LEARNING MODULE 2
LESSON 3
SPECIFIC INFECTIONS IN PAP SMEARS
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• Trichomonas vaginalis
• Mycosis (Candida)
• Vaginal Bacterioris (Gardnerella)
  • Actinomyces
  • Parasites
• Viral Infections, excluded HPV
Generally speaking, every specific infection of the cervical tract has not a same specific inflammatory pattern, but there are features that are only more suggestive than others for these specific organism.

That means it is possible to find, together with an organism, more or less every inflammatory pattern described above.
Trichomonas vaginalis

It is a protozoa that appears in smears like a greyish, oval or pear-shaped organism with an eccentric nucleus (not always discernible) and with a reddish granulation of the cytoplasm. Its presence may cause a general orangiophilic staining reaction of many squamous cells apart from superficials, named “false eosinophilia”.

Parabasal cells may be increased in number.
Frequent presence of metaplastic cells.
Orangiophilic and/or cyanophilic granular (“dirty”) background, due to cytolysis (presence of bare nuclei).
Mild nuclear enlargement, multinucleation and (a rather specific sign) presence of a clear perinuclear halo.
Epithelial changes (perinuclear halo, moth-eaten) probably related to *Trichomonas vaginalis* infection, the parasite is not clearly identifiable in this picture. (obj. 20x)
Inflammatory ectocervix: higher magnification, presence of Trichomonas (arrow). (obj. 40x)
Trichomonas vaginalis

Inflammatory ectocervix: dirty background, Trichomonas vaginalis infection (arrows: visible parasites). (obj. 20x)
Trichomonas vaginalis

Inflammatory background, squamous cells with a clear perinuclear halo and an enlarged hyperchromatic nucleus (purple arrow): Trichomonas vaginalis infection (black arrow: parasite). (obj. 10x)
Trichomonas vaginalis

Inflammatory ectocervix: Trichomonas vaginalis more or less identifiable (purple arrow), faint clear perinuclear halos and an enlarged nucleus (black arrow). (obj. 20x)
Trichomonas vaginalis

Inflammatory ectocervix: presence of Trichomonas vaginalis (pear shaped organised, inside the black circle). (obj. 40x)
Mycosis (Candida)

Like in *Trichomonas* infection, it could be false eosinophilia.

It is typical of *Candida* infection a particular disposition of cells that look strongly embedded one another by hyphae.

There are also other mycotic infections, i.e. *Torulopsis glabrata*, with smaller yeasts (spore) than Candida, usually intracytoplasmatic, and *Leptothrix*, with longer hyphae and often associated with *Trichomonas* infection.
Mycosis (Candida)

Cervical and vaginal mycosis: many hyphae (arrows) and yeasts are visible at low magnification. (obj. 10x)
Mycosis (Candida)

Cervical mycosis: details of hyphae (arrows) and yeasts. (obj. 20x)
Mycosis (Candida)

Candida: hyphae and yeasts in an inflammatory background. (obj. 20x)
Mycosis (Candida)

Candida albicans: details of hyphae and yeasts. Compare sizes of yeasts and squamous cell nuclei. (obj. 40x)
Mycosis (Candida)

Ectocervix: pseudofilaments composed of mucus. An eosinophilic polymorph is present (circle). (A: obj. 20x, B: obj. 40x)
Mycosis (Candida)

Ectocervix: normal flora with filamentous bacilli to be distinguished from pathogenic flora or from fungal filaments. (obj. 40x)
Vaginal Bacterioritis (Gardnerella)

The most frequent bacterium is *Haemophilus vaginalis* or *Gardnerella*.

Enlargement of nuclei.
False eosinophilia.
Cytolysis
Squamous cells often completely covered by coccobacilli, giving them a “dusty” appearance.

In presence of multinucleated giant cells is suspected for TB infection (*Mycobacterium*).
Gardnerella vaginalis: bacteria are seen in the background, mainly on the squamous cells. Polymorphs are absent or rare. (obj. 20x)
Gardnerella vaginalis: bacteria are seen in the background, mainly on squamous cells. Polymorphs are absent or rare. An intermediate squamous cell with an enlarged nucleus. (obj. 20x)
Gardnerella vaginalis: “Dirty” background. (obj. 40x)
Actinomyces

Actinomyces is a particular type of bacterium (rather than a fungus).
Groups of many, long and disorderly arranged filamentous material.
Slight and aspecific cellular changes.
It must be recognized because it can cause severe inflammation of salpinx and ovary.
Actinomyces: low magnification of a typical aggregate of pseudofilamentous material. Woman with an IUD. (obj. 10x)
Actinomyces: a typical aggregate of pseudofilamentous material. Smear from a woman with an IUD. (obj. 20x)
Actinomyces: typical aggregates of pseudofilamentous material. Smear from a woman with an IUD. (obj. 40x)
Exocervical smear: ovum of Enterobius vermicularis with a thick eosinophilic capsule and the larva inside. (obj. 20x)
Parasites

Wuchereria bancrofti type microfilariasis. (obj. 20x)
The most important virus is the Human Papilloma Virus (HPV), will be discussed together with displastic and neoplastic lesion, playing a role in neoplastic transformation of squamous cells.

Among other viruses, the most frequent to observe in cervical smear is Herpes Simplex Virus (HSV).

A third virus, the Cytomegalovirus (CMV) may infects cervical cells of immunosoppressed women (i.e. HIV-positive women). The cytological features are quite similar to HIV, and a definitive diagnosis can be obtained only through culture and serology.
Viral infections/2

HSV infection in smear is characterized by inflammation with presence of mononucleate and multinucleate giant cells with an high N/C ratio and blurred cells margins. “Ground-glass” appearance of nuclei, with margination of chromatin (impression of thickening of nuclear membrane).

Molding of neighboring nuclei.
Large eosinophilic inclusion intranuclear bodies (type A bodies).
Small basophilic inclusion bodies (type B bodies).
Herpes virus

Herpetic infection: multinucleated cell (arrow) with intranuclear viral inclusion. (obj. 20x)
Herpes virus

Herpetic infection: multinucleate cell (arrow) with intranuclear viral inclusions. High magnification. (obj. 40x)
Herpes virus

Herpetic infection: mononucleated cells with intranuclear viral inclusion (arrows). (obj. 20x)
Herpes virus

Herpetic infection: mononucleated cells with intranuclear viral inclusion (arrows). (obj. 40x)
Herpes virus

HSV infection: mono- and multinucleate cells with intranuclear ground glass inclusion and margined chromatin. Nuclear moulding (arrow). (obj. 20x)
HSV infection: three mononucleate (black arrows) and one multinucleate (purple arrow) cells with intranuclear viral inclusion. (obj. 40x)