Management of HSCT Complications

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Complications of Hematopoietic Stem Cell Transplantation (HSCT)

A High-Level Overview Based on Latest Clinical Guidelines

Introduction

- Hematopoietic Stem Cell Transplantation (HSCT) is a curative treatment but has significant complications.
- - Early (conditioning and post-engraftment)
- - Intermediate (up to day 100)
- - Late (beyond day 100, survivorship issues)
- Guidelines: ASH, EBMT, NCCN, ASTCT

Early Complications (0–30 Days)

- - Mucositis (chemotherapy-induced, pain, infection risk)
- - Sinusoidal Obstruction Syndrome (VOD/SOS)
- - Graft failure (primary or secondary, risk in mismatched HSCT)
- - Neutropenic infections (bacterial, fungal, viral)
- - Engraftment Syndrome (capillary leak, fever, rash)

Intermediate Complications (Day 30–100)

- - Acute Graft-versus-Host Disease (GVHD: Skin, Liver, GI)
- - Opportunistic infections (CMV, EBV, PJP, fungal infections)
- - Thrombotic Microangiopathy (TMA)
- - Pulmonary complications (Idiopathic Pneumonia Syndrome)
- - Late hemorrhagic cystitis (BK virus-associated)

Late Complications (Beyond Day 100)

- - Chronic GVHD (Multi-organ fibrosis, immune dysregulation)
- - Secondary Malignancies (t-MDS/AML, solid tumors, SCC, oral cancers)
- - Endocrine & Metabolic Issues (Hypothyroidism, Infertility, Osteoporosis)
- - Cardiopulmonary Disease (Pulmonary fibrosis, BOS, CHF)
- - Immune deficiency & infections (Encapsulated bacteria, re-vaccination)

Acute GVHD Management (Day 30–100)

- - Prophylaxis: Tacrolimus ± Methotrexate, ATG, Post-transplant Cy
- - First-line: Corticosteroids (1–2 mg/kg/day Prednisone)
- - Steroid-refractory: Ruxolitinib (JAK inhibitor), ECP, MMF, mTOR inhibitors
- - Emerging therapies: Abatacept, novel immune modulation

Chronic GVHD Management (Late Phase)

- - First-line: Corticosteroids + Calcineurin Inhibitor (Tacrolimus)
- - Second-line: Ibrutinib (BTK inhibitor), Ruxolitinib (JAK inhibitor), Belumosudil (ROCK2 inhibitor)
- - Supportive care: Lung (FAM therapy), Eyes (Cyclosporine drops), Skin (ECP, topical steroids)
- - Long-term immunosuppression & tapering strategies

Prevention & Long-Term Follow-up

- - Infection Prophylaxis (Letermovir for CMV, Acyclovir for VZV, PJP prophylaxis)
- - Secondary cancer screening (Skin exams, HPV, Mammograms, Thyroid function)
- - Cardiovascular & metabolic monitoring (Lipids, BP, Diabetes prevention)
- - Psychological & Quality of Life (Cognitive rehab, Fatigue management, Mental health support)
- - Vaccination protocols (Pneumococcus, H. influenzae, Hepatitis, HPV, COVID-19)

Conclusion

- - HSCT complications span immediate to lifelong issues
- - Multidisciplinary monitoring improves outcomes
- - New therapies (JAK inhibitors, BTK inhibitors) transforming GVHD treatment
- - Infection prophylaxis and cancer screening are key for long-term survival
- - Personalized medicine & novel strategies continue to evolve

✔ Standard Prophylaxis Regimens

Conditioning	GVHD Prophylaxis Regimen
Myeloablative Conditioning (MAC)	Tacrolimus + Methotrexate
Reduced-Intensity Conditioning (RIC)	Tacrolimus + MMF ± ATG
Haploidentical HSCT	Post-Transplant Cyclophosphamide (PTCy) + Tacrolimus + MMF
Unrelated Donor (URD)	Tacrolimus + Methotrexate ± ATG
Cord Blood Transplant	Tacrolimus + MMF