Vaccination after HCT

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Loss of Measles IgG After Allo HCT, No Vaccination

- Measles disease pre-transplant
- Measles vaccine pre-transplant

Months posttransplant

Probability of protective measles IgG
Recipient versus Donor Immunity

Without GVHD/IS Drugs

With GVHD/IS Drugs

% normal immunity

Donor

Recipient

1 week, 1 month, 1 year, 10 years

After Transplant

www.albertahealthservices.ca
Factors Influencing Specific Antibody Levels After HCT

- **Major:**
  - pre-transplant levels (early post-transplant)

- **Minor:**
  - Allo- versus auto-transplant
  - GVHD/Rx

- **No effect:**
  - Total body irradiation
  - Age
  - PBSC vs BM (10-fold difference in Ly content)
Effect of Pre-Transplant IgG Levels

Day 80
- Recipient pre-transplant S. pneumoniae IgG
  - $r = 0.77$
  - $p < 0.01$
- Donor pre-transplant S. pneumoniae IgG
  - $r = -0.01$
  - N.S.

Day 365
- Recipient pre-transplant S. pneumoniae IgG
  - $r = 0.27$
  - N.S.
- Donor pre-transplant S. pneumoniae IgG
  - $r = 0.28$
  - $p = 0.05$

Day 395
- Recipient pre-transplant S. pneumoniae IgG
  - $r = -0.15$
  - N.S.
- Donor pre-transplant S. pneumoniae IgG
  - $r = 0.63$
  - $p < 0.01$

Storek et al: Blood 2003
Reason for Also Vaccinating Patients with cGVHD (except with live vaccines)

Response to H.infl.conj.vaccine at 1 y after allo-BMT

Storek et al: unpublished
Ig levels & Responses to Recall Ag, Allo BM vs PBSC

Patients were vaccinated on day 365

Storek et al: Blood 2003
Why Vaccination After HCT?

• Lets transplant recipients enjoy the same protection from vaccine-preventable diseases as the general population
  – Haemophilus influenzae type b
  – Neisseria meningitidis
  – Diphteria
  – Tetanus
  – Pertussis
  – Poliomyelitis
  – Hepatitis B

• Protects against infectious diseases that occur more frequently in transplant recipients than in the general population, or are more severe in transplant recipients, in particular
  • Influenza virus
  • Streptococcus pneumoniae
  • Varicella zoster virus
Which Patients Should Be Vaccinated?

- Allograft recipients for sure
  - Pneumococcal disease 0.5-29%
  - Influenza ~4%
  - Zoster ~25%

- Autograft recipients less important
  - Pneumococcal disease <1%
  - Influenza ~2%
  - Zoster ~10%
Close Contact Vaccination

• Important for influenza
• Recommended for VZV if no history of chickenpox or shingles or vaccination, or for seronegative family members; however, practical issues limit use.
  – If a family member or a health care worker vaccinated with a VZV vaccine (live) develops a vesicular rash, there is a small chance of transmitting the virus and, theoretically, causing VZV disease in the immunocompromized patient. Thus, it may be prudent to advise VZV vaccinees that if they develop a rash within 6 weeks post-vaccination, they should avoid contact with immunocompromized patients, particularly VZV seronegative immunocompromized patients.
When to Vaccinate?

• B cell counts recover to normal at 3-6 months, memory B cells later
  – In case of B cell depleting antibodies (eg, rituximab), B cell counts zero/low for 6 months after last dose. If a patient was treated with a B cell depleting antibody posttransplant, delay start of vaccination till at least 6 months after the last antibody dose.

• CD4 T cells recover to normal at >1 year, but T cell responses detectable earlier
  – In case of T cell depleting antibodies (eg, rabbit ATG for GVHD), T cell counts are low for 6 months after last dose. If a patient was treated with a T cell depleting antibody posttransplant, delay start of vaccination till at least 6 months after the last antibody dose.
When to Vaccinate?

• Pneumococcal disease most frequent at 6-24 months

• Other considerations
  – Live vaccines after uncomplicated HCT: safe at 2 years
  – Relapse: nonlive futile, live contraindicated
  – Active GVHD: nonlive indicated, live contraindicated
  – Immunomodulatory drug maintenance: nonlive?, live contraindicated
  – IVIG: nonlive OK, live wait 7-11 months
# Recommended Schedule of Posttransplant Immunizations

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<th>Vaccine</th>
<th>6 mo</th>
<th>7 mo</th>
<th>8 mo</th>
<th>12 mo</th>
<th>14 mo</th>
<th>24 mo</th>
<th>27 mo</th>
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<td>Conjug</td>
<td>Polysacc</td>
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</table>

* Influenza vaccination should be given annually
Non-Routine Vaccines

• Funding
  – If used for medical/occupational reason, funded by Alberta Public Health.
  – Examples:
    • Hepatitis A for illicit drug users or patients with chronic liver disease
    • Rabies for handlers of potentially rabid animals
    • Salmonella typhi for close contacts of carriers or lab workers
  – If used for travel reason, NOT funded by Alberta Public Health.
  – Examples:
    • Hepatitis A
    • Salmonella typhi
    • Tick-borne encephalitis
    • Japanese encephalitis
    • Yellow fever (live)
Non-Routine Vaccines

• Timing
  – Non-live vaccines can be given already at 6-24 months posttransplant, however, immunogenicity is limited.
  – If travel is planned at 2.5 years posttransplant or later, vaccinate at 24 months. In case of GVHD, wait until at least 3 months after immunosuppressive drugs have been discontinued.
  – Live vaccines (yellow fever) can be given at 24 months (if off of immunosuppressive drugs)
    • Disclaimer: Probably safe, however, data is limited.
Effect of Vaccination Strategy

- **Donor nil; Recip. d 365**
- **Donor nil; Recip. d -1, 50, 365**
- **Donor d -20; Recip. d -1, 50, 365**

Storek et al: BMT 2004