ASN Dialysis Advisory Group

ASN DIALYSIS CURRICULUM
Prevention of Transmission of Non-Access Related Infections in Dialysis Patients

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Infection Transmission Methods

• **Transmission routes**
  • Physical contact
  • Blood-borne transmission
  • Respiratory (droplet)

• **Patient-to-patient or staff-to-patient transmission could occur through**
  • Contaminated devices, equipment, or supplies
  • Environmental surfaces
  • Hands of personnel
Principles to Prevent Infection Transmission in Hemodialysis Units

• Infection control precautions for all patients—Universal Precautions
• Cleaning and disinfection
• Routine serologic testing for hepatitis B and C
• Hepatitis B vaccination
• Isolation of hepatitis B-infected patients (not hepatitis C, human immunodeficiency virus (HIV), or other infections)
Universal Precautions for Hemodialysis

- **Staff should use gloves whenever caring for a patient or touching equipment**
  - Change gloves and clean hands between patients every time
- **Anything taken to, or kept on, a patient’s machine should be considered contaminated**
  - Either throw it away or decontaminate it before the next patient’s use
- **Medications should be prepared in an area away from the patient’s machine and only one patient’s medications should be administered at a time**
  - No common trays or carts should be taken from one patient’s machine to another
  - Do not puncture single-use vials more than once

Centers for Disease Control and Prevention. Recommendations for preventing transmission of infections among chronic hemodialysis patients. MMWR Recomm Rep 50(No. RR-5); 1-43, 2001
Universal Precautions for Hemodialysis

- Staff members should wear protective gear (gowns, face shields, eyewear, and masks) when initiating or terminating hemodialysis (HD) treatment, cleaning dialyzers, and centrifuging blood.
- Staff members should not eat or drink in patient care areas or the laboratory.
  - There are no CDC or federally mandated restrictions on patients eating food during treatment.

Centers for Disease Control and Prevention. Recommendations for preventing transmission of infections among chronic hemodialysis patients. MMWR Recomm Rep 50(No. RR-5); 1-43, 2001
**Cleaning and Disinfection**

- **Careful mechanical cleaning to remove debris should always be done before disinfection**

<table>
<thead>
<tr>
<th>Cleaned Item</th>
<th>Low-Level Disinfection</th>
<th>Intermediate-Level Disinfection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross blood spills or items contaminated with visible blood</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Hemodialyzer port caps</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Interior pathways of dialysis machine</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Water treatment and distribution system</td>
<td>X</td>
<td>X*</td>
</tr>
<tr>
<td>Scissors, hemostats, clamps, blood pressure cuffs, and stethoscopes</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Environmental surfaces, including exterior surfaces of HD machines</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

*Water treatment and fluid concentrate distribution systems require more extensive disinfection if significant biofilm is present within the system.

Centers for Disease Control and Prevention. Recommendations for preventing transmission of infections among chronic hemodialysis patients. MMWR Recomm Rep 50(No. RR-5); 1-43, 2001
Dialyzer Reuse and Infection Control

• Dialyzer reuse is an economic reality in many units and countries
• Use single-use dialyzers for
  • Hepatitis B surface antigen–positive (HepBsAg+) patients
  • Patients with acute bacterial infections being treated with antibiotics
  • All hospitalized patients—whether acute kidney injury patients or hospitalized chronic dialysis patients
• Dialyzer reuse in HepBsAg+ patients places both patients and staff at risk

Centers for Disease Control and Prevention. Recommendations for preventing transmission of infections among chronic hemodialysis patients. MMWR Recomm Rep 50(No. RR-5); 1–43, 2001
Blood-Borne Infections Can Be Transmitted in HD Units

- **Hepatitis**
  - Hepatitis B
  - Hepatitis C
- **HIV**
- **Bacterial infections (during episodes of bacteremia)**
Hepatitis C – Prevalence and Seroconversion in HD Units

Fissell RB, et al. Patterns of hepatitis C prevalence and seroconversion in hemodialysis units from three continents: the DOPPS. Kidney Int 65; 2335–2342, 2004
Principles to Prevent Transmission of Blood-Borne Infections in HD Units

- **Universal Precautions** (as discussed in previous slides)
- Monitoring for early detection of seroconversion
  - Routine monitoring of Hep B and C serologic status
- **Hepatitis B immunization**
- **Isolation of hepatitis B-infected patients**
Monitoring for Early Detection of Seroconversion

• **Requirements for admission to dialysis unit**
  - HepBsAg, hepatitis B core antibody (HepBcAb), and anti-hepatitis B surface antibody (HBsAb) status
  - Hepatitis C virus (HCV) and HIV status

• **Monthly monitoring**
  - Alanine transaminase (ALT) (serum glutamic pyruvic transaminase [SGPT])
  - HepBsAg (in patients not immune to hepatitis B)

• **Annual monitoring**
  - HepBsAb
  - HCV

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Monitoring for Early Detection of Seroconversion

- Monitoring not recommended
  - Routine monitoring of patient HIV status
  - Serologic testing of staff members

Centers for Disease Control and Prevention. Recommendations for preventing transmission of infections among chronic hemodialysis patients. MMWR Recomm Rep 50(No. RR-5); 1–43, 2001
Hepatitis B Vaccination Principles

• All dialysis patients not immune to hepatitis B should be immunized
• Check seroconversion (HepBsAb titers > 10 mIU/ml)
• If patients fail to seroconvert, consider repeating regimen or alternative schedules
• Those patients that do seroconvert should be routinely monitored for HepBsAb titers annually
Hepatitis B Vaccination—All Non-immune Patients (HD and Peritoneal Dialysis)

<table>
<thead>
<tr>
<th></th>
<th>Recombivax HB</th>
<th>Engirex-B</th>
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<tbody>
<tr>
<td></td>
<td>Dose</td>
<td>Volume</td>
</tr>
<tr>
<td>e 20 years Pre-Dialysis Dialysis</td>
<td>10 µg</td>
<td>1.0 ml</td>
</tr>
<tr>
<td></td>
<td>40 µg</td>
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<tr>
<td>&lt;20 years</td>
<td>5 µg</td>
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</tr>
<tr>
<td>Staff</td>
<td>10 µg</td>
<td>1.0 ml</td>
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</tbody>
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Centers for Disease Control and Prevention. Recommendations for preventing transmission of infections among chronic hemodialysis patients. MMWR Recomm Rep 50(No. RR-5); 1–43, 2001
Isolation Precautions for HepBsAg+ Patients

• There should be a separate room/area, dedicated machines, equipment, and instruments for HepBsAg+ patients
  • These cannot be shared with HepBsAg- patients
• The separation of HepBsAg+ and HepBsAg- patients should be complete
  • Staff who care for HepBsAg+ patients should only treat patients who are immune to hepatitis B (titers > 10 mIU/ml)
• No dialyzer reuse

Centers for Disease Control and Prevention. Recommendations for preventing transmission of infections among chronic hemodialysis patients. MMWR Recomm Rep 50(No. RR-5); 1-43, 2001
• Isolation precautions are not recommended for HCV+ and HIV+ patients
• Universal Precautions are sufficient to prevent infection transmission
Principles for Prevention of Selected Droplet Infections

- Universal Precautions for the transmission of infections
- All dialysis patients should have these immunizations
  - Annual influenza immunization during the flu season
  - Pneumovax immunization—two doses at 5 year intervals
- All dialysis patients should undergo purified protein derivative (PPD) testing at the time of admission to dialysis unit and annually thereafter