Prevention of Viral Infections after SOT: Vaccination and More

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Vaccination of SOT-recipients

- Which infections/vaccines to consider?
- Are vaccines effective in SOT-recipients?
- Which vaccines are safe (and which are not)?
- Should we monitor antibody titers?
- Is there a comprehensive framework/guideline?
- Other preventive measures

Vaccines to consider in SOT recipients

- Pediatric patients
  - All routine vaccines (which are safe?)

- Adults
  - Herpes virus infections: VZV
  - Respiratory infections: Influenza (Pertussis, Pneumococci)
  - Others: Hepatitis B, Hepatitis A, HPV

Waiting List- Opportunity for Vaccination

- SOT is only rarely performed for sudden organ function deterioration (eg fulminant hepatic failure)
- Waiting list: Opportunity for vaccination
  - Boosters, refills (eg diphteria,tetanus, pertussis)
  - Hepatitis A/B, VZV
  - Pneumococcal, influenza vaccines
- Vaccines are more effective **before** SOT
  - Live-attenuated vaccines can be given up to 2 weeks before SOT

Hepatitis A

- Generally low risk of infection, high risk of complication, especially in liver disease
  - In a Korean outbreak 0,5% mortality or transplantation
  - Study from Taiwan: 1,7% mortality in hospitalized patients
- Vaccine safe in SOT recipients
- Immunogenicity low in SOT patients
  - Seroconversion 27% in kidney, 26 in liver transplant recipients with two doses

Kwon, J Korean Med Sci 2014; Chen, J Viral Hep 2016; Jeon, Transpl Inf Dis 2014; Arslan, Transplantation 2001

Hepatitis A

- While on waiting list:
  - Vaccinate non-immune individuals with two doses
- SOT recipient
  - Vaccinate non-immune individuals
  - Waning of antibodies rapid and common (loss of seroprotective levels in 60% of seroconverters after two years)
  - Open questions:
    - Optimal schedule two doses?
    - Monitor antibodies and revaccinate?

Gunther, Transplantation 2001

Hepatitis B

- Low risk of infection, high risk of complications and chronic infection in immunocompromised individuals, especially with a liver graft from a anti HBc +-donor
- Vaccine safe in SOT recipients
- Pretransplant seroconversion rates 27-40%, even with high dose schedules
- Posttransplant seroconversion rates 40-70 (only children) %

Loinaz, Hepatgastroenterol 1997, Carey Am J Gastro 1990

Hepatitis B

- Waiting list
  - Vaccinate seronegative individuals with high dose schedule (3x), monitor seroprotection, apply additional booster
  - Open question:
    - number of boosters maximally?
    - Monitoring schedule
- SOT recipients
  - Vaccinate seronegative individuals with high dose schedule
  - Open questions: as above

HPV

- Risk of HPV-associated tumors clearly elevated (SIR 2-3) in SOT recipients
- HPV vaccine is safe in SOT recipients, quadrivalent more effective, also prevents warts
- Seroconversion in adolescents (9-17yo) 100% after 3 doses of quadrivalent vaccine
- Seroconversion rates in young adults (18-35yo) 53-68% (for different, lower in lung tx, lower soon after tx and with high dose immunosuppression)

Madeleine, Am J Transpl 2013; Gomez-Lobo, Pediatr Transplant 2014; Kumar, Am J T

HPV

- Waiting list
  - Vaccinate 9-26 year old SOT candidates (M/F), nonovalent vaccine, 3 doses
  - Open question: Monitoring, booster, age boundaries

- SOT recipients
  - Vaccinate 9-26 year old SOT recipients (M/F), nonovalent vaccine, 3 doses
  - Open questions: as above

ACIP, MMWR 2016

Influenza

- High risk of infection and complication
- Burden of disease still ill-defined in seasonal influenza
  - In pandemic influenza (pdm2009) high morbidity and mortality in several multicenter cohorts
- Influenza vaccine seroconversion rates generally lower than in immunocompetent patients
- No data for clinical efficacy in SOT recipients

Kumar, Lancet Inf Dis 2010;Smud, Transplantation 2010; Cordero, EJCMI 2012

Influenza

- Waiting List
  - Vaccinate all candidates yearly with inactivated vaccine (LAV only children, only pretransplant)
  - Open questions: optimal dose/adjuvant?

- SOT recipients
  - Vaccinate all yearly with inactivated vaccine
  - Open questions: as above

Influenza Vaccine: Two Doses?

- Study in 499 SOT(kidney, liver, heart,lung)-recipients >16yo, > 30d post-transplant
- Randomised to single dose or single+booster dose at 5 weeks
- Higher seroconversion rates in the PP-Group (not mITT) at short term and week 10 for all virus types (OR 1.3-2.2 for seroprotection to different numbers of antigens in multivariate analysis)
- Only 3 clinical events

Cordero, CID 2017

Varizella Zoster Virus

- High risk of complications with primary VZV-infection
- Zoster incidence clearly elevated in SOT-recipients (HR 2-5)
- VZV–vaccine and Zoster-vaccine currently LAV

Hamaguchi, Transpl Inf Dis 2015; Koo, Transpl Inf Dis 2014

VZV

- Waiting list
  - Vaccinate non-immune individuals with VZV-vaccine up to 50yo
  - Vaccinate with Zoster-vaccine (>50yo)
  - Open question: Zoster prevention with Zoster-vaccine?
- SOT
  - Do not vaccinate: Live vaccine (although VZV-vaccine safety in small pediatric cohorts encouraging)