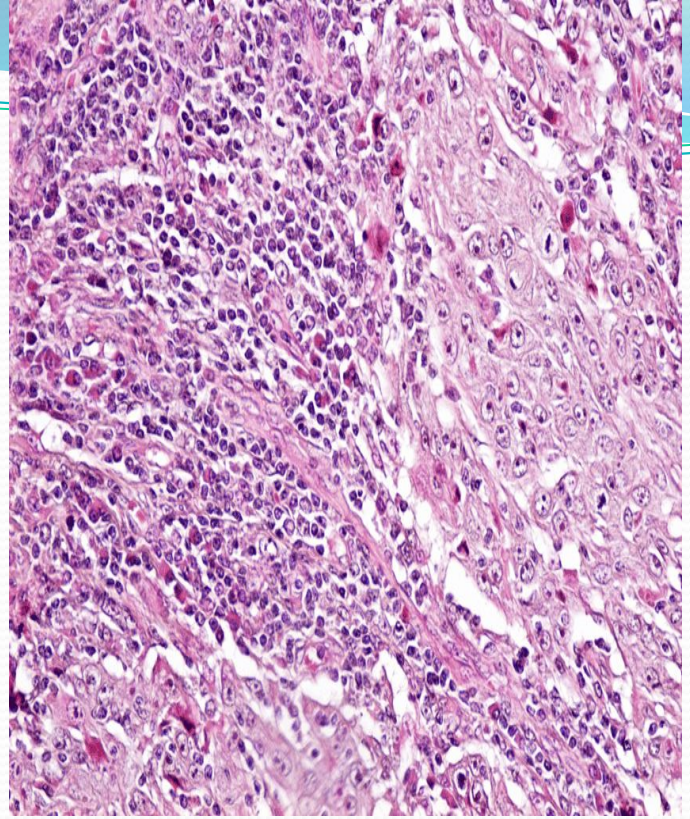


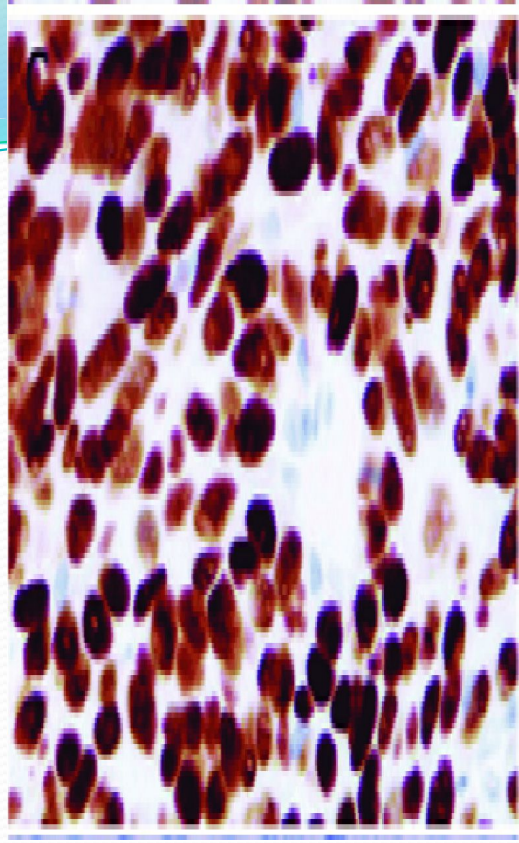


Abnormal mitosis









positive CK, brown staining

Poorly differentiated squamous cell carcinoma having only minimal residual squamous cell features with feature of malignancy which include :-pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure .

Give positive cytokeratin IHC staining (brown staining)

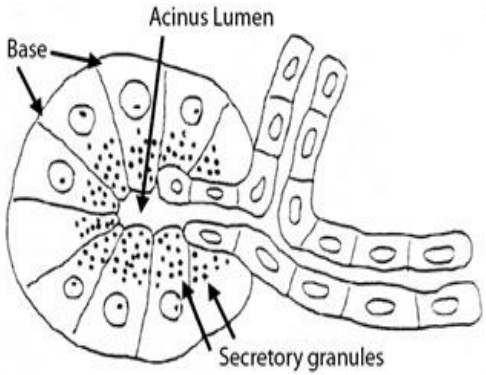
II-Adenocarcinomas

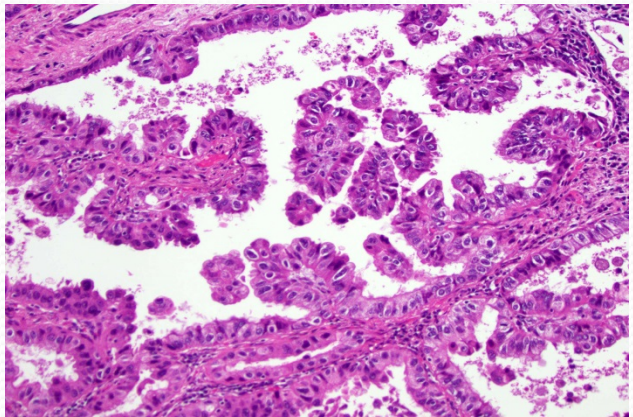
Adenocarcinomas : are the most common primary tumors than other lung tumor (37% of male and 47% of female lung cancers), and arising in women, in nonsmokers, and in persons younger than 45 years. More frequent adenocarcinomas with EGFR mutations .

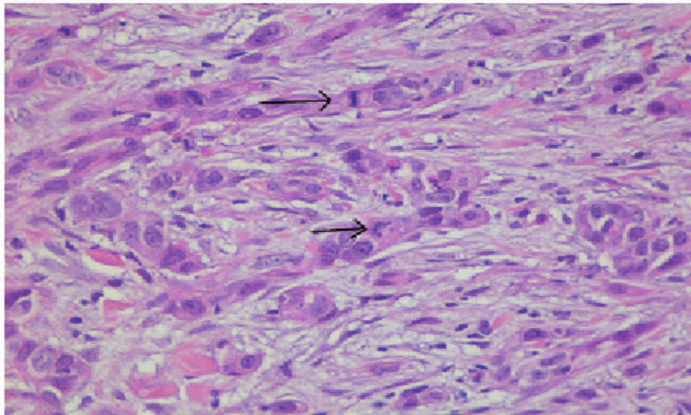
Targeted therapies, such as EGFR inhibitor therapy for adenocarcinomas with EGFR mutations, can be effective, an excellent example of personalized cancer therapy.

Adenocarcinomas means gland forming either:-

acinar , papillary , or solid types

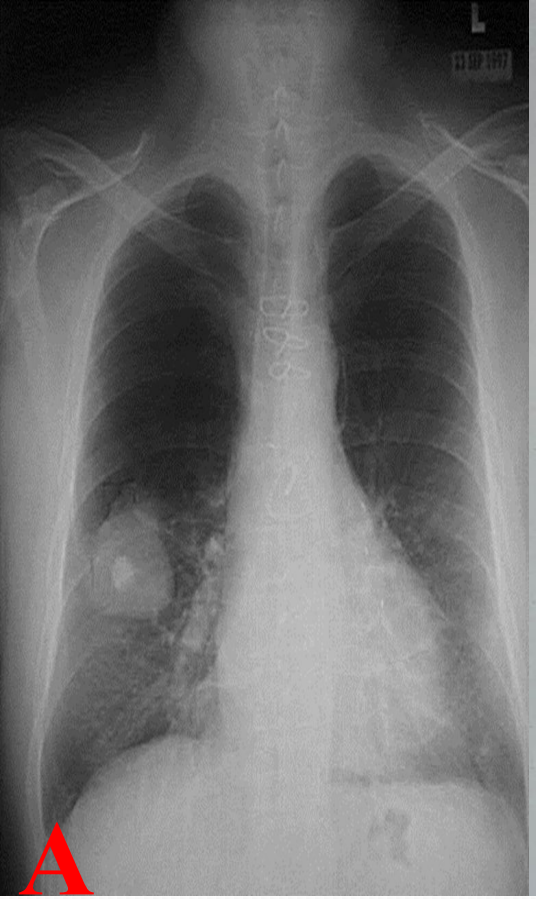


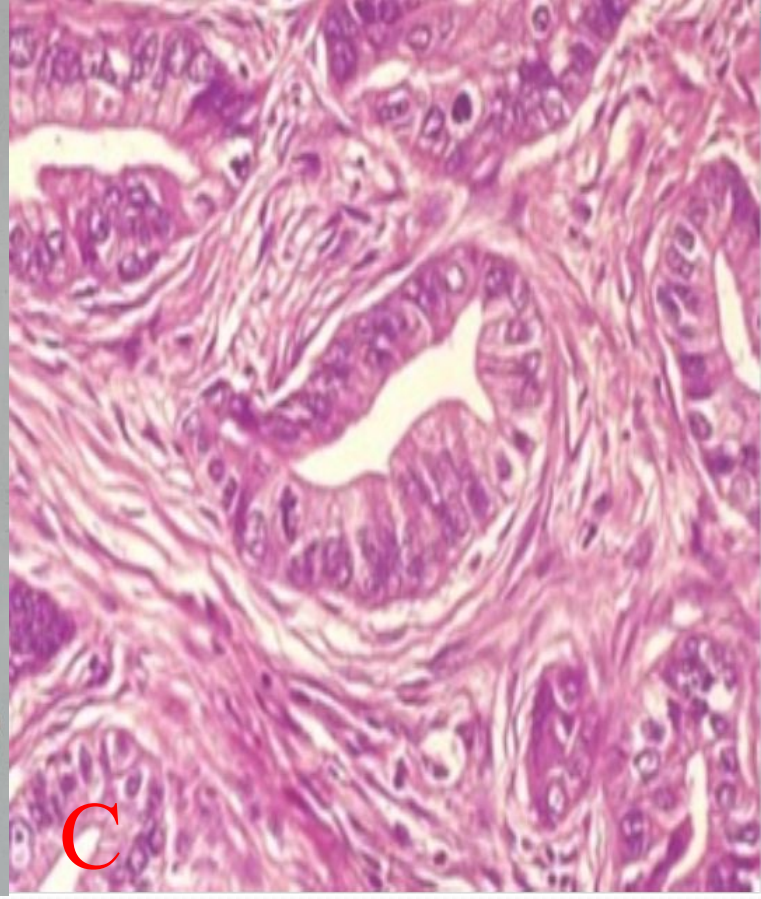




Adenocarcinoma ,which secrete substances such as mucus, give positive special stains (Alcian-blue, PAS(periodic acid shift))and tends to develop in smaller airways, such as alveoli.

The solid variant often requires demonstration of intracellular mucin production by special stains (Alcian-blue, PAS) to establish its adenocarcinomatous nature.

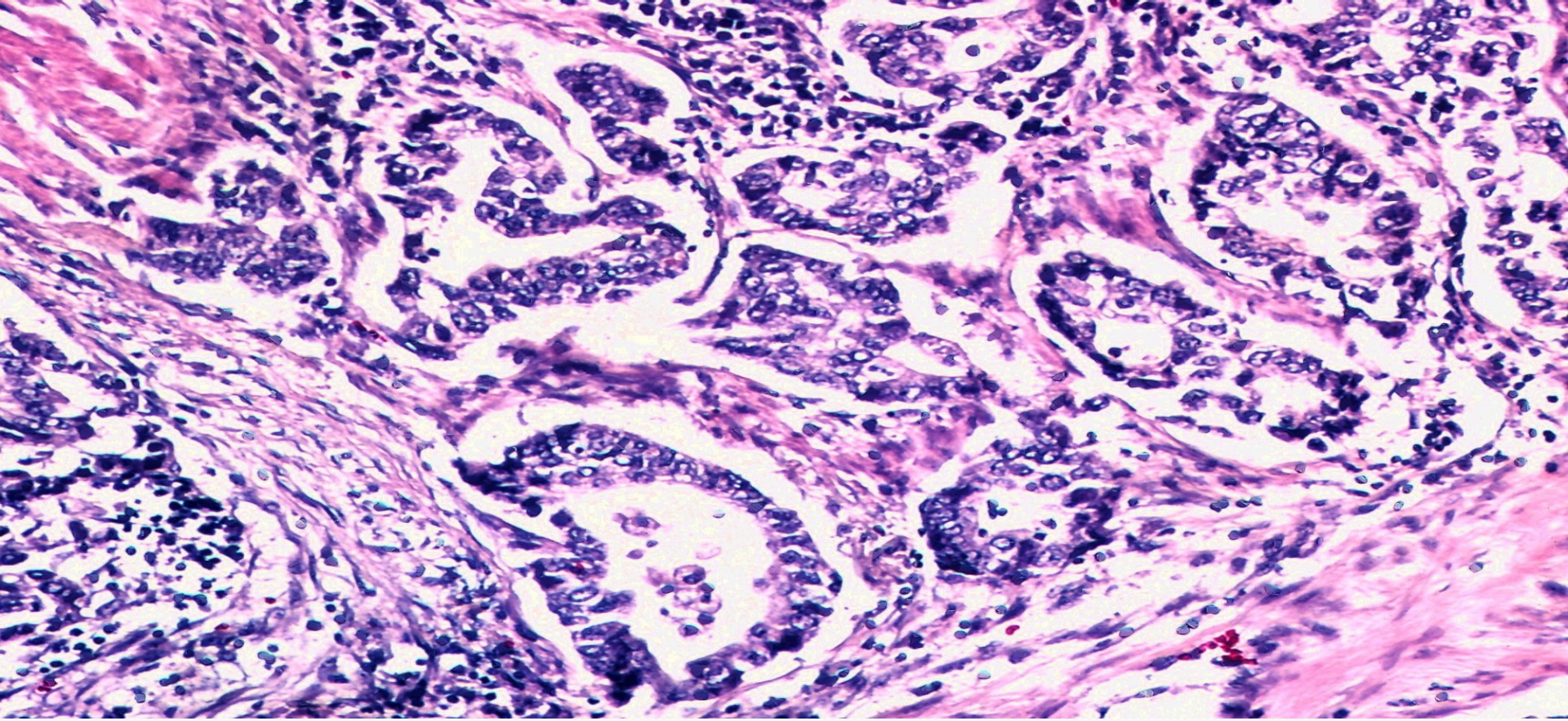




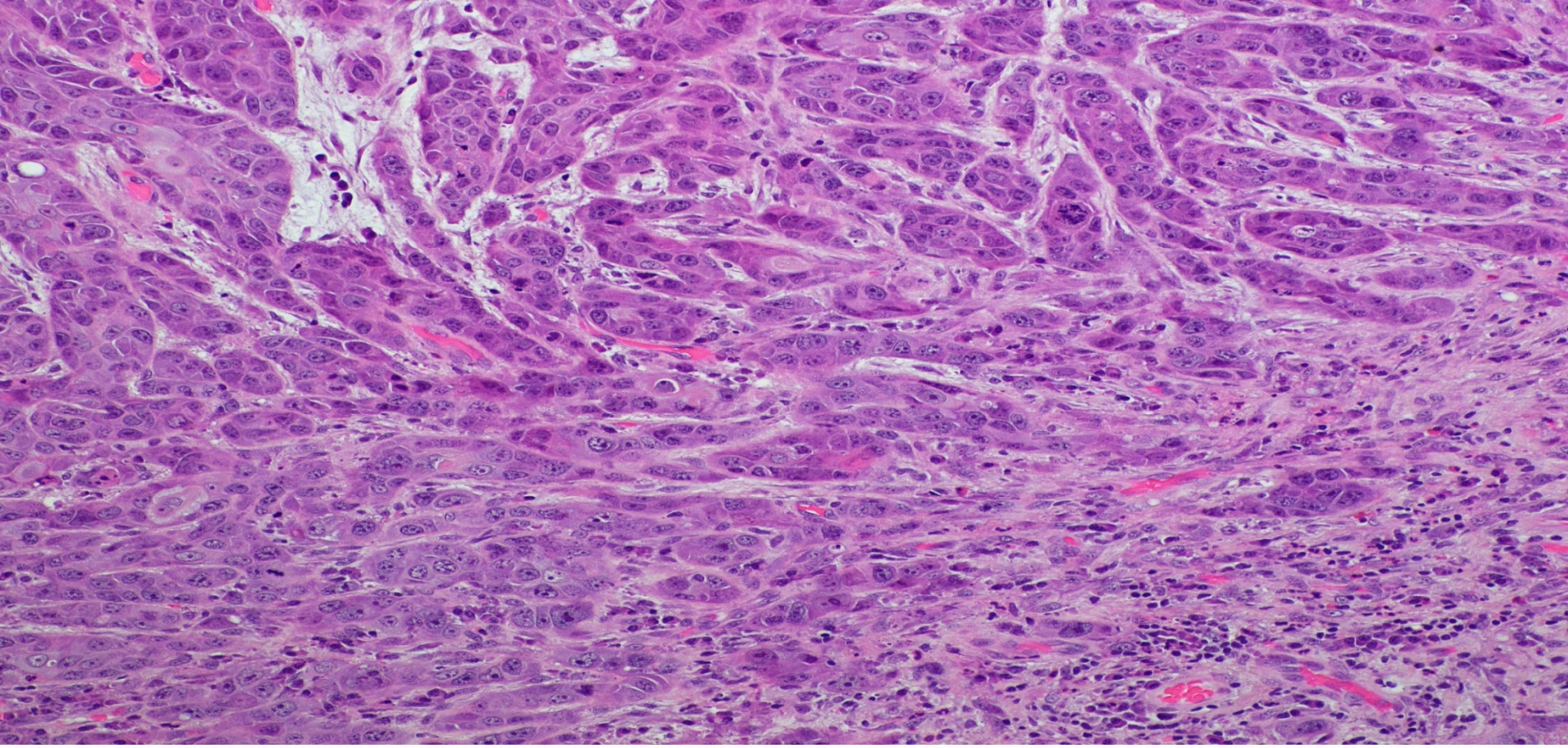
A- CXR demonstrates a large shadow and consolidation at the right lower lobe with area of calcification

B- large peripheral mass located immediately under visceral pleura likely adenocarcinoma of lung .

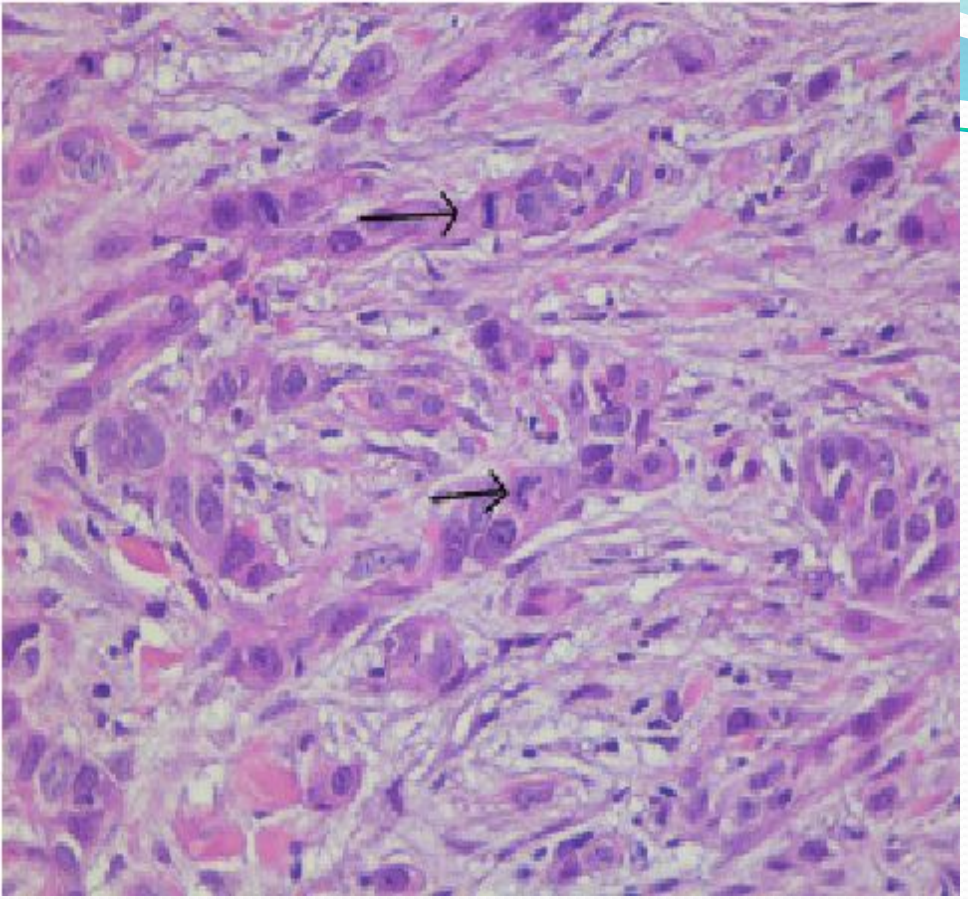
C-Well differentiated adenocarcinoma (grade Ior low grade) acinar subtype :-glandular structure with feature of malignancy which include pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure . give positive special stains (Alcian-blue, PAS)

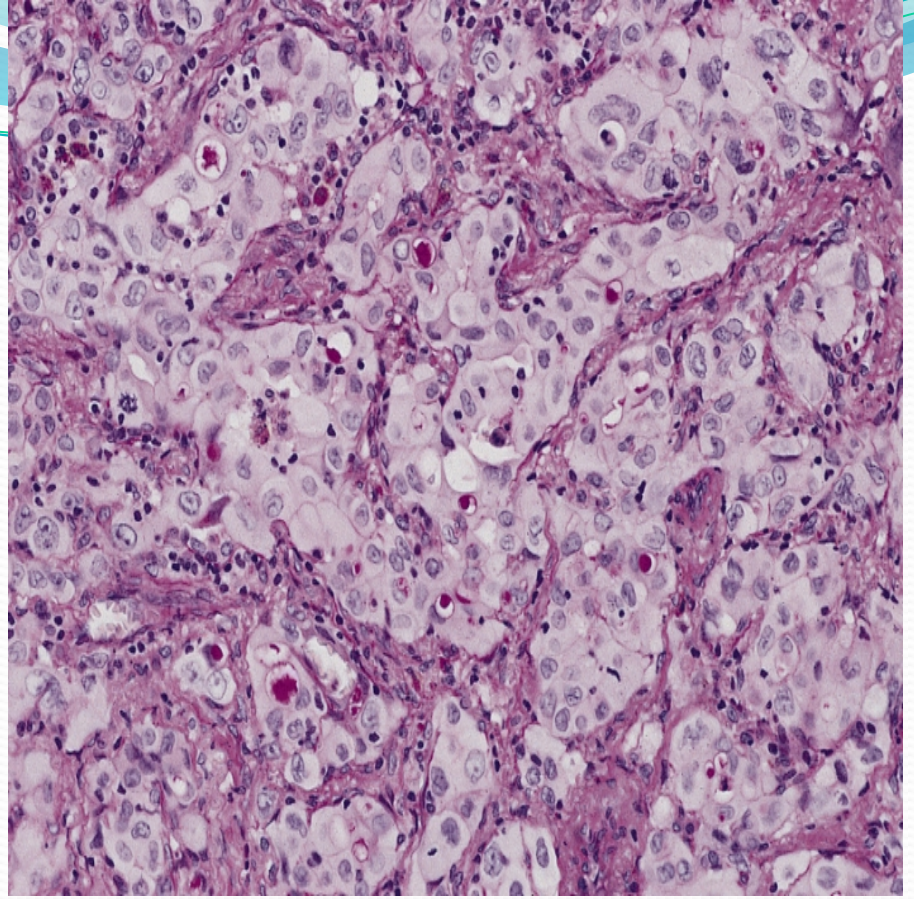


Well differentiated adenocarcinoma of lung (grade I or low grade) acinar subtype :-glandular structure with feature of malignancy which include pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure . give positive special stains (Alcian-blue, PAS)



Moderate differentiated adenocarcinoma of lung (grade II or moderate grade) :-glandular structure without luman with mild mucin production and feature of malignancy which include pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure .
give positive special stains (Alcian-blue, PAS)



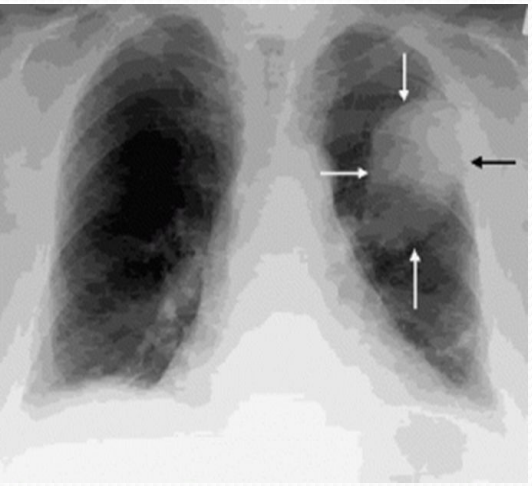


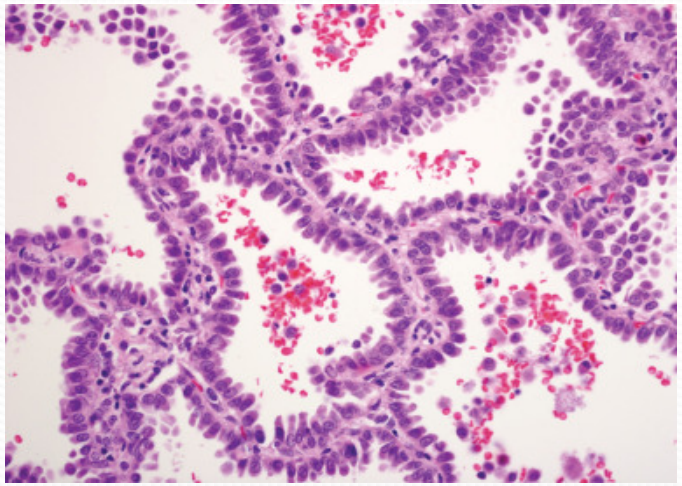
Poor differentiated adenocarcinoma of lung(grade III or high grade) the solid variant) :--sheet of malignant cells with feature of malignancy which include pleomorphic cells and nuclear hyperchromasia , increased N/C ratio , no glandular structure pattern and abnormal mitotic figure .

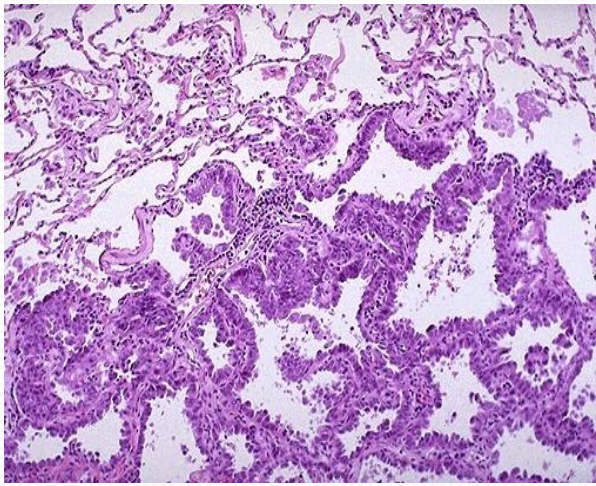
The solid variant often requires demonstration of intracellular mucin production by special stains (Alcian-blue, PAS) to establish its adenocarcinomatous nature.

Bronchioloalveolar adenocarcinomas (BACs):

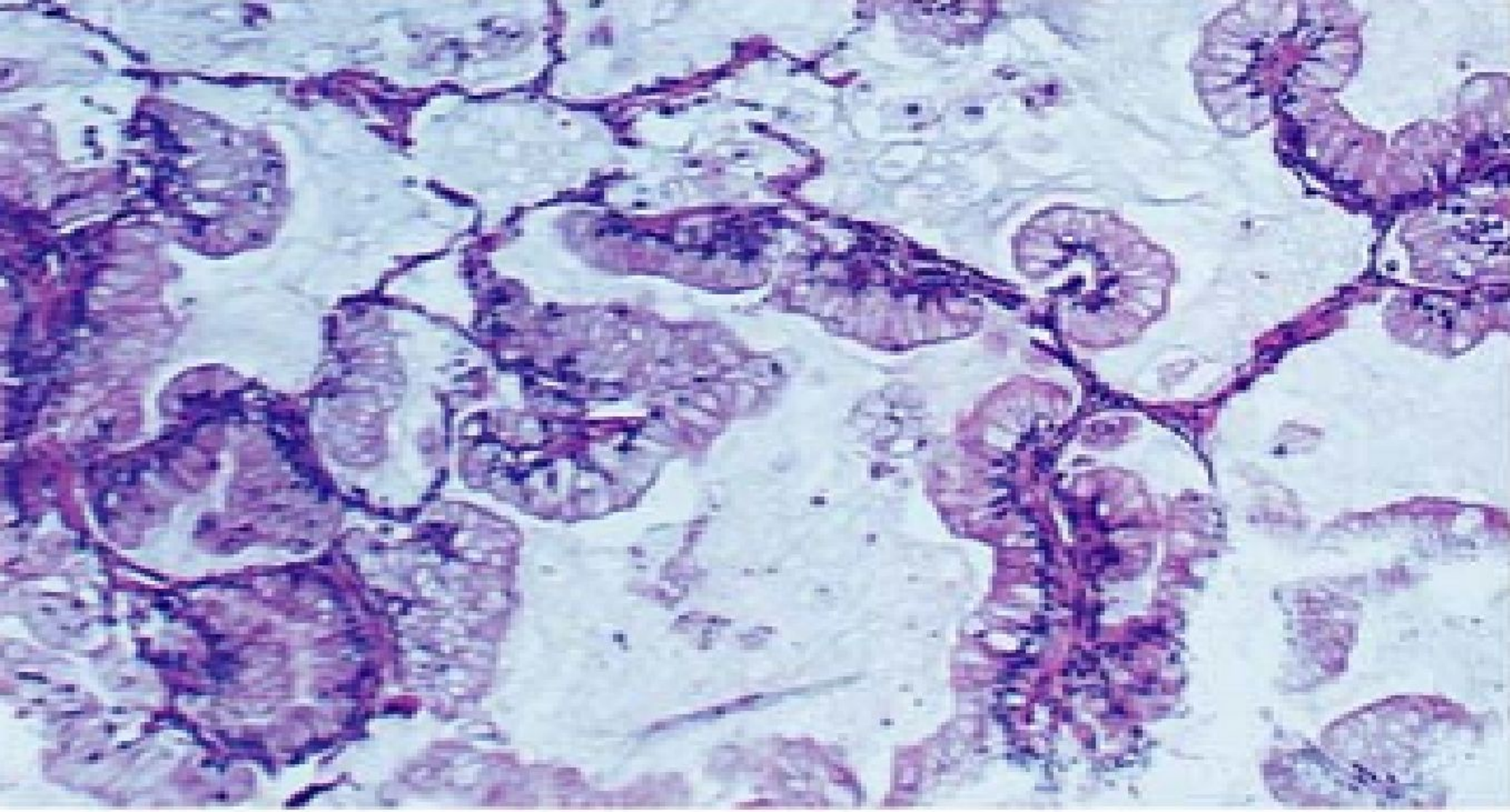
is a less common form of adenocarcinoma arising in the terminal bronchioloalveolar regions, are a subtype of adenocarcinomas. They involve peripheral parts of the lung, either as a single nodule or more , often as multiple diffuse nodules that may coalesce to produce pneumonia-like consolidation.







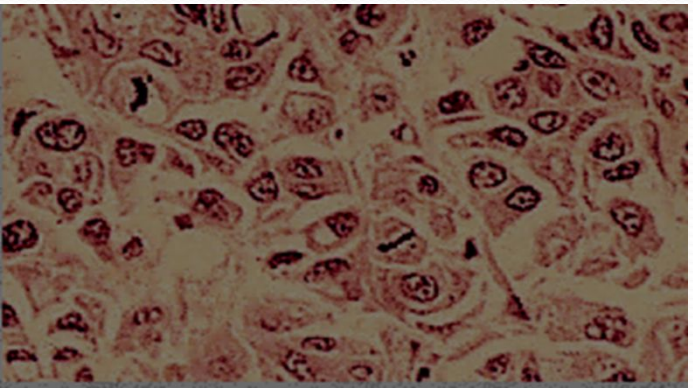
well-differentiated non mucinous bronchioloalveolar adenocarcinomas :-The tumor is composed of columnar cells that proliferate along the alveolar septa with feature of malignancy which include pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure

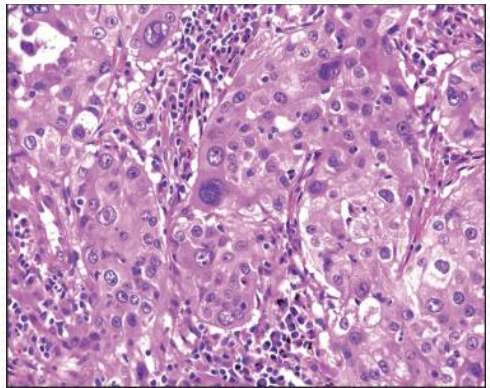


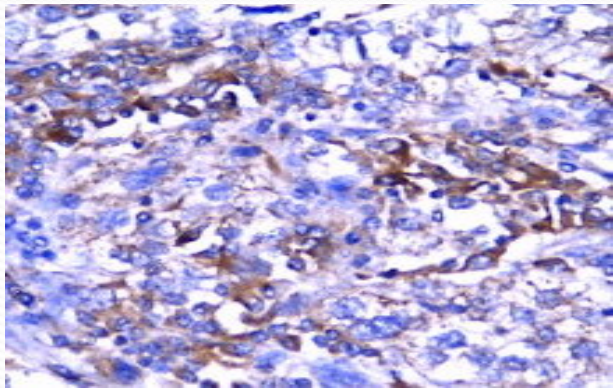
Mucinous bronchioloalveolar carcinoma consists of tall columnar cells filled with apical cytoplasmic mucin that grow along the existing alveolar walls with feature of malignancy which include pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure

III- Large-cell carcinomas

are undifferentiated malignant epithelial tumors that lack the cytological features of glandular or squamous differentiation. The cells have large nuclei, prominent nucleoli, with feature of malignancy which include pleomorphic cells and nuclear hyperchromasia ,increased N/C ratio and abnormal mitotic figure .This tumor usually located periphery .Prognosis of this tumor very poor . More frequent large cell ca. with COX-2 mutations, so, COX-2 staining of a case of bronchogenic large cell carcinoma(brown discoloration)



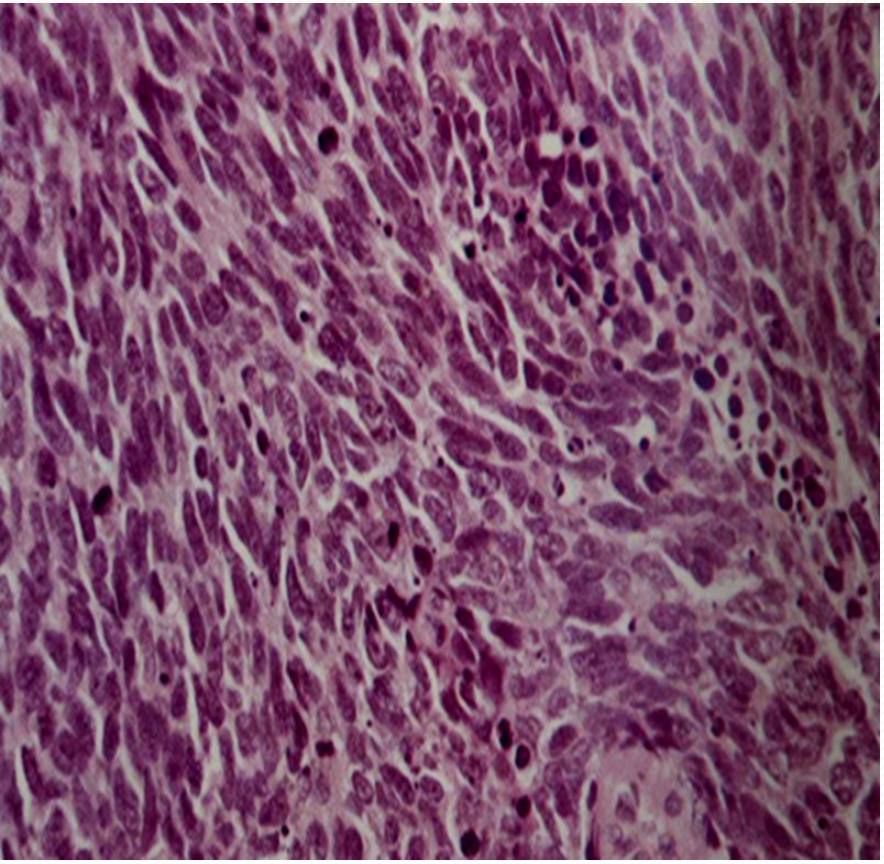


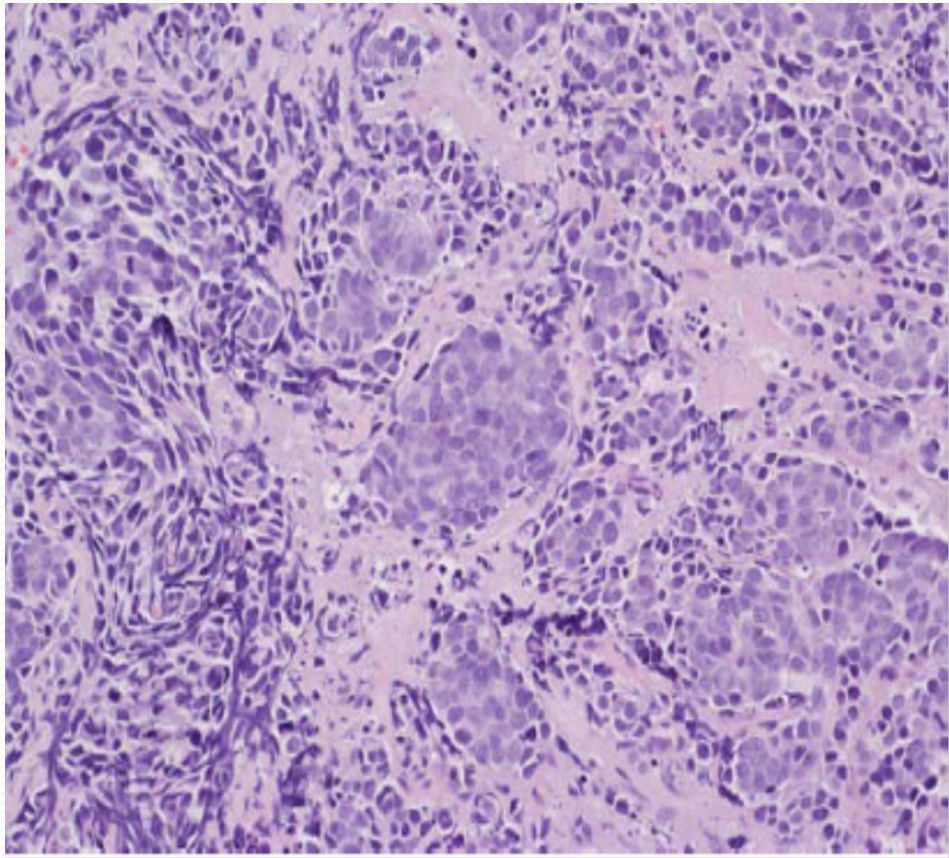


COX-2 postive

IV- Small-cell lung carcinomas(oat cell)

are composed of small tumor cells with a round - fusiform nuclei ,hyperchromasia with increased N/C ratio and finely granular chromatin, and scant cytoplasm. Mitotic figures are frequently seen. This tumor usually located centrally . Prognosis of this tumor very poor .



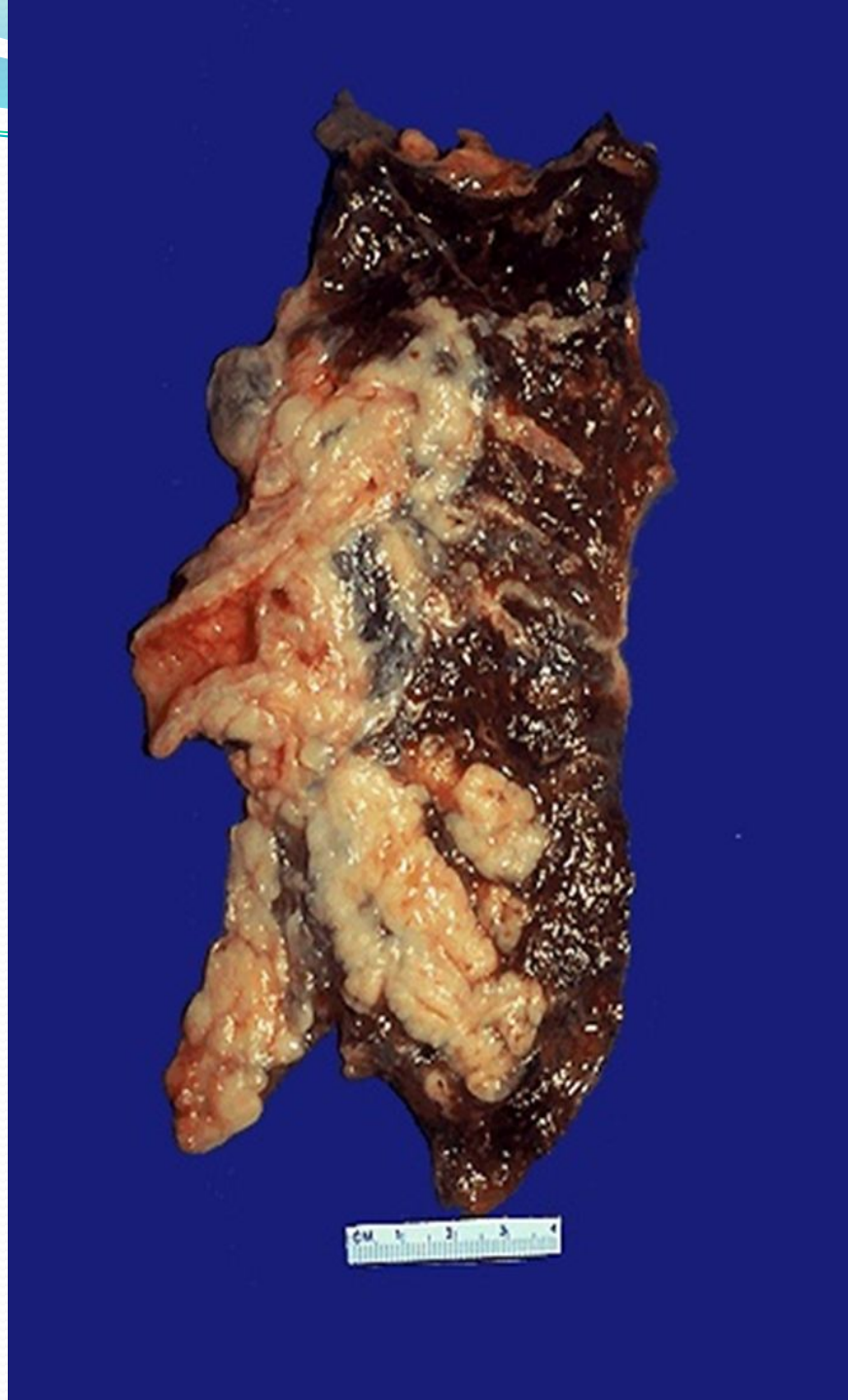


Small-cell lung carcinomas (oat cell)

Arising centrally and spreading extensively

The tumor seen here has caused obstruction of the main bronchus to left lung so that the distal lung is collapsed.

Oat cell carcinomas are very aggressive and often metastasize widely before the primary tumor mass in the lung reaches a large size.



Despite the term of "small," the neoplastic cells are usually twice the size of resting lymphocytes.
Necrosis is invariably present and may be extensive.

These tumors are derived from neuroendocrine cells of the lung, and they express a variety of neuroendocrine markers by immunohistochemical staining IHC stain (e.g., neuron specific enolase , chromogranin , synaptophysin)
In addition to many polypeptide hormones that may result in paraneoplastic syndromes.

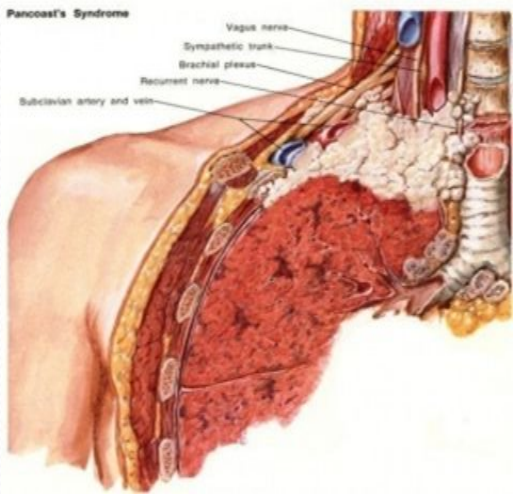
Lung cancers commonly cause a variety of para-neoplastic syndromes.

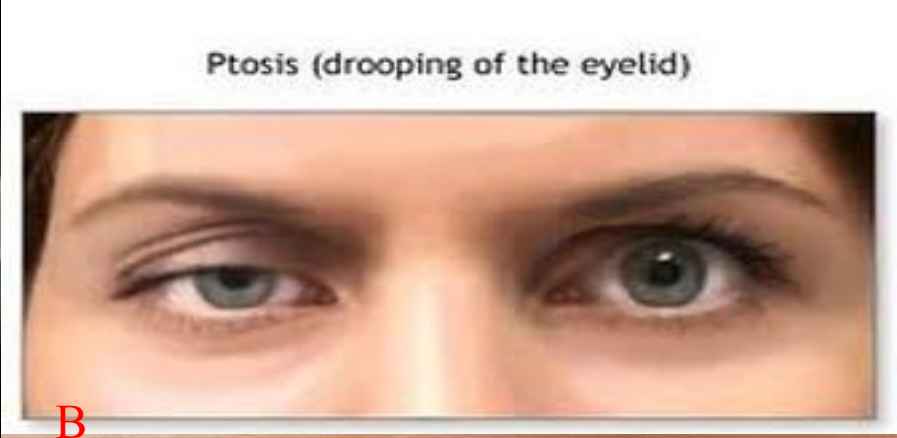
Tumor spread

1-The tumors may extend to the pleura ,invade the pleural cavity occurs in (adenocarcinoma and large cell tumor), or tumors invade chest wall, or lung apex (the tumor in this site called pancost tumor) causing horner syndrome .

Apical neoplasms may invade the brachial or cervical sympathetic plexus to cause severe pain in the distribution of the ulnar nerve or to produce horner syndrome results in a decreased pupil size (miosis) , a drooping eyelid (ptosis) and decreased sweating (anhidrosis) on the affected side of your face .

Such apical neoplasms are sometimes called Pancoast tumors, and the combination of clinical findings is known as Pancoast syndrome.



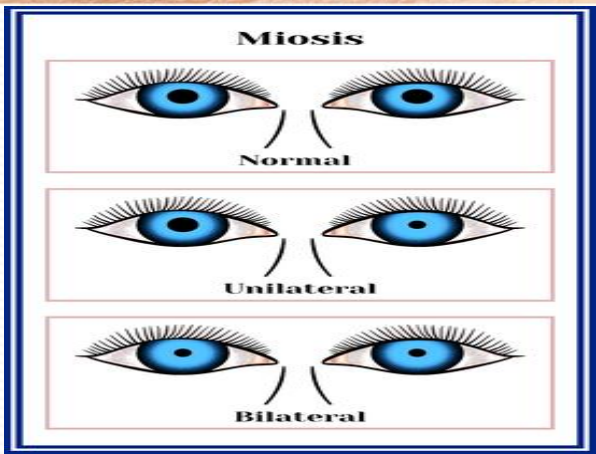


Pancoast tumor

A-Chest x-ray show Rt upper lobe shadow (consolidation) .

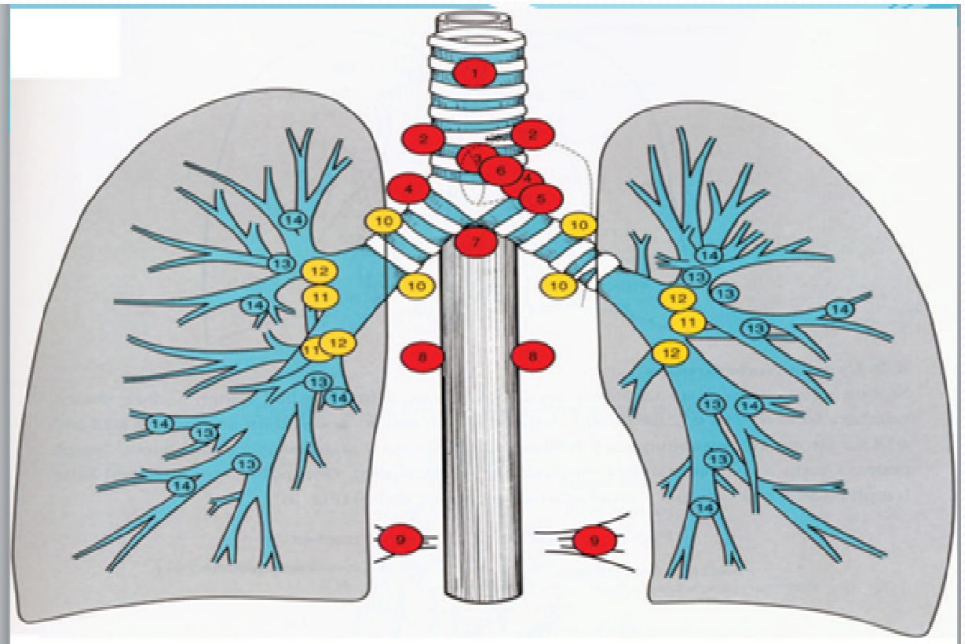
B- Horner syndrome (ptosis , miosis)

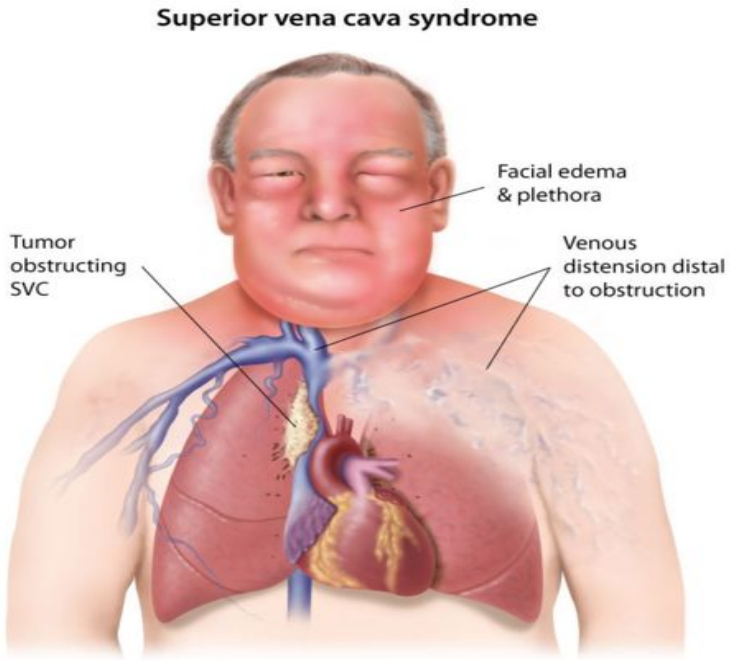
C-Miosis



2-Intra-thoracic spread of lung cancer is to lymph nodes, particulary bronchial ,tracheal , hilar , carina , mediastinum, in the neck (scalene nodes) , Involvement of the left supraclavicular node (Virchow node) is particularly characteristic to an occult primary tumor .

-Obstruction of superior vena cava by tumor causes superior vena cava syndrome , characterized by distended head and neck veins, plethora , facial and upper arm edema.



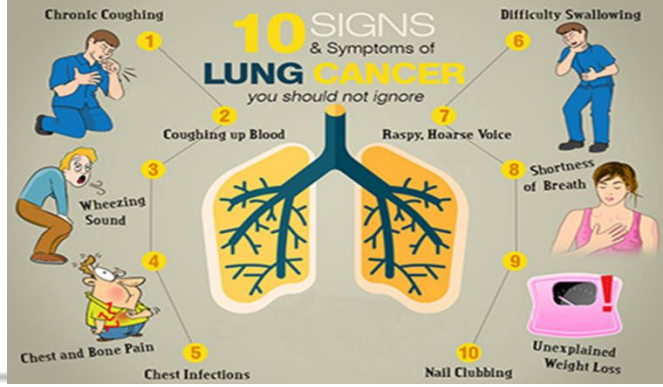


Esophageal obstruction can cause dysphagia

-Recurrent laryngeal nerve involvement causes hoarseness while phrenic nerve damage causes diaphragmatic paralysis .

3-Extrathoracic sites of metastasis include adrenal (more than 50%) ,liver ,brain ,and bone .

Symptoms & signs



- Cough
- Change in cough
- Hemoptysis
- Dyspnea
- Postobstructive pneumonia
- Pleural effusion
- Dysphagia
- Chest pain
- Shoulder/arm pain

Brachial plexus involvement

- Horner's syndrome

Ptosis, miosis, I/L anhidrosis

- Hoarseness

RLN compression, L>R

- SVC syndrome
- Weight loss

How do you diagnose lung cancer

1-The history and on physical examination .

2-Chest X-rays

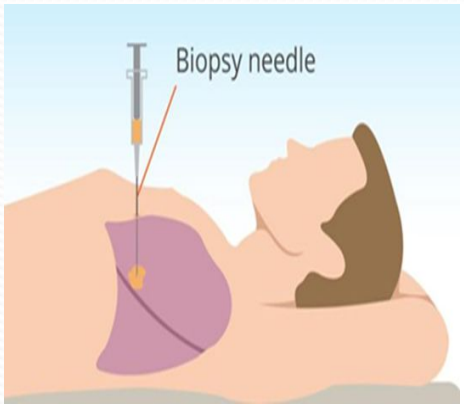
Radiographic findings of consolidation , cavitation or LN involvement also to see complication of lung cancer.

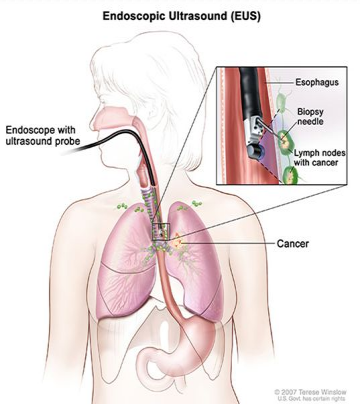
3-microscopical examination through

A-Sputum collection and cytological examination for cancer cells .

B-Bronchoscopy for lavage for cytological examination and tissue biopsy for histopathological Examination.

C-Niddle biopsy under U/S guide Or CT scan





4-MRI(magnetic resonance imaging) and CT scan.

5-Molecular studies and biomarker analysis .e.g, Florescent in situ hybridization (FISH) for EGFR and HER2

6-PET scan (positron emission tomography (PET) . for follow up

When you talk, you are only repeating what you already know , but if you listen, you may learn something new