Practical - 10

NON-GYN MALIGNANCY

+

FNA MATERIAL

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2- NON-GYN MALIGNANCY

*Diagnostic role of Non-GYN cytology:

- It is very useful for diagnosis of premalignant and malignant tumors, especially **metastatic tumors.**

- It is very useful for diagnosis of **inflammatory conditions** (e.g. TB).

Non- GYN sample processing:

1) Sample collection
2) Concentrate by Centrifugation
3) Pour Off Supernatant and Resuspend Cell Pellet (resuspension can be done on a vortexor)
4) CytoLyt Solution Wash

- Add 30ml CytoLyt solution
- Centrifuge
- Pour off supernatant
- Resuspend cell pellet

5) Evaluate Cell Pellet Appearance

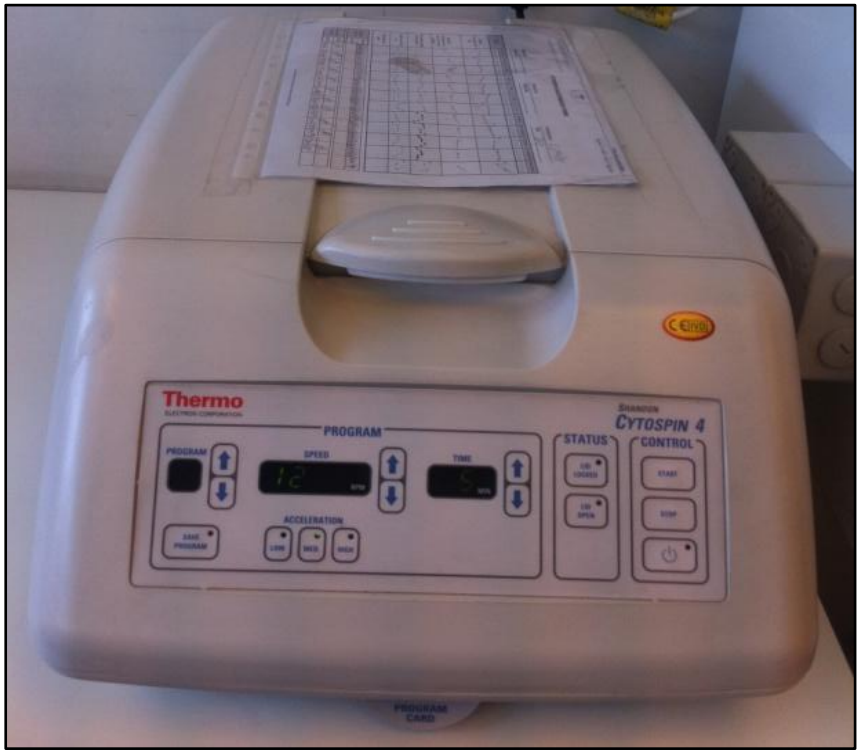
- If cell pellet is not free of blood, add 30ml of CytoLyt and repeat from step 2.
- In the case of mucoid specimens confirm the cell pellet is in liquid form. If the cell pellet is not in liquid form, add 30ml CytoLyt solution and repeat steps 2 and 4.

6) Add Fixative

7) But 1-2 drops of the specimen in to the Cytology Funnel

- The Cytology Funnel with the use of the funnel clips is a specially designed unit that facilitates the transfer a thin layer of cells (non-gyn specimens) on to microscope slides in a clearly defined area.
- Cytology Funnel Clip The clip holds the cytology funnel snugly against the microscope slide during the centrifugation process.
- The attached white filter card wicks away excess supernatant and eliminating cell loss.

8) *Cytospin or* Cytocentrifuge



9) Stain the slides

*** The needle and syringe can be washed out with buffered formalin and any tissue fragments will processed for histological sectioning.**

*Types of staining smears:

- PAP Stain
- Gram Stain
- H & E for Cell block from remnant sediment for histopathological examination.
- Other special stains for the most suspected diseases, to confirm diagnosis.

*The samples that are dealt with are:

Urines: Patients are asked to provide a 20 ml mid morning, urine sample in an empty universal container.

Pleural, Pericardial and Peritoneal samples: These specimens are obtained from patients that are in hospital either directly by the use of a syringe or from a tap. A minimum of 50 ml is required for accurate diagnosis.

Ascites: a condition in which fluid accumulates within the peritoneal space.

Bronchial washings and brushings: Bronchial samples are received from the endosocopy clinic, processed, stained and examined. Benign and malignant lung disease can all be identified.

*__Sputums:__ Sputum production in significant amounts is itself evidence of lung pathology.

- Early morning specimen of sputum should be selected for cytology examination to ensure that it is not with food particles, oil droplets or toothpaste, any of which would make it unsuitable for examination.
- Three consecutive early morning specimens should be submitted for examination.
- A positive specimen should be followed by a confirmatory sample, to eliminate the possibility of the specimen mix-ups, labeling errors is required.
- If necessary, specimens can be refrigerated at 4º C overnight having the advantages of causing autolysis.

Joint Fluids: There is a small amount of synovial fluid within the joint spaces, which acts as a lubricant. The fluid is examined on a polarised microscope for different crystal types, which could indicate gout.

Cerebral Spinal Fluid: CSF is aspirated using a sterile needle either by a lumber puncture or by passing into the skull. Aspiration of CSF is indicated as a diagnostic procedure in patients thought to be suffering from bacterial, viral or fungal infections.

*All of the above specimens need to be labeled with the correct patient demographics or it will lead to repeat specimens being requested or a delay in the processing of samples.

Respiratory Cytology

Infective agents, or the effect of them, may also be seen in respiratory samples, these include:

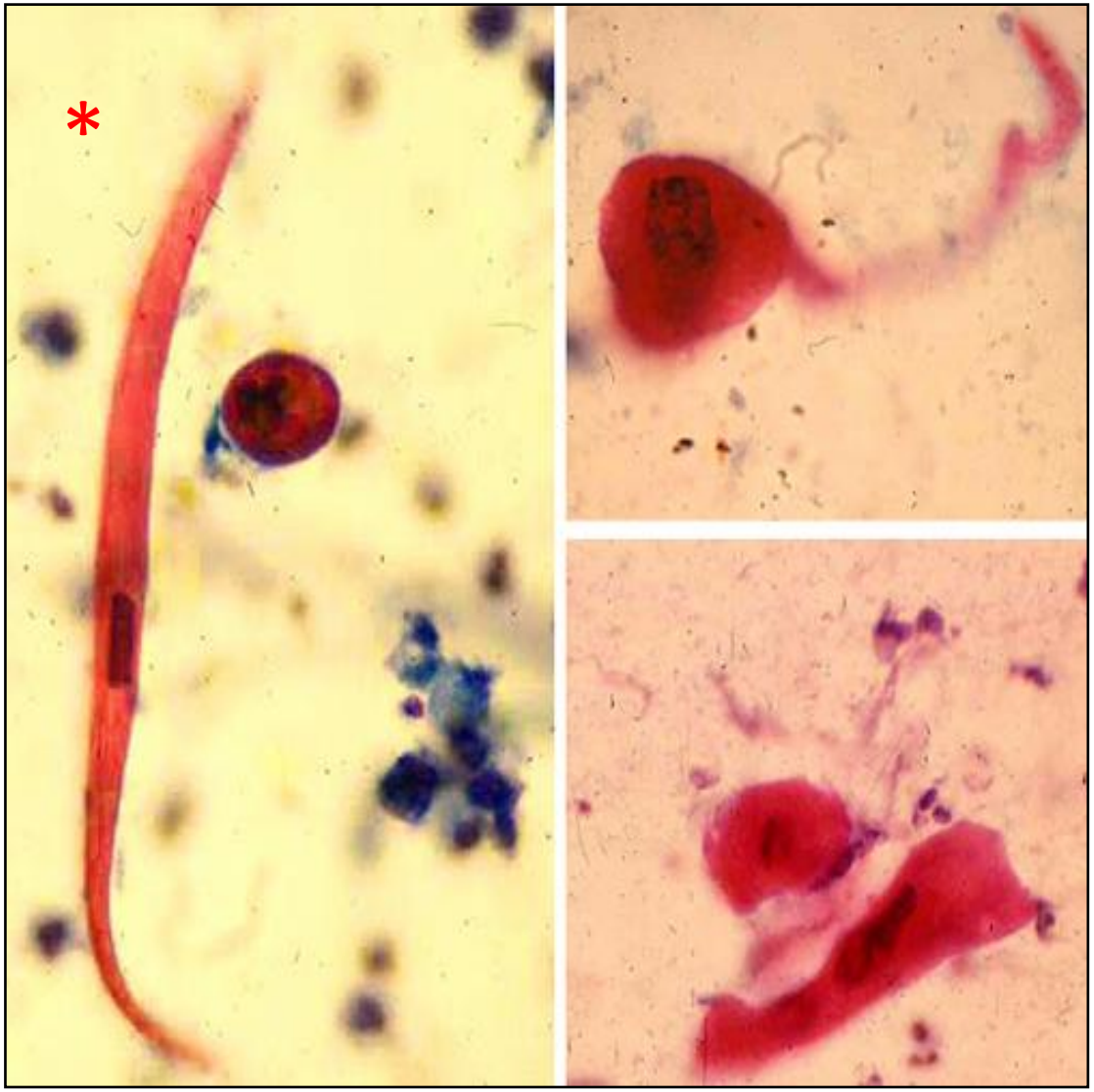
- Mycobacterium tuberculosis, M avium, M intracellulare (TB)
- Candida spp
- Mucor spp
- Aspergillus spp
- Pneumocystis carinii
- Herpes simplex virus
- Cytomegalovirus
- Severe Acute Respiratory Syndrome (SARS) - vaculoated cells seen in sputum, bronchial lavage and tracheal aspirates.

*Types of malignancy in respiratory cytology:

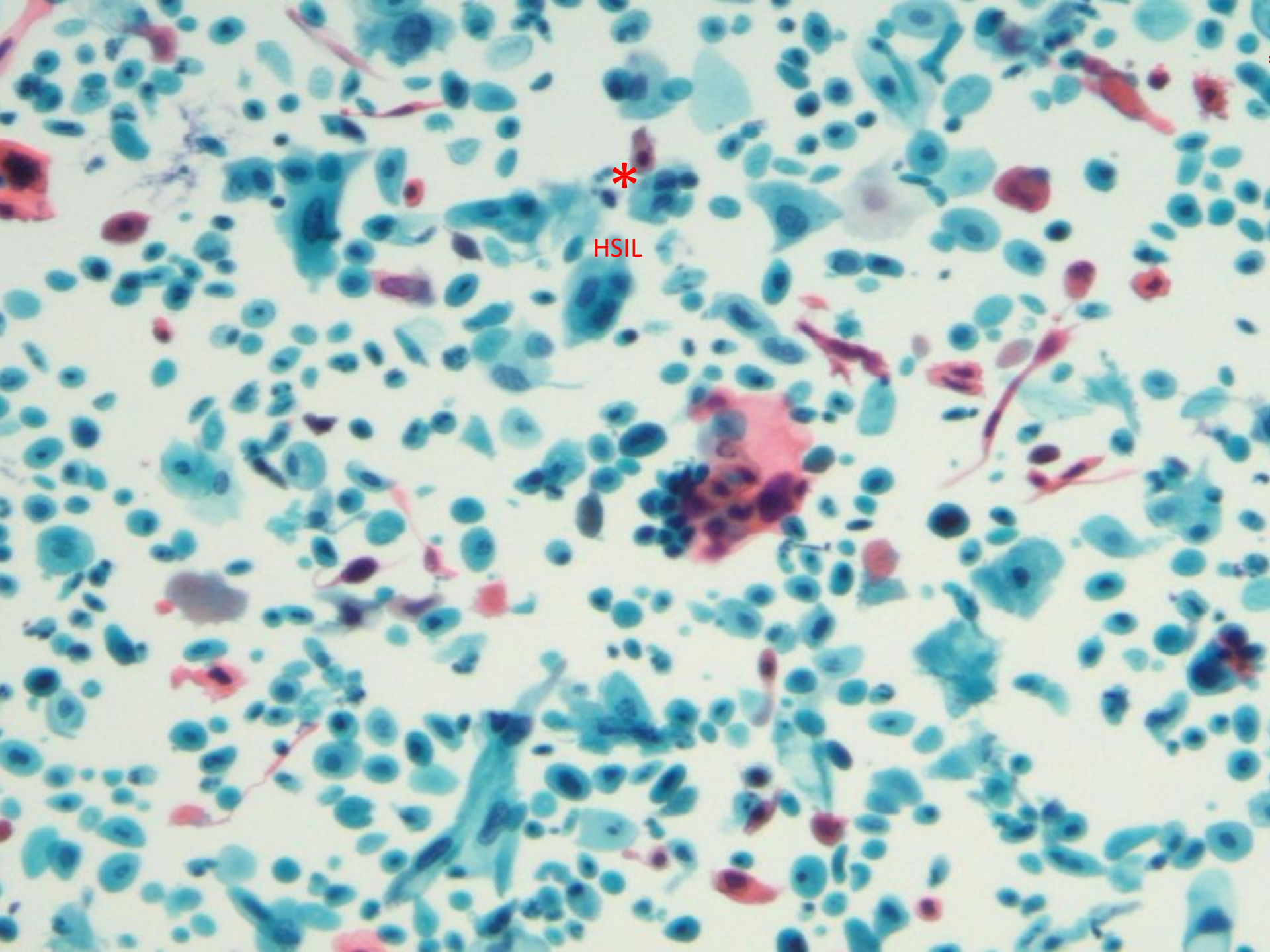
1. Differentiated squamous carcinoma or Squamous cell carcinoma.
2. Undifferentiated squamous carcinoma (large cells, small or oat cells).
3. Adenocarcinaoma
1. Other types include:
   - Bronchial alveolar cell carcinoma
   - Lymphomas
   - Melanoma
   - Other metastatic disease

*Squamous cell carcinoma

- Single or in small groups,
- Cytoplasm is often strikingly abnormal and having a definite opaque quality,
- Bizarre shaped cells are common, with "Tadpole" and "Fibrile" forms.



These 3 photos from a sputum cytological specimen show keratinized malignant epithelial cells consistent with invasive squamous cell carcinoma.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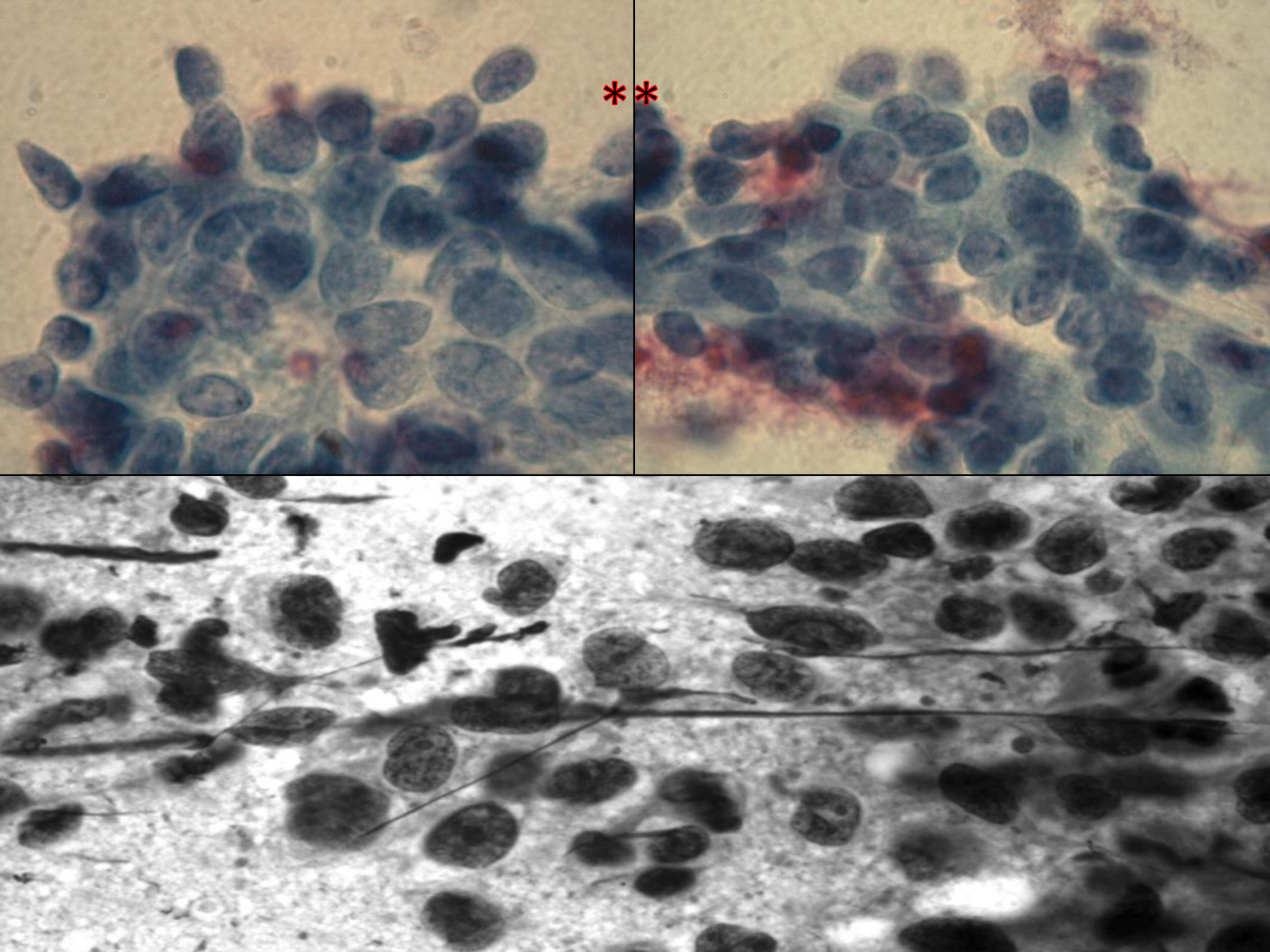
HSIL

Squamous cell caricinoma (sputum, high power)

Undifferentiated small cell carcinoma (Oat cell carcinoma)*

- The oat cells tend to lie in groups stretched out along a streak of mucus.
- Many these undifferentiated cells lie singly but when in close contact show the typical nuclear "molding" which is important diagnostic point.
- The nuclear structure again is variable, being either densely hyperchromatic or showing deeply basophilic chromatin clumping with some condensation of nuclear membrane.

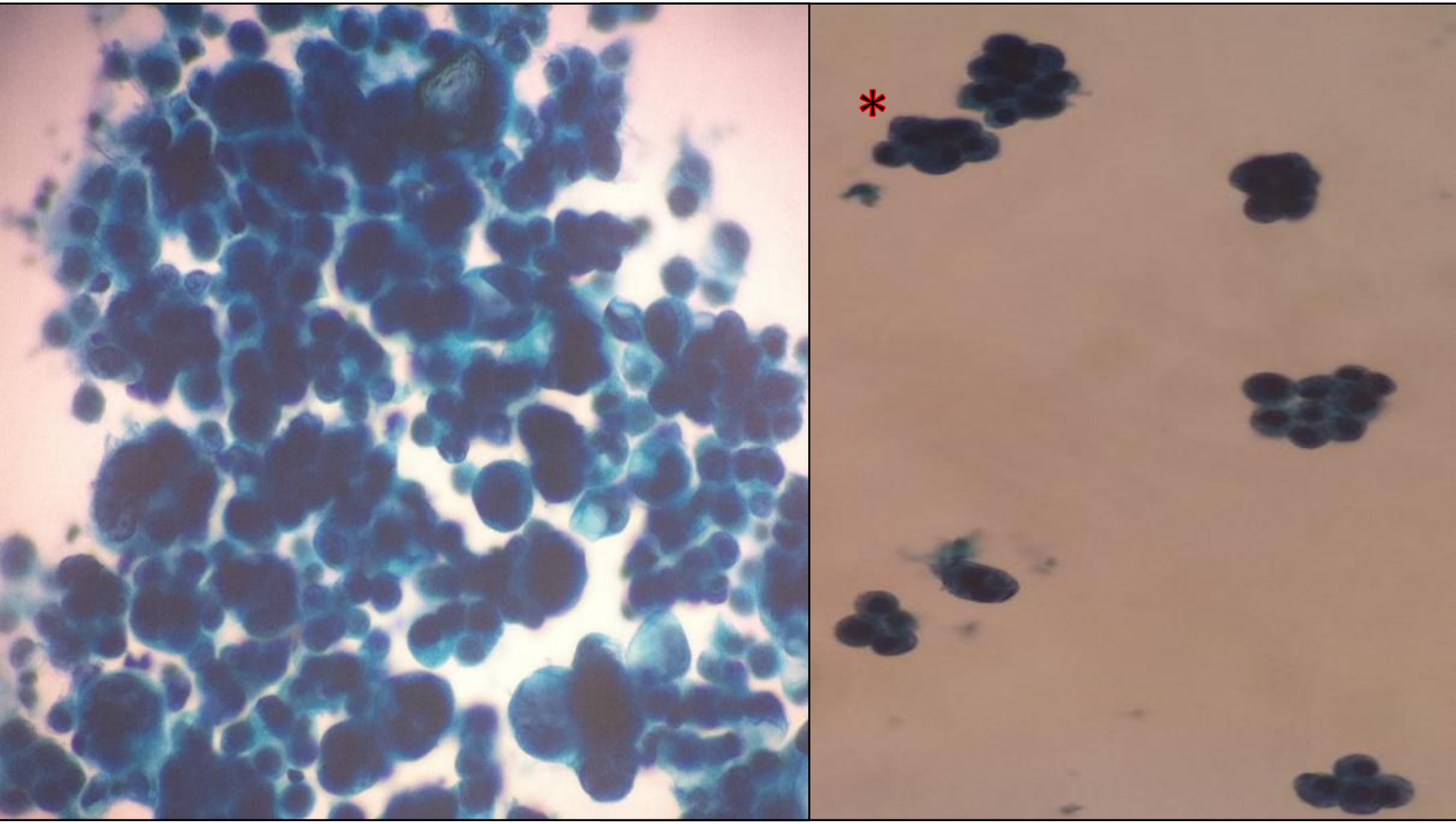


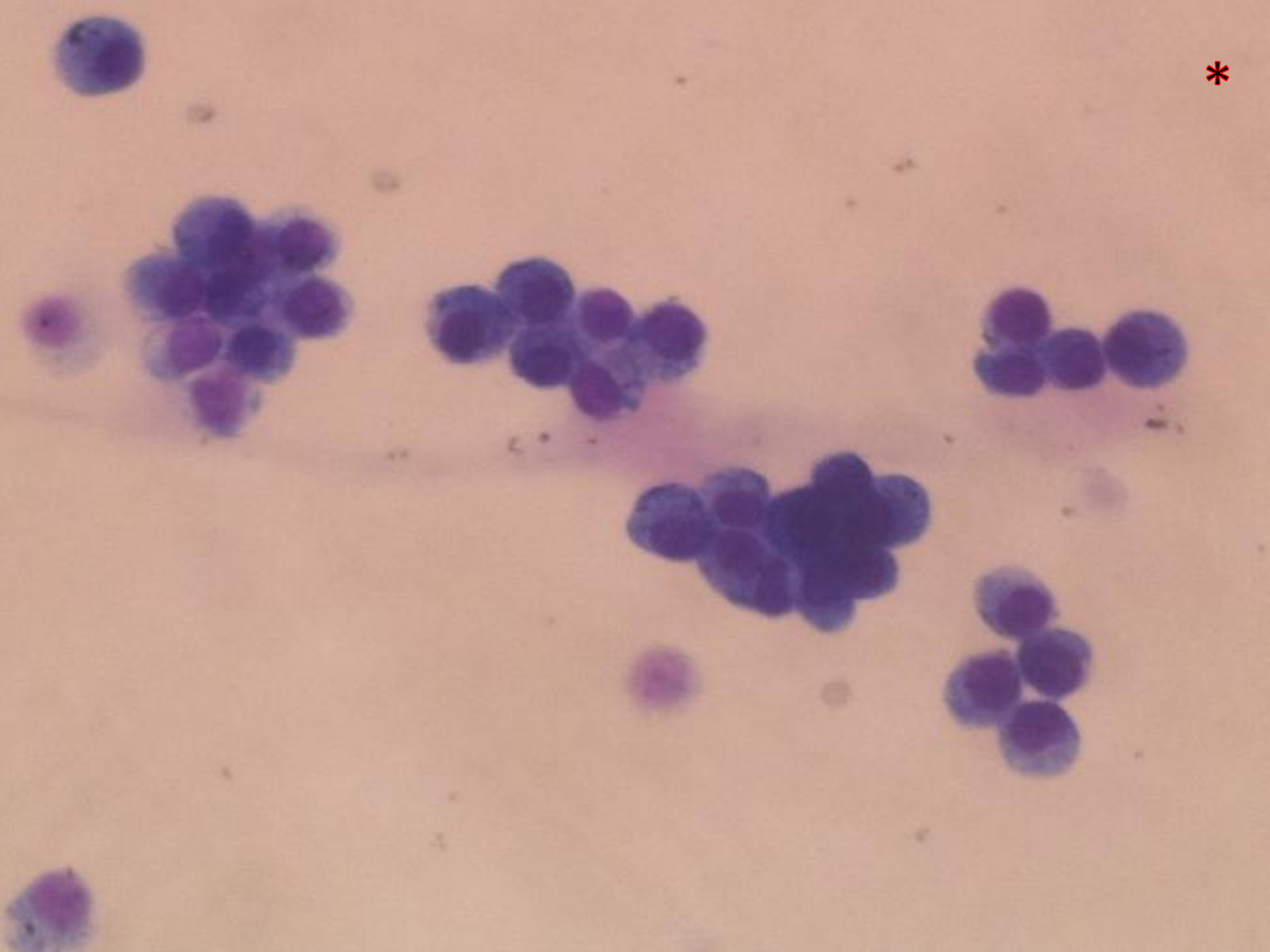
Undifferentiated large cell carcinoma*

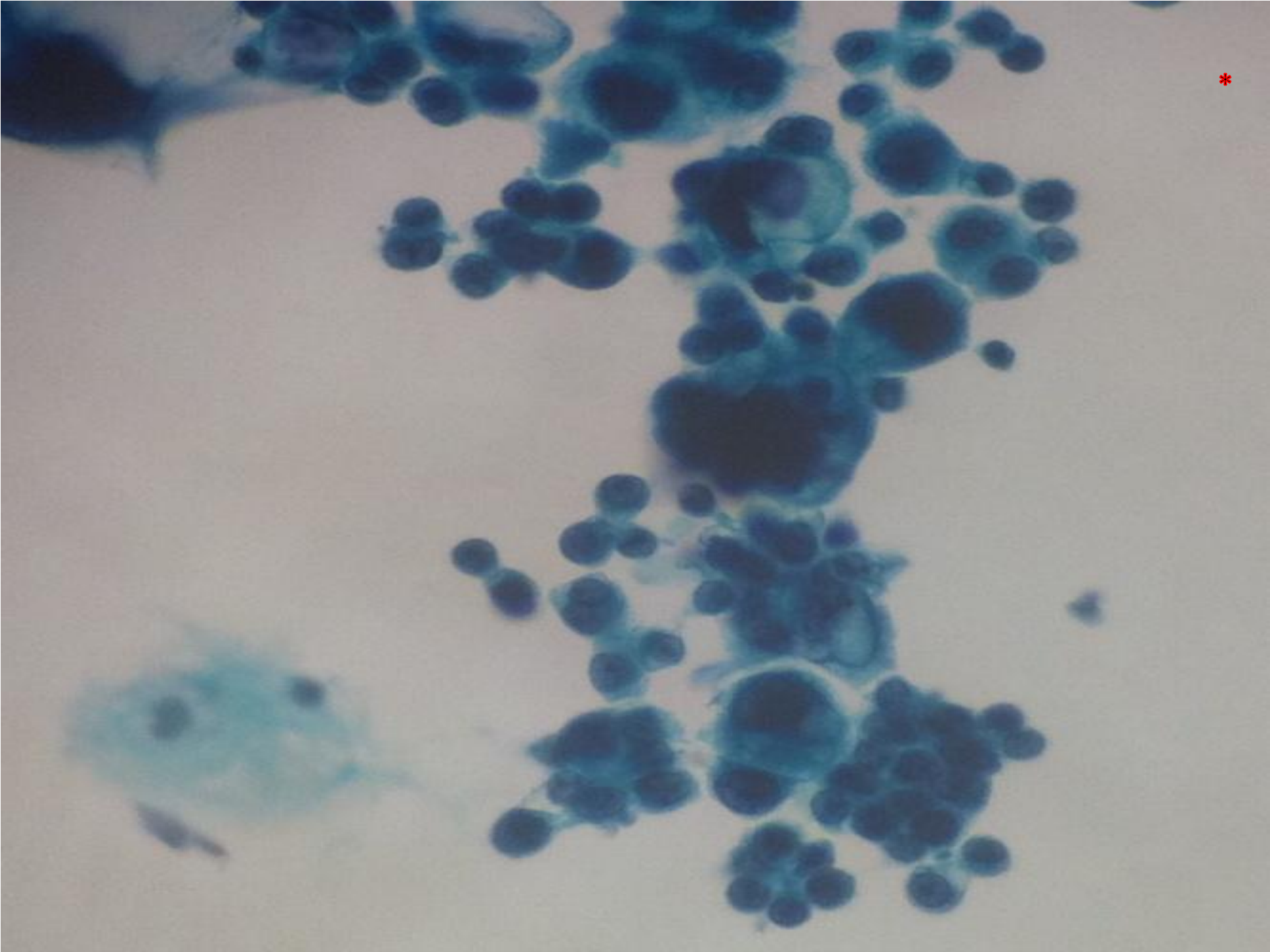
- **Large undifferentiated malignant cells appear almost completely denuded cytoplasm.**

- **The nuclei are more commonly hyperchromatic and show abnormal chromatin clumping with occasional large nucleoli.**

Adenocarcinoma





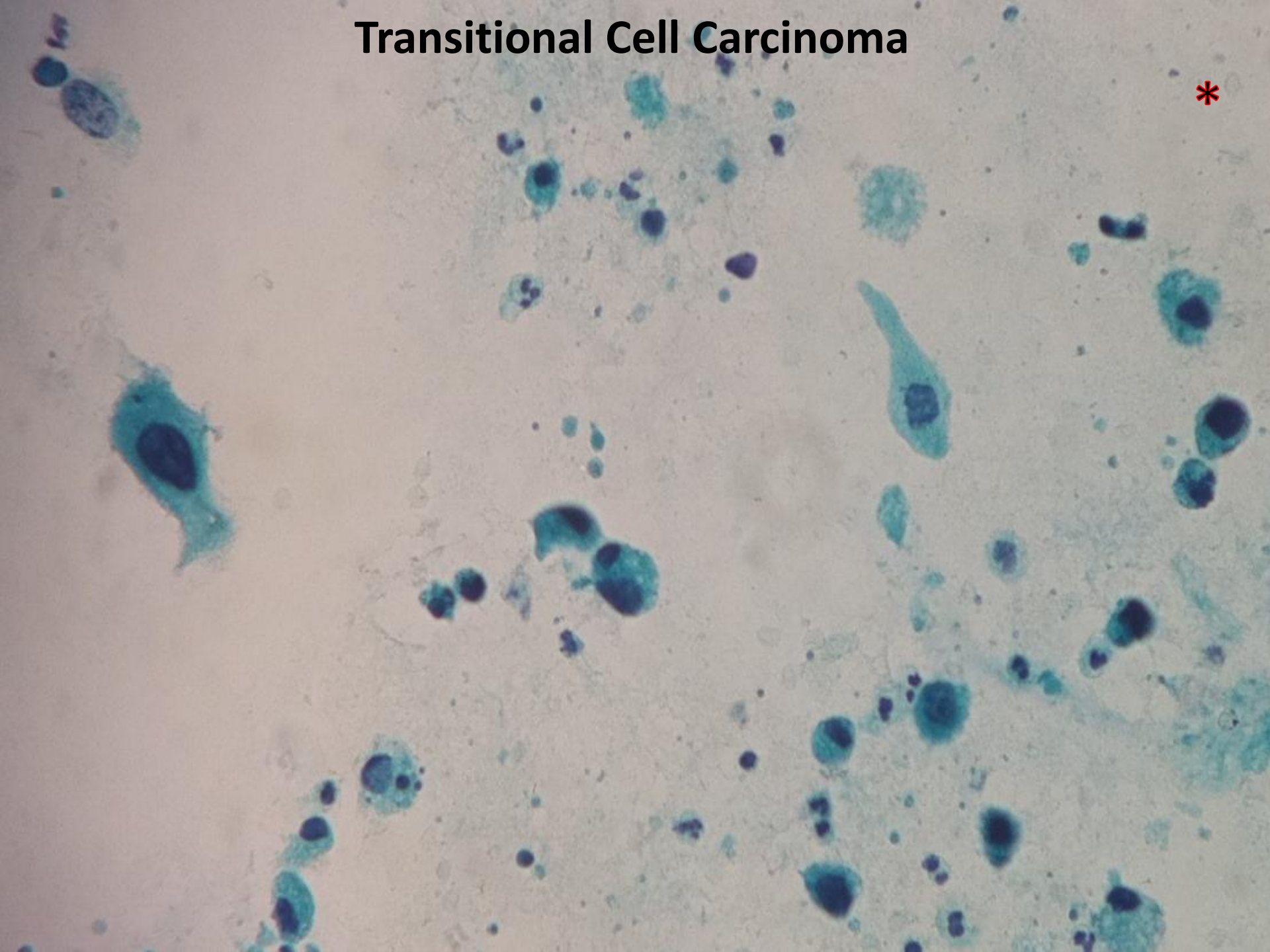


Urinary cytology*

- The cytological analysis of urine is an important investigative tool in the screening, diagnosis and follow-up of urological malignancy, in particular, **Transitional Cell Carcinoma**.

- In **urine** smear a combination of urothelial cells, squamous cells and glandular cells may present.

Transitional Cell Carcinoma



Cytology of serous fluids*

- **The sampling of fluids form the serous membranes of the pleura, peritoneum and pericardial cavities is performed to ascertain the reason for a fluid build up as these membranes normally contain a small amount of fluid to provide lubrication against moving surfaces.**

There are two basic types of fluid, the transudate and the exudate, Accumulation of fluids in body cavities will lead to effusions of:

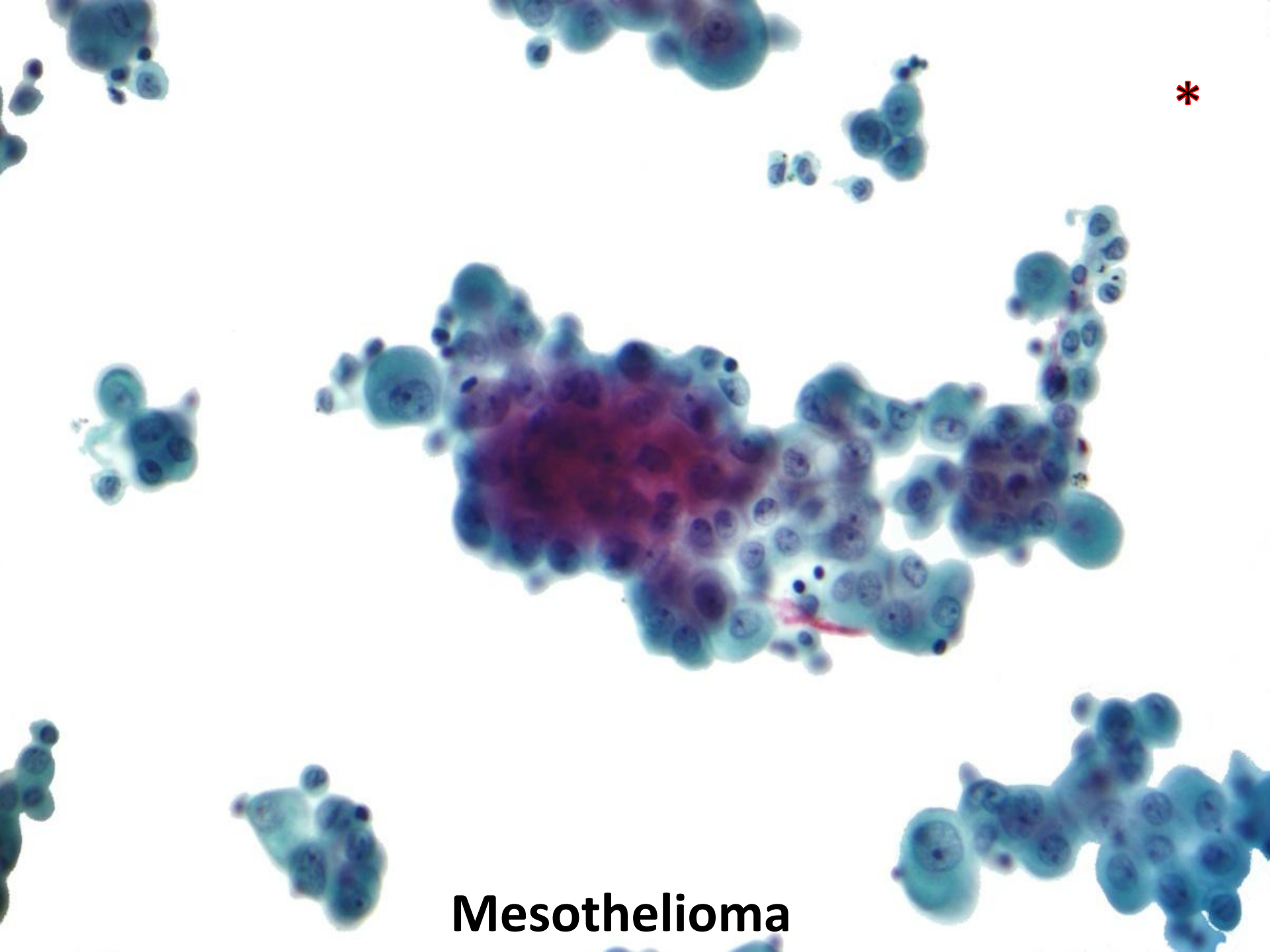
1- Transudates

- Has a low protein and cellular content.
- Associated with circulatatory disorders.

2- Exudate

- Have a high protein and cellular content
- Associated with malignant disease and inflammation or infection

* ***The primary tumour of serous membranes is mesothelioma that is strongly associated with exposure to asbestos. However, adenocarcinoma may be seen.***



Mesothelioma

Other conditions that may be diagnosed in serous fluids include:

- *Mycobacterium tuberculosis* (TB)
- Rheumatoid
- Eosinophils
- Empyema
- Lymphocytic effusions

Fine Needle Aspirations*

- For lesions that are less accessible fine needle aspiration (FNA) cytology may be used with or without the assistance of imaging devices such as ultrasound or X-ray guidance.

- Fine needle aspiration (FNA) is frequently used in cytology to provide a rapid diagnostic procedure performed in an out/in patient setting with or without the use of imaging.

Site of specimen:

- Breast, Kidney, Liver, Lung, Pancreas and Thyroid

Advantages of FNA over open surgical biopsy*

- Diagnosis with a simple test,
- Cheap compared with biopsy,
- Avoids biopsy in some cases and may allow treatment of cancers at a planned surgery,
- Outpatient procedure,
- Surgical team and theatre time not required,
- Avoids frozen section,
- Reduces patient uncertainty and anxiety,
- Low complication rate.

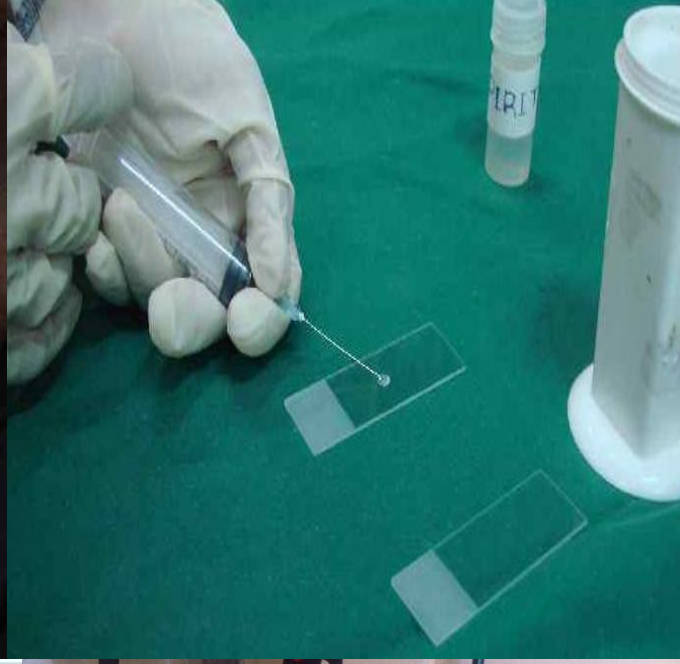
Disadvantages of FNA over open surgical biopsy

- Errors in diagnosis may lead to overtreatment or delay in making the correct diagnosis.
- Occassional complications such as bleeding or pneumothorax.
- Requires skilled personnel to take the sample.

FNA methodology:*

- Direct smears usually made immediately after aspiration.
- Half of the smears should be air-dryed (stained with Diff-Quick) and half should be fixed (stained with Pap stain).
- Fixed slides should be placed in 95% ethanol vial (available from the Cytopathology lab) immediately after they are performed and smeared.
- Material left in the syringe can be aspirated into a centrifuge tube to prepare cell block from it and the needle disposed of in a proper container.






The End

good luck ladies!!!

Revision

Staining lecture------5marks

Power point pictures: -----10marks

Normal Epithelial cells

Hormonal

Inflammation

Malignancy: Gyn & Non-Gyn

Screening: +side question ----------10marks

Inflammation & Malignancy