RESPIRATORY SYSTEM BLOCK

PATHOLOGY PRACTICAL - L2

TUBERCULOSIS

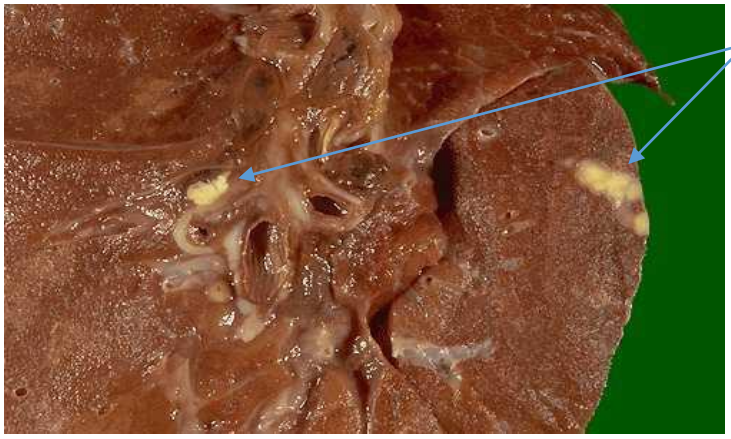
- **Epithelioid and giant cell Granuloma, Ghon's**

complex or caseation is present

- **Complications of TB are:**

- Amyloidosis ,
- Tuberculous pneumonia
- Miliary tuberculosis
- Tuberculous meningitis
- Addison disease .

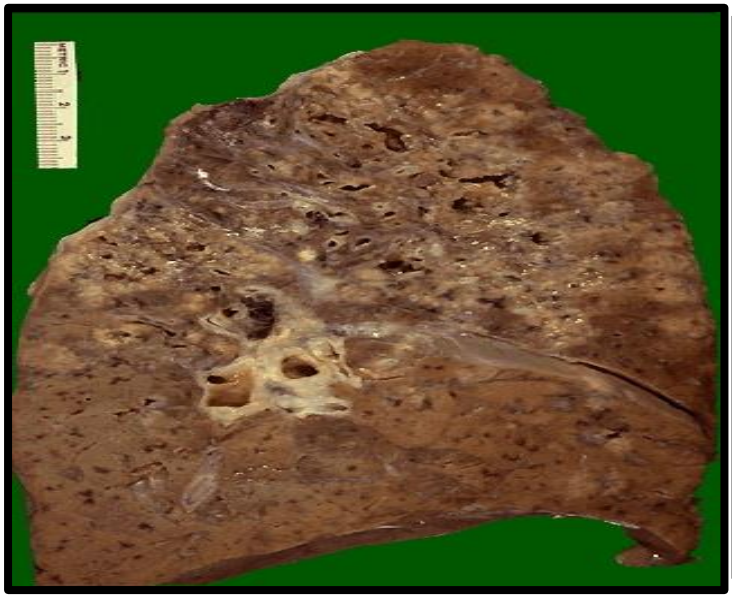
TUBERCULOSIS



The Ghon's complex is seen here at closer range.

Primary tuberculosis is the pattern seen with initial infection with tuberculosis in children.

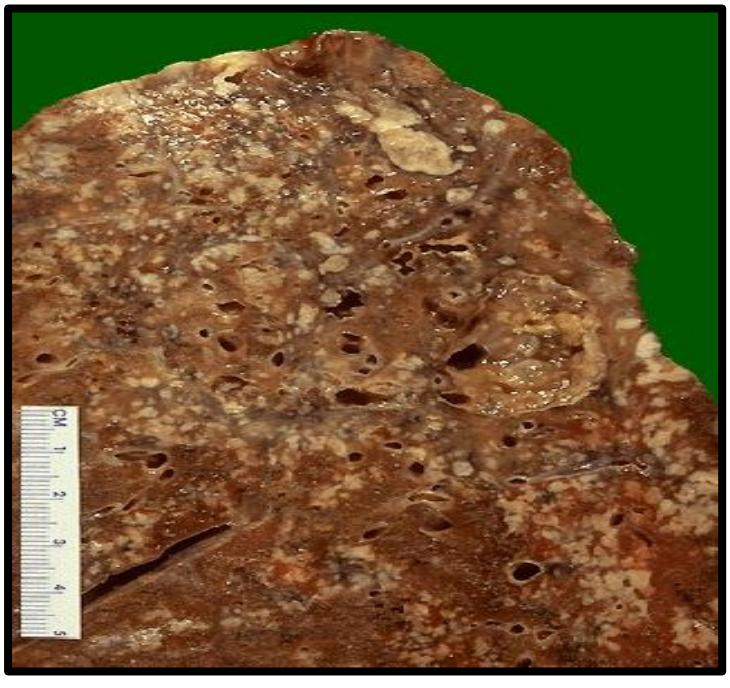
Reactivation, or secondary tuberculosis, is more typically seen in adults.



Extensive caseation and the granulomas involve a larger bronchus causing soft, necrotic center to drain out and leave behind a cavity.

Cavitation is typical for large granulomas with TB.

Cavitation is more common in the upper lobes.



the granulomas have areas of caseous necrosis.

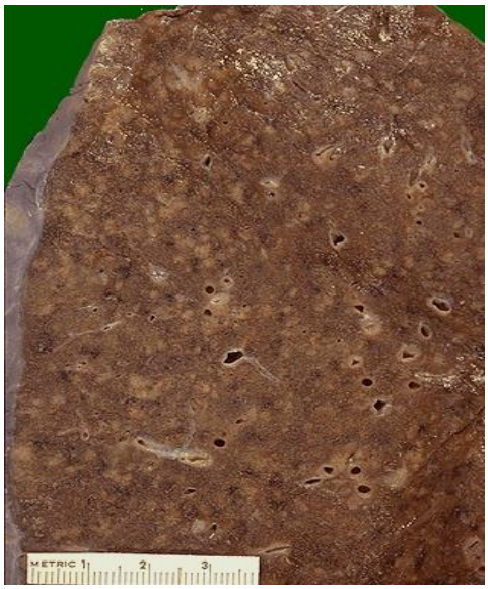
This pattern of multiple caseating granulomas primarily in the upper lobes is most characteristic of secondary (reactivation) tuberculosis.

Miliary TB can occur when TB lung lesions erode pulmonary veins or when extrapulmonary TB lesions erode systemic veins.

This results in hematogenous dissemination of tubercle bacilli producing myriads of 1-2 mm. lesions throughout the body in susceptible hosts.

Miliary spread limited to the lungs,

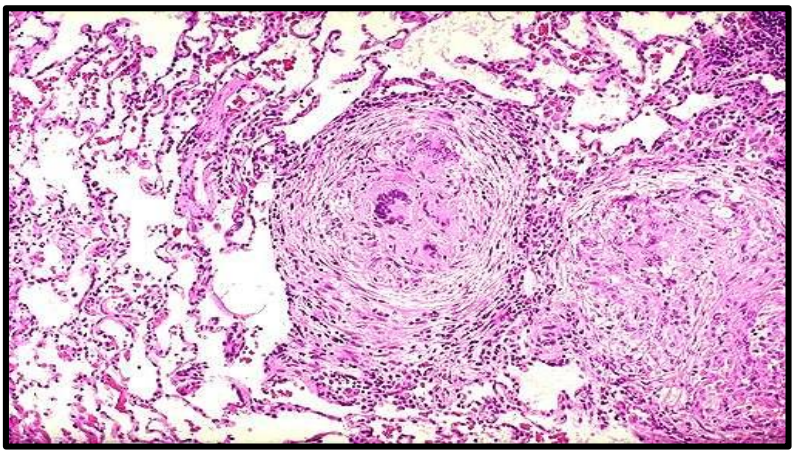
The route by which the organisms have spread: following erosion of pulmonary arteries by TB lung lesions.



This is a "miliary" pattern of granulomas because there are a multitude of small tan granulomas, about 2 to 4 mm in size, scattered throughout the lung parenchyma.

The miliary pattern gets its name from the resemblence of the granulomas to millet seeds.

This chest x-ray shows a patient with miliary TB showing miliary nodules and Reticular shadows.

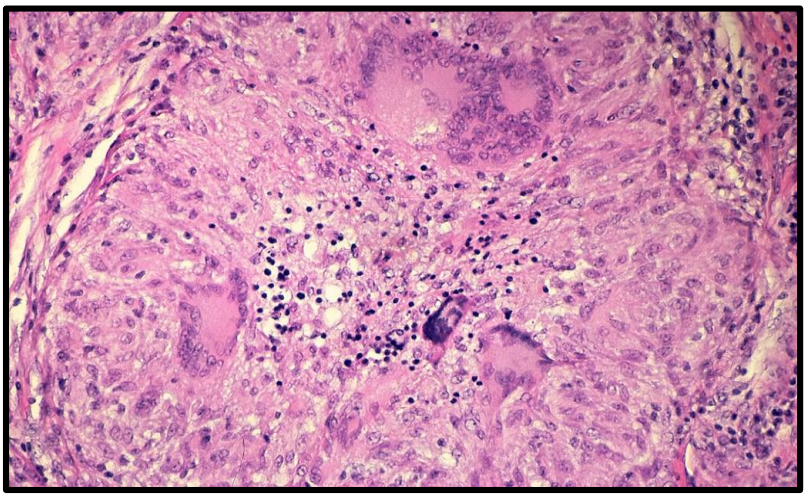


Well-defined granulomas are seen here.

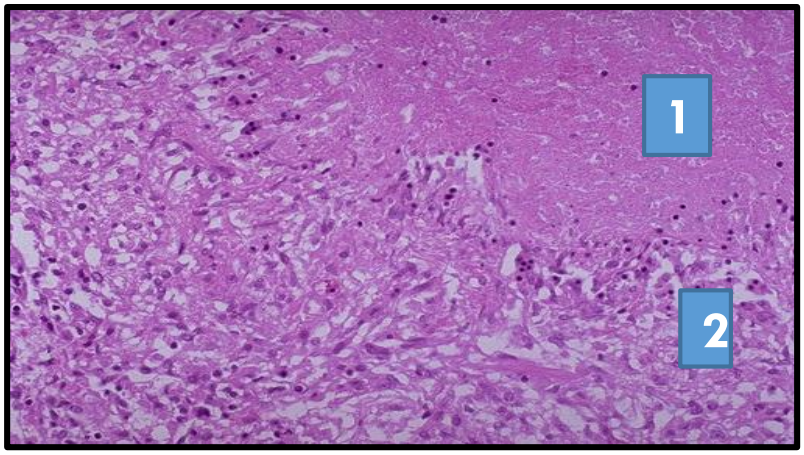
They have rounded outlines.

The one toward the center of the photograph contains several Langhan's giant cells.

Granulomas are composed of transformed macrophages called epithelioid cells along with lymphocytes, occasional PMN's, plasma cells, and fibroblasts.

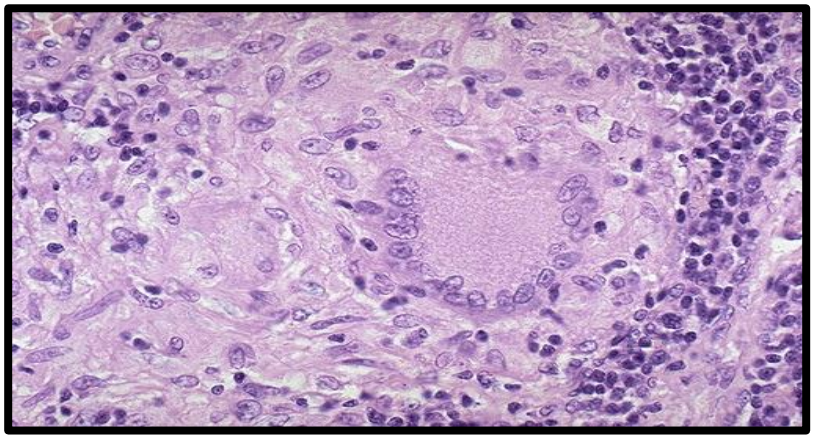


Giant cells and epithelioid histiocytic granulomas with caseous necrosis.



At the upper is amorphous pink caseous material [1] composed of the necrotic elements of the granuloma as well as the infectious organisms.

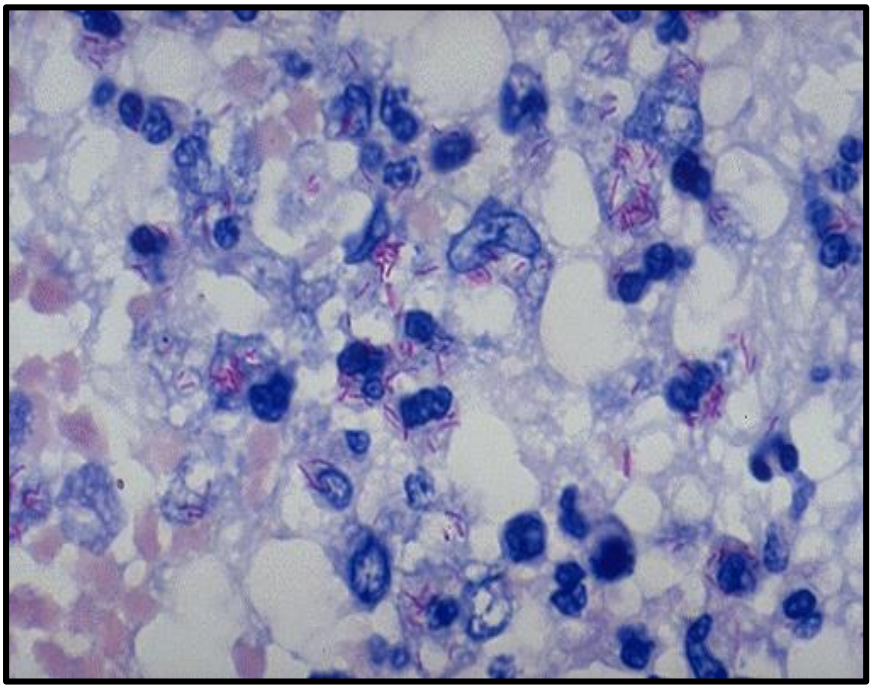
This area is ringed by the inflammatory component [2] with epithelioid cells, lymphocytes, and fibroblasts.



the granuloma demonstrates that the epithelioid macrophages are elongated with long, pale nuclei and pink cytoplasm.

The macrophages organize into committees called giant cells.

The typical giant cell for infectious granulomas is called a Langhan's giant cell and has the nuclei lined up along one edge of the cell.



A stain for Acid Fast Bacilli is done (AFB stain) to find the mycobacteria .

The mycobacteria stain as red rods, as seen here at high magnification.

LUNG CARCINOMA

TWO TYPES OF LUNG CARCINOMA

- **NON-SMALL CELL CARCINOMA**

  -SQUAMOUS CELL CARCINOMA

  -ADENOCARCINOMA

  -LARGE CELL CARCINOMA

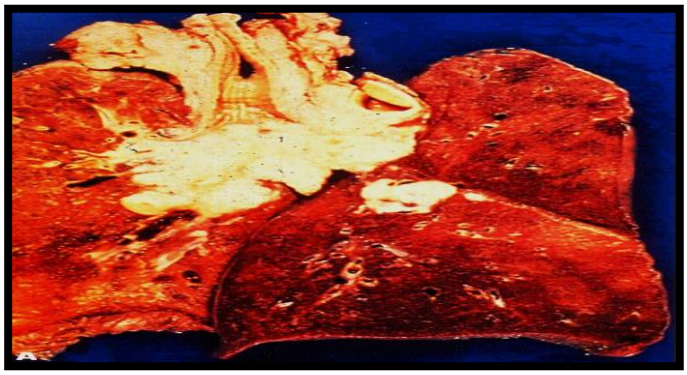
- **SMALL CELL CARCINOMA**

The NON-small cell cancers behave and are treated similarly, the SMALL cell carcinomas are WORSE than the non-small cell carcinomas, but respond better to chemotherapy, often drastically!

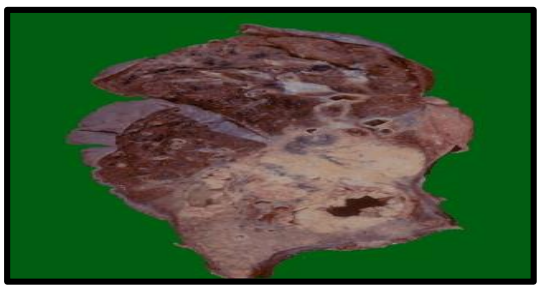
Squamous Cell Carcinoma of the lung

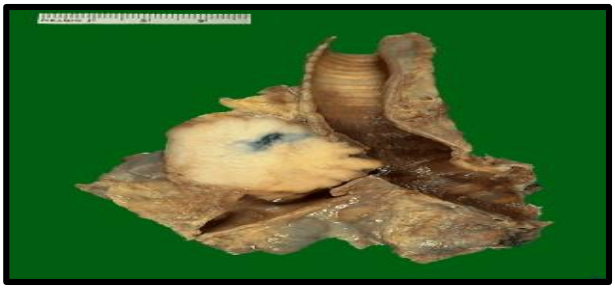
- Most commonly found in men and correlated with smoking.
- Pathology: more differentiated, more cytoplasm, keratin whorls.
- Transforms to carcinoma in situ.
- Grading is based on the amount of keratin & cytoplasm.

Squamous Cell Carcinoma of the Lung - Gross



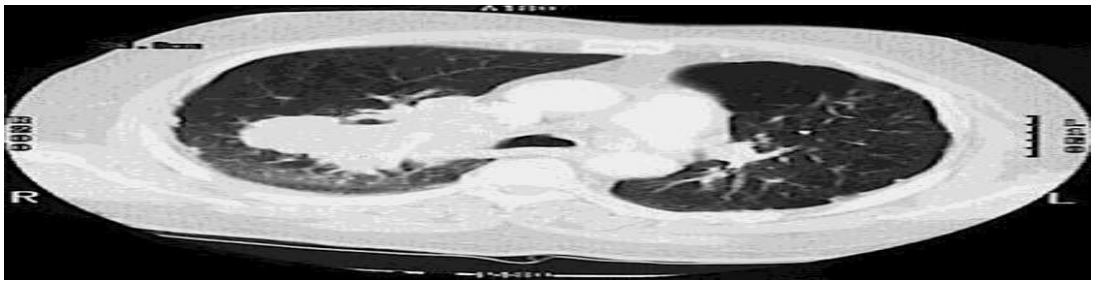
1. **This is a squamous cell carcinoma of the lung that is arising centrally in the lung**
2. **It obstructing the right main bronchus.**
3. **The neoplasm is very firm and has a pale white to tan cut surface.**





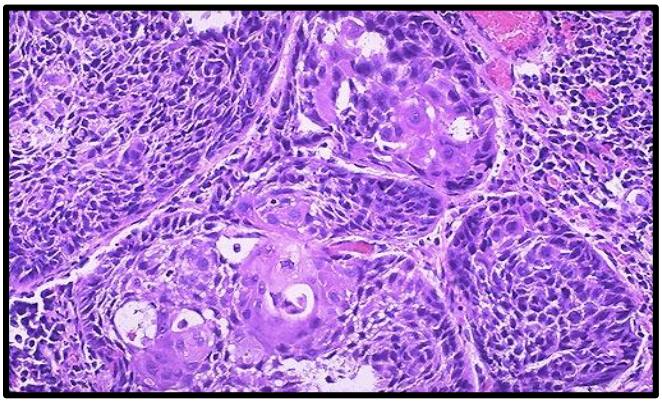
a portion of the tumor demonstrates central cavitation, because the tumor outgrew its blood supply.

CT

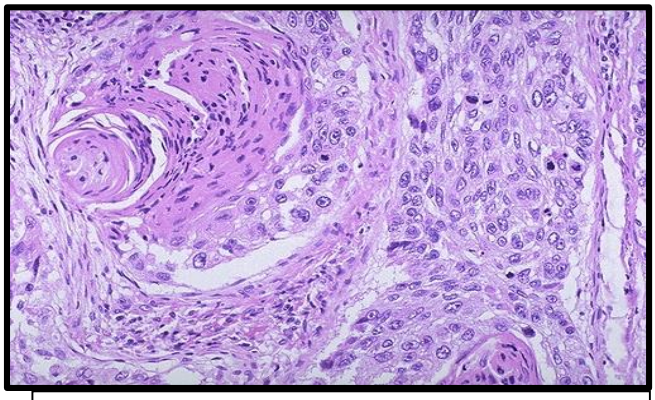


1. ***a large squamous cell carcinoma of the right upper lobe***
2. ***extends around the right main bronchus***
3. ***invades into the mediastinum and involves hilar lymph nodes.***

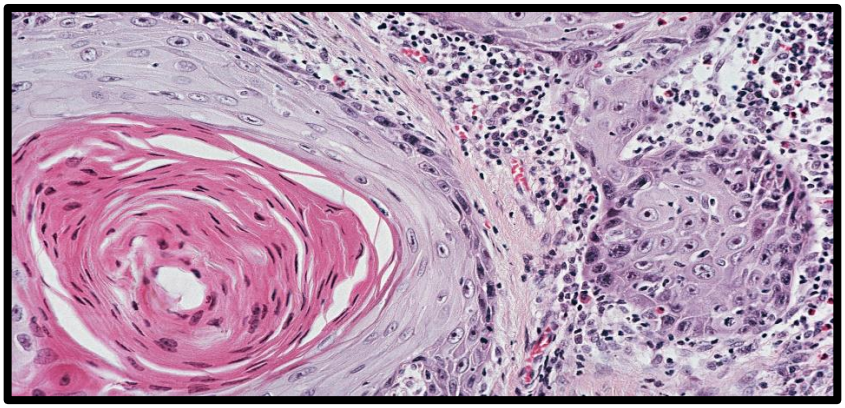
HPF

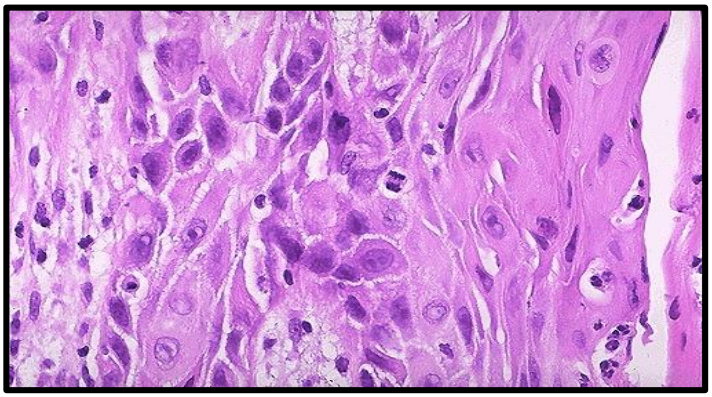


1. **nests of polygonal cells with pink cytoplasm and distinct cell borders.**
2. **The nuclei are hyperchromatic and angular.**



1. ***squamous eddy(دوامة)with a keratin pearl (لؤلؤة) (upper right)***
2. ***the tumor is less differentiated (on the left)***
3. ***dark mitotic figures are seen***





Neoplastic squamous cells show

1. Pleomorphism 2. hyperchromatism
3. Keratinization 4. mitoses areas of necrosis

characteristic for a squamous cell carcinoma of the lung

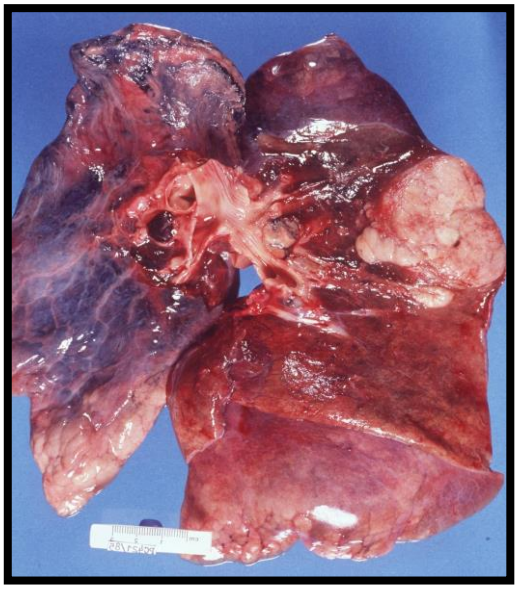
1. **pink cytoplasm**
2. **distinct cell borders**
3. **intercellular bridges**

2. Adenocarcinoma of the lung

The most common type of lung cancer, making up 30-40% of all cases.

Glandular differentiation by tumor cells and 80% of those cells produce mucin.

Not as strongly associated with a smoking history as compared to Squamous or Small Cell Carcinomas



A peripheral adenocarcinoma of the lung.

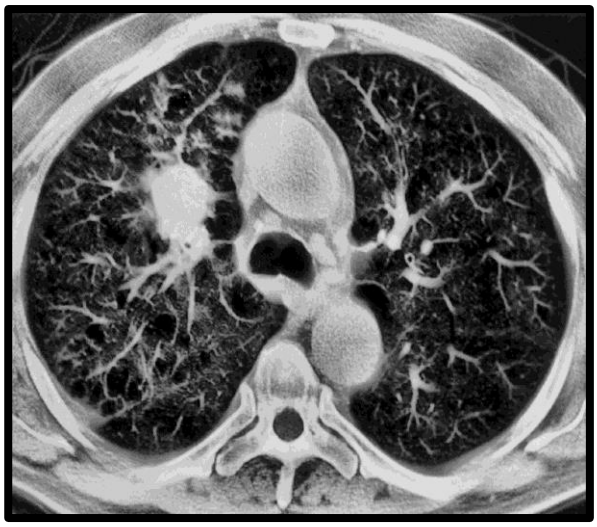
Adenocarcinomas and large cell anaplastic carcinomas tend to occur more peripherally in lung.

Adenocarcinoma is the one cell type of primary lung tumor that occurs more often in non-smokers and in smokers who have quit.

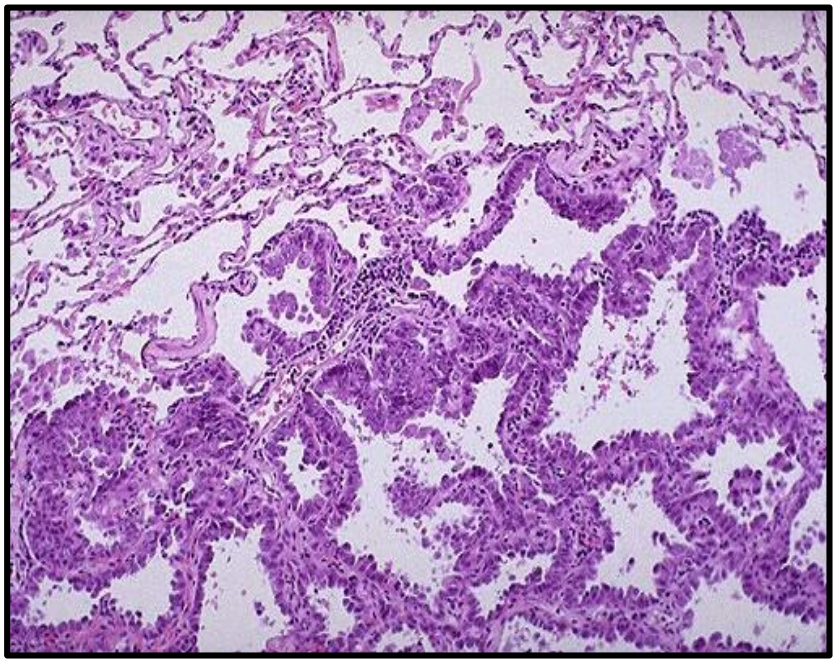
X-Ray

A peripheral adenocarcinoma of the lung appears in this chest radiograph of an elderly non-smoker woman.

CT

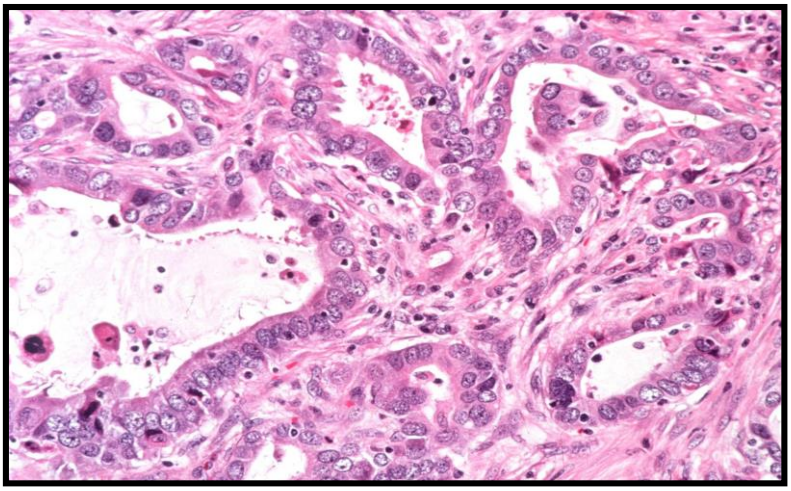


CT scans in a 61-year-old man with adenocarcinoma of the lung



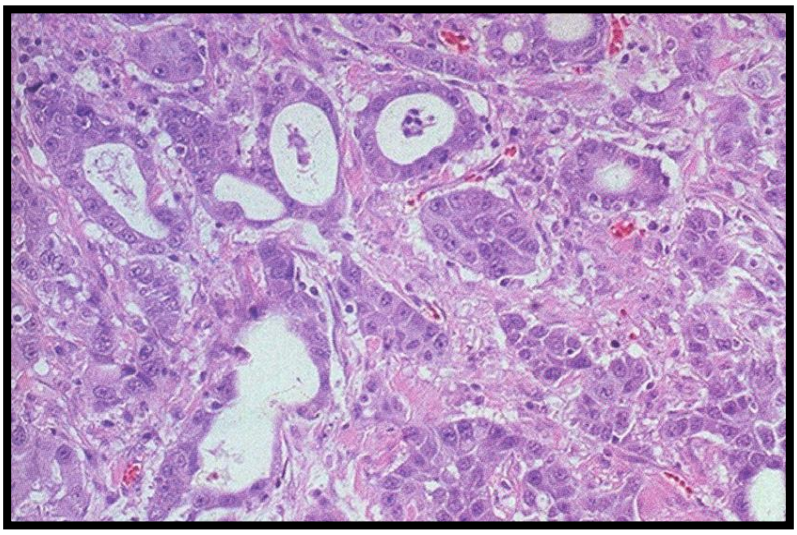
Microscopically, the Adenocarcinoma in Situ (Previously named Bronchioloalveolar Carcinoma) is composed of columnar cells that proliferate along the framework of alveolar septae.

The cells are well-differentiated.



Section of the tumor shows moderately differentiated malignant glands lined by pleomorphic and hyperchromatic malignant cells showing conspicuous nucleoli .

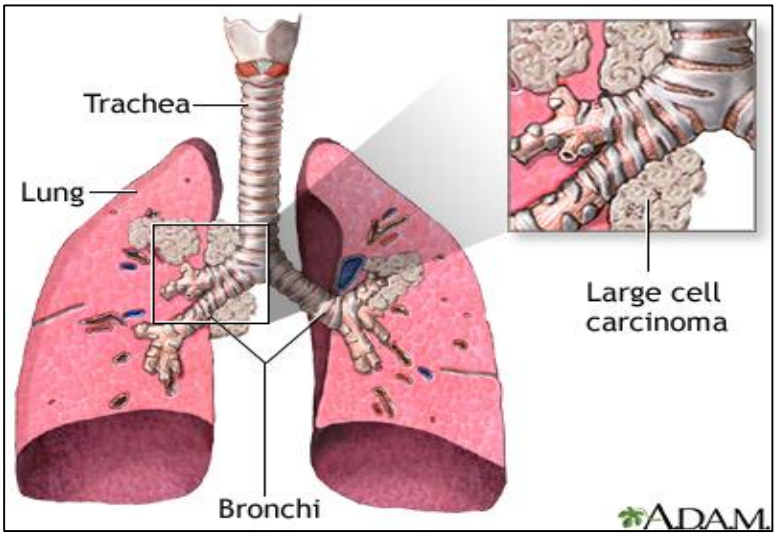
Note the presence of tissue desmoplasia around the neoplastic glands .

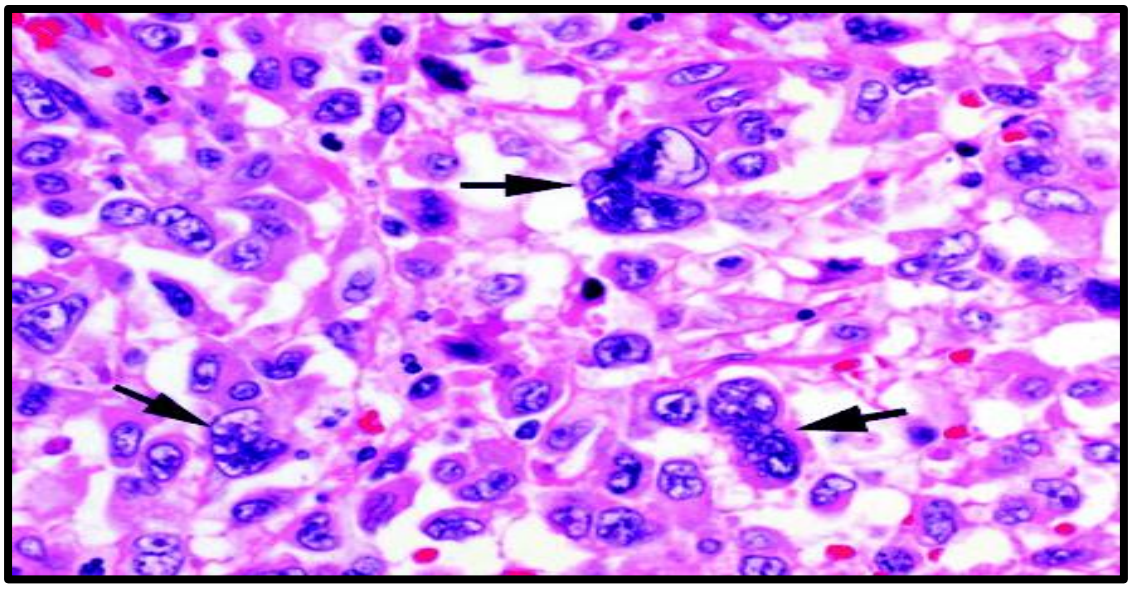


Differentiated malignant glands lined by pleomorphic and hyperchromatic malignant cells showing conspicuous nucleoli.

3. Large Cell Carcinoma of the lung

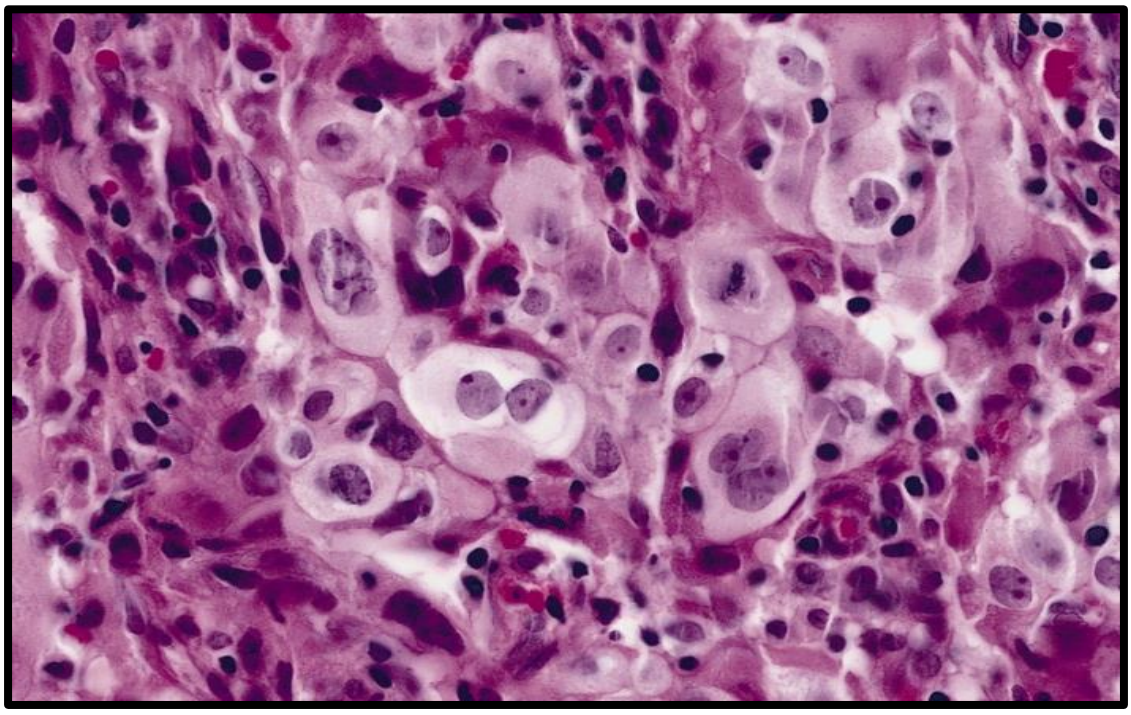
- Can be a neuroendocrine carcinoma. Probably represents undifferentiated SCC and adenocarcinomas.
- Large nuclei, prominent nucleoli.
- Variation in size and shape.
- Nuclei normally do not touch due to more cytoplasm.
- Moderate amount of cytoplasm.





Pleomorphic carcinoma of lung (large cell and giant cell subtype).

It shows mixed composition of large cell carcinoma and pleomorphic multinucleated giant cells (arrows).



This section from lower respiratory tract shows neoplastic cells with abundant pale eosinophilic cytoplasm and a surrounding infiltrate of inflammatory cells

Small cell carcinoma of the lung

- Highly Malignant Tumor.
- Cells are small, with scant cytoplasm, ill-defined borders, finely granular chromatin (salt & pepper pattern) and absent or inconspicious nucleoli.
- High mitotic count and often extensive necrosis.
- Typically not graded as all SCLC are considered High Grade.
- Very strong relationship with smoking.
- Often lead to paraneoplastic syndromes.

Paraneoplastic syndromes due to oat cell (Small)cell Carcinoma:

- ☐ **a- Cushing syndrome (ACTH).**
- ☐ **b- Inappropriate secretion of ADH.**
- ☐ **c- Hypercalcaemia.**
- ☐ **d- Hypertrophic pulmonary osteodystrophy.**
- ☐ **e- Coagulation abnormalities.**

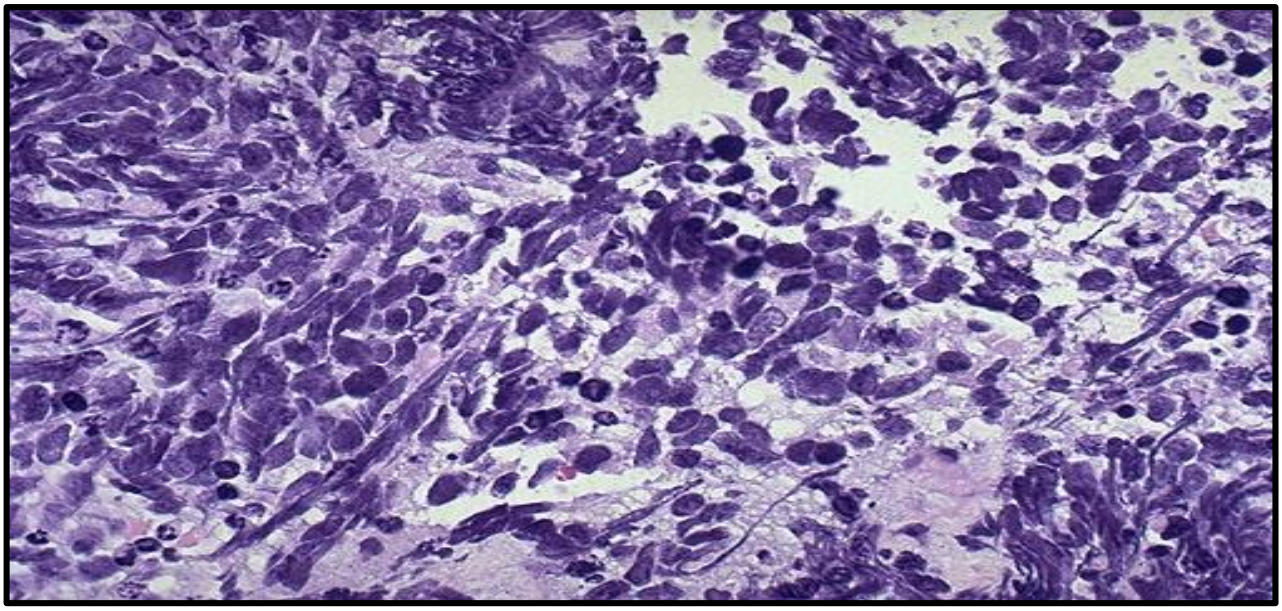
Arising centrally in this lung and spreading extensively is a small cell anaplastic (oat cell) carcinoma.

The cut surface of this tumor has a soft, lobulated, white to tan appearance.

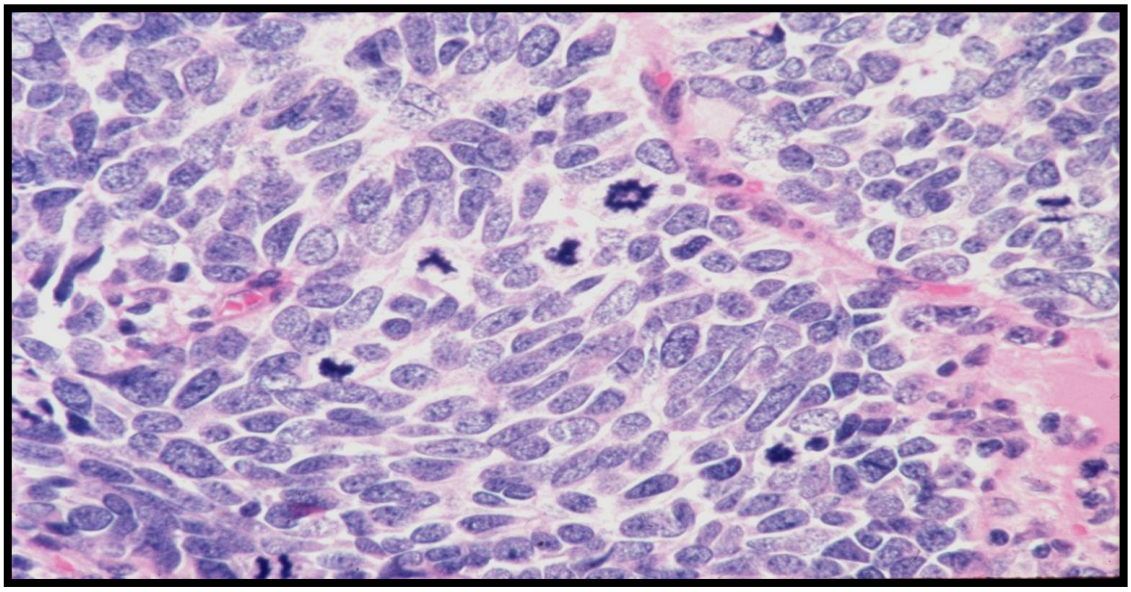
The tumor seen here has caused obstruction of the main bronchus to left lung so that the distal lung is collapsed.

Small cell carcinoma which is Pale tumor tissue spreading along the bronchi.

Metastatic tumour involving hilar lymph nodes.



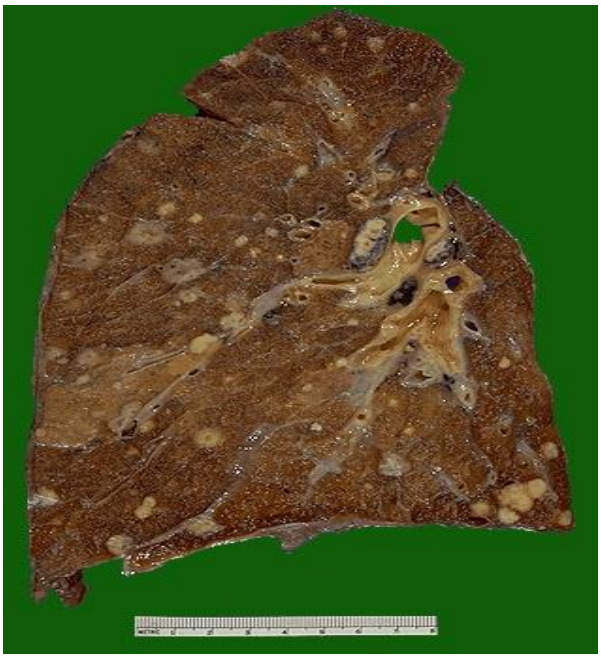
This is the microscopic pattern of a small cell anaplastic (oat cell) carcinoma in which small dark blue cells with minimal cytoplasm are packed together in sheets.



- *Small round, oval and spindle –shaped tumour cells.*
- *Granular nuclear chromatin (salt and pepper pattern)*
- *With prominent nuclear molding*
- *High mitotic count.*
- *Focal necrosis.*

METASTATIC TUMORS

- **LUNG is the MOST COMMON site for all metastatic tumors, regardless of the site of origin.**
- **It is the site of FIRST CHOICE for metastatic sarcomas for purely anatomic reasons !**



Multiple variably-sized masses are seen in all lung fields.

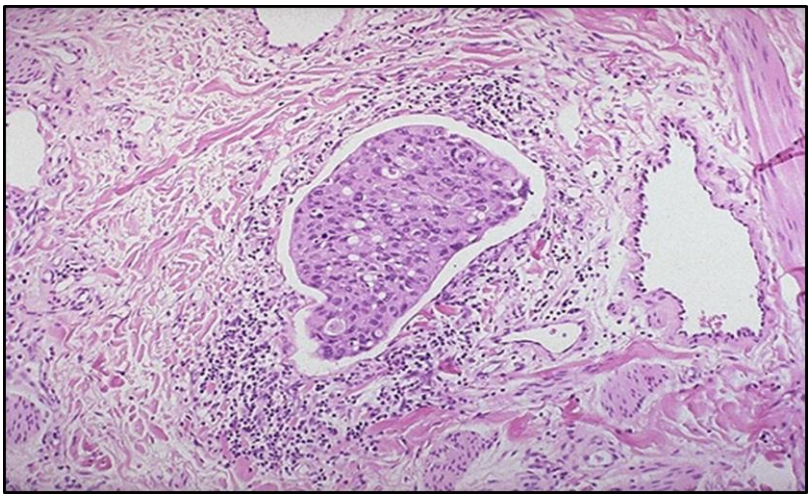
These tan-white nodules are characteristic for metastatic carcinoma.

Metastases to the lungs are more common even than primary lung neoplasms.

Chest X-ray showing multiple cannon ball opacities in both lung fields.

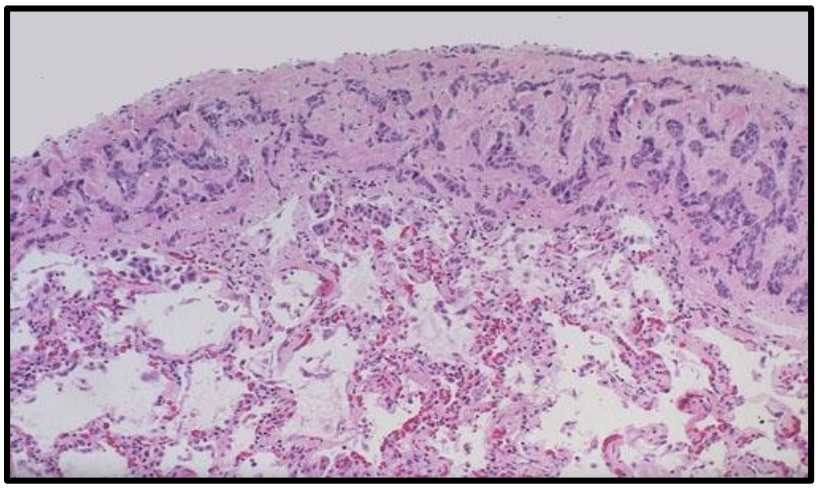
Here are larger but still variably-sized nodules of metastatic carcinoma in lung.

CT Lung shows Cannonball Metastases-large, hematogenously spread metastatic lesions in the lungs of varying sizes most often from colon, breast, renal, thyroid primaries



A nest of metastatic infiltrating ductal carcinoma from breast is seen in a dilated lymphatic channel in the lung.

Carcinomas often metastasize via lymphatics.



A focus of metastatic carcinoma from breast is seen on the pleural surface of the lung.

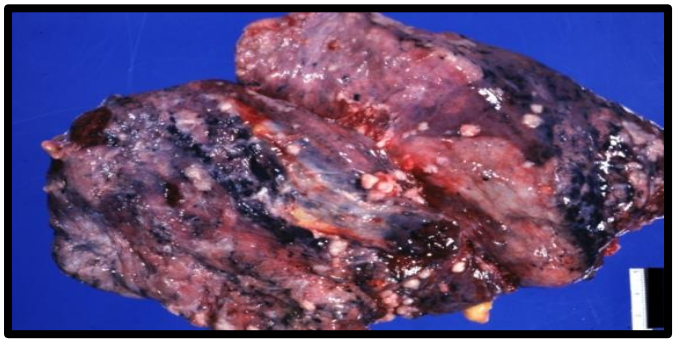
Such pleural metastases may lead to pleural effusions, including hemorrhagic effusions, and pleural fluid cytology can often reveal the malignant cells.

Mesothelioma of the lung

Mesothelioma of the Lung – Gross

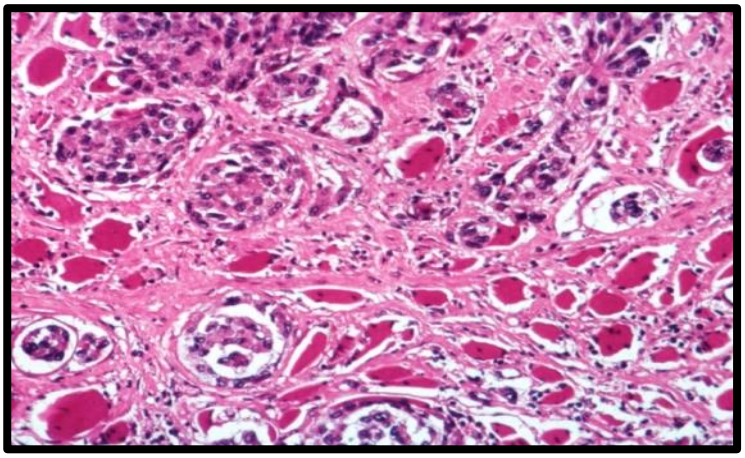
1. ***The dense white encircling tumor mass is arising from the visceral pleura and is a mesothelioma.***
2. ***big bulky tumors that can fill the chest cavity.***

- ***The risk factor for mesothelioma is asbestos exposure.***



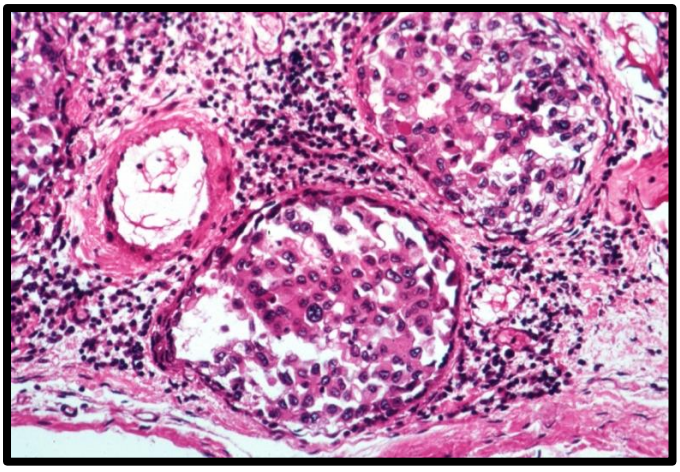
1. ***natural color external view of lung***
2. ***nodules of tumor on pleura***

Mesothelioma of the Lung – MPF/HPF



1. ***spindle cells or plump rounded cells forming gland-like configurations,***

- ***very difficult to diagnose cytologically.***



1. ***Micro epithelial pattern spindle cells or plump rounded cells forming gland-like configurations***

Thank you

حاجتي وقت إلى فرده حفظت وما قرأت ما استودعتك إني اللهم

Faisal Algharbi

Talal Alenezi

Essam Alshahrani

Abdulkarim alotaibi

Moataz ltokhais

Mohammad Hakami

Mubasher Alasmari