Transplant Medicine: Managing Hospitalized Patients with Transplant Complications

Definition and Overview

- Transplant medicine involves the care of patients with solid organ (e.g., kidney, liver, heart, lung) or hematopoietic stem cell transplants (HSCT), particularly when hospitalized for complications such as immunocompromised infections, acute or chronic rejection, and graft dysfunction. This guide focuses on managing these complications, continuing immunosuppression, and understanding common immunosuppressive regimens in the inpatient setting.
- Prevalence
  - ~5-15% of transplant recipients are hospitalized annually for complications, with infections (50-60%), rejection (10-20%), and graft dysfunction (10-15%) being leading causes. Kidney and liver transplants are most common (~60% of solid organs).
- Risk Factors
  - Immunosuppression, comorbidities (e.g., diabetes), non-compliance, recent surgery, CMV mismatch.
- Rare Demographics
  - Pediatric transplants, multi-organ transplants, xenotransplantation complications.

Common Complications and Management

Complication	Description	Common Causes	Management	Notes
Immunocompromised Infections	Opportunistic infections due to immunosuppression	CMV, PCP, Aspergillus, MRSA, BK virus	CMV: Ganciclovir 5 mg/kg IV q12h; PCP: TMP-SMX 15 mg/kg/day IV; Fungal: Voriconazole 6 mg/kg IV q12h. Blood cultures, PCR	Prophylaxis key (TMP-SMX, valganciclovir); adjust immunosuppression

Complication	Description	Common Causes	Management	Notes
Acute Rejection	Immune-mediated graft damage (days-weeks)	Non-compliance, low drug levels, HLA mismatch	Pulse steroids (methylprednisolone 500 mg IV q24h x 3-5d), ATG (1.5 mg/kg/day x 5-7d). Biopsy	Occurs in 10-20% within 1 year; monitor drug levels
Chronic Rejection	Progressive graft fibrosis (months-years)	Recurrent acute rejection, antibody-mediated	Optimize immunosuppression (tacrolimus, MMF); rituximab for AMR. Biopsy	Common in lung, heart; less reversible
Graft Dysfunction	Impaired organ function (e.g., AKI, elevated LFTs)	Ischemia, drug toxicity, recurrence	Adjust immunosuppression (e.g., reduce tacrolimus), treat cause (e.g., fluids for AKI). US, biopsy	Check cyclosporine/tacrolimus levels (nephrotoxicity)
GVHD (HSCT)	Donor T-cells attack host tissues	HLA mismatch, T-cell replete graft	Steroids (prednisone 1-2 mg/kg/day), ruxolitinib 10 mg PO BID. Skin/liver/GI biopsy	Acute GVHD in 30-50% of HSCT; chronic in 20-40%

Immunosuppression Management

Drug Class	Common Agents	Dosing	Indications	Notes
Calcineurin Inhibitors	Tacrolimus, Cyclosporine	Tacrolimus: 0.05-0.1 mg/kg/day PO, target 5-10 ng/mL; Cyclosporine: 3-6 mg/kg/day PO, target 100-300 ng/mL	Maintenance, all solid organs, HSCT	Nephrotoxic; monitor levels, Cr q48h
Antimetabolites	Mycophenolate mofetil (MMF), Azathioprine	MMF: 1-1.5 g PO BID; Azathioprine: 1-3 mg/kg/day PO	Maintenance, kidney, liver, heart	GI side effects (MMF); leukopenia risk
mTOR Inhibitors	Sirolimus, Everolimus	Sirolimus: 1-5 mg/day PO, target 5-15 ng/mL	Maintenance, kidney, lung	Delayed wound healing; monitor lipids
Steroids	Prednisone	5-20 mg/day PO (maintenance); 500-1000 mg IV (pulse, rejection)	Induction, maintenance, rejection	Taper slowly; hyperglycemia, osteoporosis risks
Biologics	Basiliximab, ATG	Basiliximab: 20 mg IV days 0, 4; ATG: 1.5 mg/kg/day IV x 3-7d	Induction, rejection	Basiliximab: IL-2R antagonist; ATG: Severe rejection

When to Continue Immunosuppression

Continue immunosuppression unless life-threatening infection (e.g., septic shock, invasive fungal disease) or severe toxicity (e.g., tacrolimus-induced AKI). Reduce doses in infections (e.g., halve MMF in CMV); hold temporarily in critical illness (e.g., stop MMF, reduce tacrolimus by 50%). Restart once infection stabilizes, guided by transplant team.

Clinical Scenarios

Case 1 CMV Infection (Kidney Transplant)

- **Presentation**: 55 y/o M, 6 months post-kidney transplant, with fever, fatigue. Vitals BP 120/80, HR 100, SpO2 96%, RR 18. Exam No focal findings.
- **Labs/Studies:** CMV PCR 10,000 IU/mL, Cr 1.8 mg/dL, WBC 3K. Tacrolimus level 8 ng/mL.
- **Interpretation**: CMV viremia, immunocompromised infection.
- **Management**: Ganciclovir 5 mg/kg IV q12h, reduce MMF to 500 mg BID. Monitor CMV PCR weekly. Cr improves, viremia clears by week 3.

Case 2 Acute Rejection (Liver Transplant)

- **Presentation**: 40 y/o F, 3 months post-liver transplant, with jaundice, elevated LFTs. Vitals BP 130/80, HR 90, SpO2 98%, RR 16. Exam Scleral icterus.
- **Labs/Studies:** AST 200 U/L, ALT 250 U/L, bilirubin 3 mg/dL. Biopsy Portal inflammation, endothelialitis.
- **Interpretation**: Acute cellular rejection.
- **Management**: Methylprednisolone 500 mg IV q24h x 3d, increase tacrolimus to target 10-12 ng/mL. LFTs normalize by day 7.

Case 3 Acute Limb Ischemia (Heart Transplant)

- **Presentation**: 65 y/o M, 1 year post-heart transplant, with sudden leg pain, pallor. Vitals BP 140/80, HR 110, SpO2 96%, RR 18. Exam Cold, pulseless leg.
- **Labs/Studies:** Cr 1.2 mg/dL, lactate 4 mmol/L. CTA Femoral artery thrombus.
- **Interpretation**: Acute limb ischemia, vascular complication.
- **Management**: Heparin 80 units/kg IV, embolectomy. Continue tacrolimus, MMF. Limb salvaged, discharge day 5.

Expert Tips

- Check tacrolimus/cyclosporine levels q48h; nephrotoxicity common at high levels

- Reduce MMF in CMV/PCP; hold only in life-threatening infection
- Use CMV PCR to guide ganciclovir duration; prophylaxis critical post-transplant
- Biopsy for rejection if labs/imaging inconclusive; steroids first-line
- Monitor Cr, LFTs daily in hospitalized patients; adjust immunosuppression
- Pitfall Missing BK virus in kidney transplants; check urine/serum PCR
- Advanced Rituximab for AMR; ruxolitinib for steroid-refractory GVHD

Key Pearls

- Infections (CMV, PCP) are leading complications; use prophylaxis, PCR
- Continue immunosuppression unless severe infection; reduce doses cautiously
- Tacrolimus, MMF, prednisone are standard; monitor levels, side effects
- Acute rejection needs pulse steroids, ATG; biopsy confirms
- GVHD in HSCT requires steroids, biologics; skin/GI/liver most affected

References

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