Bugs in BMT

Common Infections Seen in Pediatric Stem Cell Transplant Patients

Elizabeth Torok CPNP

Objectives

- Review most common bacterial, fungal and viral infections
- Discuss timing of infections, when to anticipate based on transplant timeline
- Prevention, surveillance and treatment of most common infections
- Overview of new diagnostic testing, drugs and cellular therapy as related to infections
- Review infection prevention

Types of Infections

Bacterial

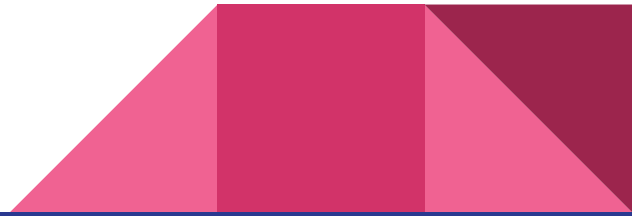
Streptococcal, E. coli, Pseudomonas, staph, etc

Viral

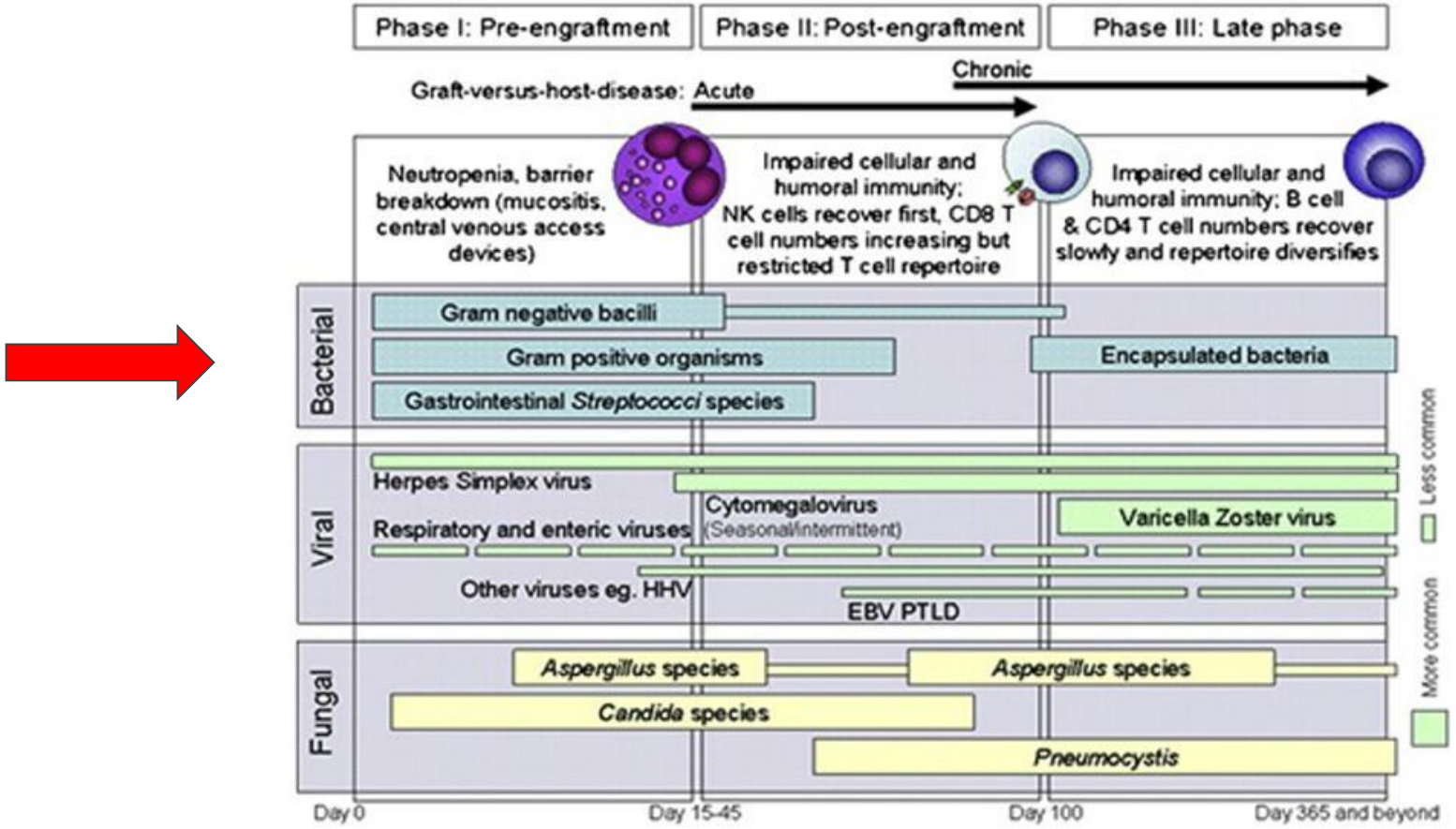
HSV, Cytomegalovirus (CMV), BK virus, Ebstein Barr Virus (EBV), Adenovirus

Fungal

Aspergillus, Candida, mucor, PJP



When do we anticipate infection?



Bacterial

Occur mainly during pre engraftment phase

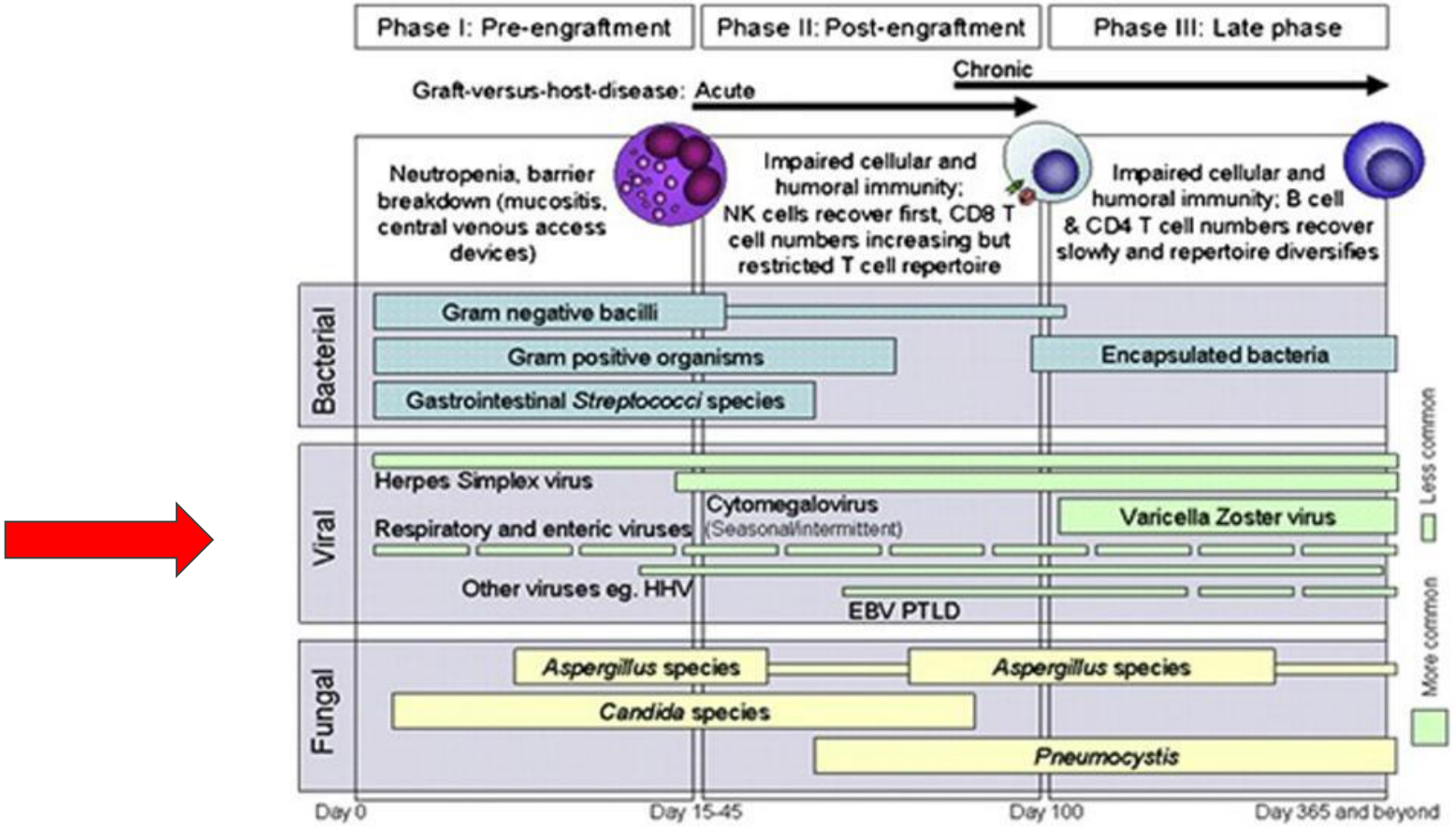
- Mucosal barrier injury (oral, GI)
- Phase of prolonged neutropenia
- Central venous access device in place

Prevention with daily bath, scheduled oral hygiene, daily room clean

Fluoroquinolone prophylaxis used in some centers

Initiation of broad spectrum antibiotics with first fever with low threshold to add gram positive coverage

When do we anticipate infection?



Viral

Most commonly occur post-engraftment or late phase of transplant

Specific to conditioning regimen or transplant type

- HSV
- CMV
- BK virus
- EBV
- Adenovirus

HSV

Herpes simplex virus 1/2

- pre transplant testing

- initiation of prophylaxis with acyclovir/valacyclovir during pre engraftment phase, continue while on immunosuppression

CMV

Patients and donors screened pre SCT. Recipients who are + or receive donor + cells higher risk for viral reactivation

Patients who receive lymphocyte depleting treatment (ATG, Campath), UCBT, or have active GVHD have higher rates of infection

Frequent surveillance with CMV PCR testing

Goal is to start preemptive therapy before signs of CMV disease (involvement of lungs, intestines, liver, etc)

Treatment with appropriate antiviral: Foscarnet/Ganciclovir/Cidofovir. Send resistance testing if CMV viral load rising

Starting to prophylax with letermovir in adult settings, some use in peds

BK virus

Often a childhood infection, 80% of adults are seropositive for BKV

Reactivates in immunocompromised pts, manifests as asymptomatic viruria

Screen pts who are symptomatic or showing signs of nephropathy

No standard options; we currently treat with Cidofovir, have added leflunomide

Cidofovir given weekly; in high doses needs co-administration of probenicid prior, just after, then 8 hours post to decrease side effects to kidneys

Consider decreasing immunosuppression

EBV

Risk factors similar to CMV

Screen patients weekly if higher risk, or every 2-4 weeks if low risk

Concern for PTLD (post-transplant lymphoproliferative disease) which is almost exclusively related to EBV

Present with fever, LAD, enlarged tonsils, organ lesions (detected on PET/CT)

Treat with Rituximab weekly, consider decreasing immunosuppression

Adenovirus

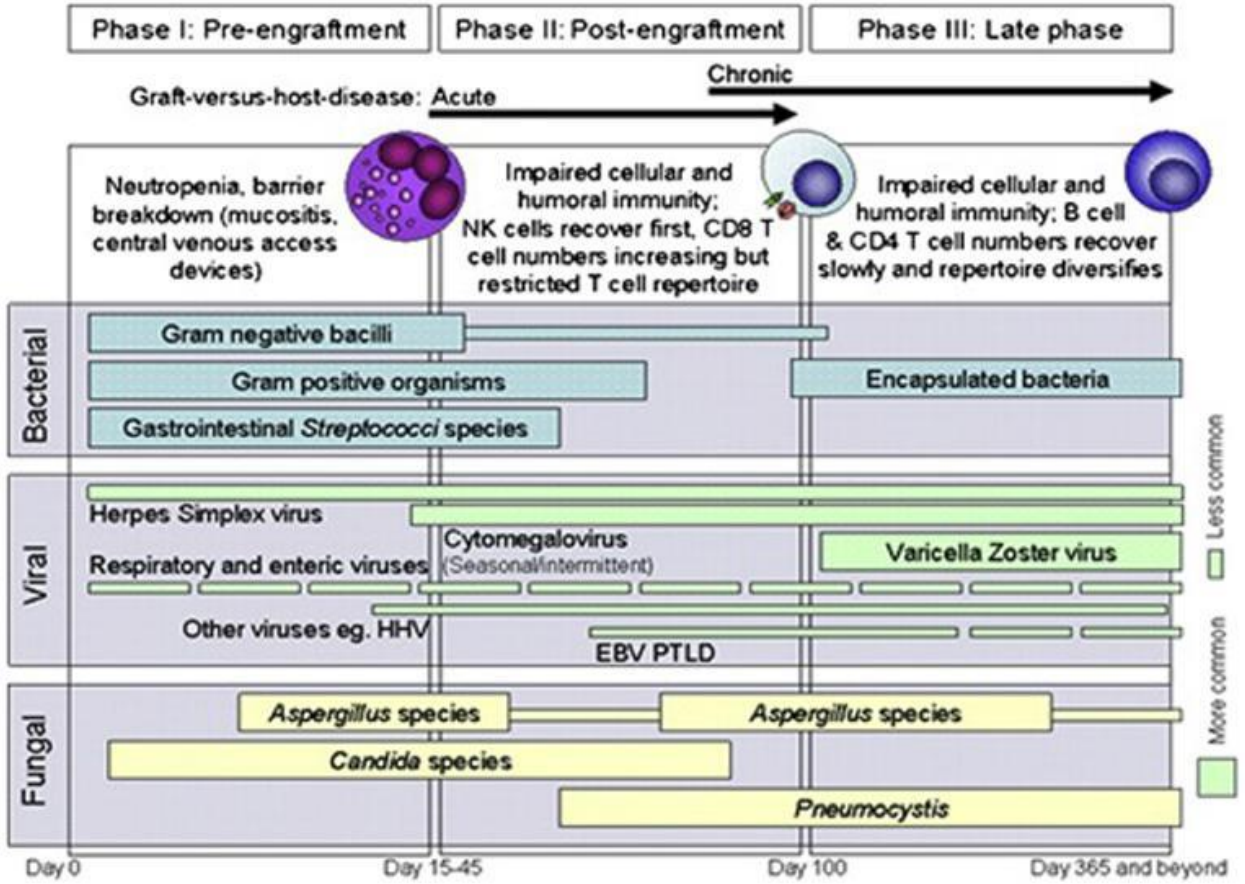
Occurs in 30% pediatric SCT patients

Found through respiratory, stool, plasma, urine testing

Presents as respiratory illness, GI disease, hepatitis, cystitis

Treat with Cidofovir

When do we anticipate infection?



Fungal

Most common fungal organisms that cause invasive fungal infections are Candida species (yeast) and Aspergillus species (mold) Less common mucor (mold)

Pre engraftment phase is often when we see fast growing invasive fungal infection in setting of prolonged neutropenia, but can occur at any time

All HSCT patients are started on fungal prophylaxis and continue until risk decreased

Fungus: prevention and treatment

- Want to prevent/treat with a mold-active agent (vs non mold agent Fluconazole)
- Micafungin often used pre transplant for ppx, as anti fungal “azole” agents have severe drug drug interactions and hepatotoxicity
- Initiate fungal workup early in setting of fever and neutropenia
- Pneumocystis jiroveci pneumonia (PJP), fungal but not treated with antifungal

New Drugs

Advancements helping detect and fight our BMT Bugs

Karius

Virus specific T Cells

Infection Prevention and Early Detection are Key

Thorough pre-HSCT screening of both donor and recipient

Prophylactic medications

Strict hygiene protocols

Routine viral surveillance

Frequent post HSCT follow-up/monitoring

Prevent/limit exposure: dedicated transplant unit, strict visitor guidelines, masks, comprehensive discharge teaching in infection prevention

Vaccines when applicable

Dedicated HSCT nursing staff, trained to recognize signs of infections, understand treatment and anticipate complications

Questions?

References

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