Risk factors:
- The main risk factors for bacterial infections following HSCT are:
  (i) neutropenia,
  (ii) mucositis or skin breakdown,
  (iii) gastrointestinal problems associated with acute GVHD,
  (iv) intravenous catheters
Clinical features:
- Severe bacterial infections in the ICU usually present as pneumonia, bacteremia, or septic shock.
- Surveillance blood cultures may be necessary to detect occult blood stream bacterial infections in HSCT recipients, especially those who are receiving systemic corticosteroids
Organisms:
- Gram-negative pathogens such as Pseudomonas and Klebsiella should be given important consideration during the neutropenic phase.
- Gram positive organisms such as MRSA, Streptococcus viridans, and enterococci are being increasingly identified as the main cause of severe bacterial infections following HSCT

- estimated to be the reason for ICU admission in approximately 25%
- susceptible to a wide range of infections including opportunistic infections such as invasive pulmonary aspergillus (IPA), CMV, and PCP

Viral infections are common following HSCT and may occasionally result in critical illness. These viruses include CMV, herpes zoster virus, respiratory syncytial virus, human herpes simplex virus 6, and adenovirus.
- The most serious complication of these viral infections is pneumonitis with acute respiratory failure; however, they may lead to other organ dysfunctions such as hepatitis, encephalitis, and bone marrow suppression.

- CMV is the most important viral infection following HSCT, and pneumonitis is the most severe manifestation of this infection.

Epidemiology:
- Recently prevalence of CMV has decreased due to:
  (i) routine prophylaxis against CMV using ganciclovir in high-risk patients in the first 100 days following HSCT.
  (ii) preemptive treatment of patients with subclinical viremia detected by surveillance pp65 antigenemia or polymerase chain reaction assay

Clinical features:
- CMV pneumonia usually presents a median of 7 wks after transplantation, with nonproductive cough, dyspnea, fever, and hypoxemia that quickly progresses to acute respiratory failure

Risk Factors:
(i) transplant from a seropositive donor to a seronegative recipient
(ii) transplantation for hematologic malignancy,
(iii) total body irradiation,
(iv) antithymocyte globulins,
(v) neutropenia,
(vi) GVHD
(vii) CMV seroconversion

Treatment:
- Treatment of CMV pneumonia using ganciclovir and immunoglobulins, especially when started early in the course of the illness, results in significant improvement in survival. However, it is important to note that ganciclovir treatment is associated with significant side effects, including neutropenia, nephrotoxicity, seizures, and retinal detachment.
Foscarnet is an alternative that may also lead to acute renal failure.

Clinical features:
- begins with URTI symptoms that progress to lower respiratory symptoms.

Investigation:
- The diagnosis is made by detecting the virus by nasal wash or BAL fluid culture.

Treatment:
- Uncontrolled trials suggest that the combination of aerosolized ribavirin and intravenous immunoglobulins decrease mortality, especially if started before the onset of acute respiratory failure

Epidemiology:
- PCP is rarely seen following HSCT due to the effective prophylaxis using trimethoprim-sulfamethoxazole
Clinical Features:
- The clinical presentation of PCP in HSCT recipients is more severe and fulminant than in HIV patients; however, response to therapy is good if instituted early.

Investigations:
- BAL is the procedure of choice for the diagnosis of PCP, with positive yield in 90% of cases

- Human herpes simplex virus 6 is another severe viral infection following HSCT and may cause pneumonitis, marrow suppression, and encephalitis.

Herpes Zoster
General:
- Herpes zoster virus infection following HSCT is rare but may lead to a disseminated disease with pneumonia, hepatis, skin rash, encephalitis, and disseminated intravascular coagulation.

Treatment:
High-dose acyclovir is the treatment of choice.