Unit IX – Problem 6 – Microbiology Lab: Infections Associated With Transplantation



- Normally, there is a balance between host defenses and microbial virulence.
- Pneumocystis jiroveci:
 - **Cystis**: because it is forming cysts during its life cycle.
 - **Pneumo**: because it is causing chest infection (type of pneumonia). Clinically, this is represented by diffuse bilateral interstitial infiltrates.
 - Sample which must be taken to detect the organism:
 - ✓ <u>Induced sputum.</u>
 - ✓ <u>Bronchoalveolar lavage</u> (most common).

Then, the sample will be stained by Giemsa or silver stain in cytology lab (why?) \rightarrow so cysts can be detected. A more common way to identify the organism from the sample is by direct antigen detection using immunofluorescence (remember that this method is also used to detect RSV or influenza virus).

- Herpes zoster:

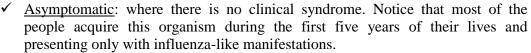
- **Skin lesion**: it is linear around the root of the nerve (along the dermatome). The lesion is characterized by vesicles (vesicles are found in lesions caused by all types of Herpes).
- Herpes family includes the following viruses:
 - Herpes simplex virus: which is further sub-classified to two types (type-I and type-II).
 - ✓ <u>Varicella zoster virus</u> (which causes chicken-pox and shingles).
 - ✓ Epstein-Barr virus (causing infectious mononucleosis).
 - ✓ Cytomegalovirus (CMV).

Note: all of these types of viruses are known as (latent viruses) \rightarrow which means that they have the ability to be reactivated especially when the immune system is compromised.

- How to detect this virus: generally viruses can be cultured on cell-line (viable cells). If the virus is present, cytopathic effects will be detected such as:
 - ✓ Ballooning (seen with herpes simplex virus).
 - ✓ <u>Inclusions.</u>
 - ✓ Lysis.
 - ✓ Syncitium formation.
- **Epstein-Barr virus (EBV):**
 - It is known to cause infectious mononucleosis.
 - Stages of disease caused by the virus:
 - ✓ <u>Acute/ primary</u>: the first exposure of the body to the virus. This type of infection results in the typical infectious mononucleosis.
 - ✓ Past EBV.
 - ✓ Reactivation of EBV in an immunocompromised patient.
 - How to detect this virus:
 - ✓ Anti-VCA: caspid antigen (which contains both IgM and IgG).
 - ✓ Anti-EBNA
 - ✓ Anti-EA

Note: Anti-EBNA is formed only two months after the exposure so it helps you to differentiate between acute primary EBV where anti-EBNA will not be present and reactivation of EBV where all of the markers above will be present together.

- Associated diseases with EBV:
 - ✓ Burkitt's lymphoma.
 - ✓ Nasopharyngeal carcinoma.
 - ✓ Post-transplant lymphoproliferative disease (PTLD).
- Cytomegalovirus CMV):
 - It is the most serious type of infection which might occur in a transplant patient. This organism is treated with ganciclovir.
 - Infection with CMV can be:





- CMV disease which is characterized by the following symptoms:
 - * Brain: encephalitis.
 - **!** Eye: retinitis.
 - **!** *Lung*: pneumonia.
 - **Stomach and intestines**: gastroenteritis.

• Detecting the virus:

- ✓ A biopsy from the transplanted organ will show inclusion bodies (known as owl's eye).
- ✓ Laboratory investigations:
 - **Culture:** usually it is not done because it consumes a lot of time.
 - ❖ Detection of pp65 antigen —in a blood sample with anticoagulant—by direct immunofluorescence (this antigen shows if there is reactivation of a past virus). This antigen is detected in PMNs (lobulated nuclei). pp stands for: pyrophosphate matrix protein.

BK virus:

- Belonging to human papilloma virus (HPV).
- In patients with kidney transplant, this virus can cause deterioration in kidney's function (nephropathy and graft loss).
- Transmission of the virus is by: respiratory secretions.
- Laboratory tests:
 - ✓ The best way to detect the virus is by taking biopsies.
 - ✓ A second way is by doing <u>urine cytology</u> aiming to detect decoy cells.
- **Treatment**: there is no specific drug against the virus but the viral load can be reduced by manipulating immunosuppressive drugs taken by the patient.

- Atypical mycobacteria:

- It causes four clinical syndromes:
 - ✓ Pulmonary disease.
 - ✓ Lymphadenopathy.
 - ✓ Skin disease.
 - ✓ Disseminated disease.
- Culture: LJ agar.
- Stain: Ziehl-Neelsen

- Cryptosporidium:

- It is a parasite.
- Clinically causing: watery diarrhea in immunocompromised patients.
- **Stain**: acid-fast

- Aspergillus:

- There are three types of aspergillus:
 - ✓ A.flavus (greenish-yellow in color): producing aphla toxin an harming the liver.
 - ✓ A.fumigatus (olive-green in color): causing aspergilloma.
 - ✓ A.niger: causing otitis externa.
- Culture: sabouraud agar.
- Candidia albicans: it is a mold.
- Cryptococcus neoformans:
 - Yeast.
 - **Transmission**: from pigeon's feces \rightarrow entry through the lungs.
 - **Stain**: india-ink.