Infection Prevention in Dialysis Settings

A Continuing Education (CE) Training Course for Outpatient Hemodialysis Healthcare Workers
Introduction to this Course

• This course is for outpatient hemodialysis healthcare workers, including technicians and nurses.

• You will learn about the following topics in this course:
  – Infections that patients can get from dialysis
  – Infection control recommendations for outpatient hemodialysis healthcare workers
  – Educating your patients and their caregivers

• Course Objectives – by the end of this course, you should be able to:
  – List three ways to prevent catheter infections in hemodialysis patients
  – Describe how to safely carry medications
  – Describe how to effectively perform hand hygiene

• If you want to receive continuing education (CE) credit for completing this course, you must complete a course assessment and evaluation.
Course Contents

- Lesson 1: Infections that Patients Can Get from Hemodialysis
- Lesson 2: Standard Precautions for all Healthcare Workers in all healthcare Settings
- Lesson 3: Specific Infection Control Recommendations for Outpatient Hemodialysis Healthcare Workers
- Lesson 5: Educating your Patients and their Caregivers
- Recap: Preventing Infections in Hemodialysis Settings
- Course Assessment
Lesson 1: Infections

Infections that Patients Can Get from Hemodialysis

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A Patient’s Story

Brian Hess

• 22-year old hemodialysis patient
• Central venous access port became infected
• Healthcare workers tried to eliminate my infection for several weeks using antibiotics
• Ultimately my central venous access port had to be removed to clear the infection

Photo provided by Brian Hess, used with permission
Why are Dialysis Patients at Risk for Infection?

• Patients who undergo hemodialysis have a higher risk of infection, due to the following factors:
  – Frequent use of catheters or insertion of needles to access the bloodstream
  – Weakened immune systems
  – Frequent hospital stays and surgery
Infections in Dialysis Patients

- Dialysis patients are at risk of getting **hepatitis B and C infections** and **bloodstream infections**

  - **Hepatitis B and C** are bloodborne viral infections that can cause chronic (life-long) disease involving inflammation (swelling) of the liver
    - Hepatitis B and C viruses can live on surfaces and be spread without visible blood

  - A **bloodstream infection** is a serious infection that can occur when bacteria or other germs get into the blood
    - One way bacteria can enter the bloodstream is through a vascular access (catheter, fistula, or graft)
• **Bloodstream infections** are a dangerous complication of dialysis

• 1 in 4 patients who get a bloodstream infection caused by *S. aureus* (staph) bacteria can face complications such as:
  – Endocarditis (infected heart valve)
  – Osteomyelitis (infected bone)

• Total costs for each infection can be more than $20,000

• Bloodstream infections can cause sepsis (a potentially deadly condition)

• Up to 1 in 5 patients with an infection die within 12 weeks
National Burden of Dialysis Infections
A Cause for Concern

- In the US, there are about 370,000 people relying on hemodialysis
- About 75,000 people receive hemodialysis through a central line
- Central lines have a higher risk of infection than a fistula or graft
- CDC estimates 37,000 central line-associated bloodstream infections may have occurred in U.S. hemodialysis patients in 2008
How Do Infections Happen?

Three elements must be present for an infection to occur:

1. A **source** of germs (like bacteria or viruses)
2. A susceptible **host**, meaning a person who is at risk of getting an infection from the germs
3. A **way** for the germs to move from the source to the host
   - There are three ways in which germs move from the source to the host: **Contact, Droplet, and Airborne Transmission**
Your Role in Contact Transmission

- During dialysis, infections can be spread by Contact Transmission
- Most commonly by **healthcare worker hands!**

Photo provided by Stephanie Booth, used with permission
• Certain infections are spread by certain routes:
  – Flu may be spread by Droplet Transmission
  – Tuberculosis is spread by Airborne Transmission
What Can You do to Prevent the Spread of Infections?

*Understand and Follow the Basics of Infection Control*

• All healthcare workers are expected to follow **Standard Precautions** for infection control.
  – *Standard Precautions* are reviewed in Lesson 2

• In addition, CDC has developed specific recommendations tailored for hemodialysis healthcare workers, recognizing the increased risks for infection.
  – *These dialysis-specific recommendations* are reviewed in Lesson 3
Lesson 2: Standard Precautions

Standard Precautions for all Healthcare Workers in All Healthcare Settings

PPE photo provided by Rosetta Jackson, used with permission
Standard Precautions for all Healthcare Workers

- Perform hand hygiene
- Use personal protective equipment (PPE)
- Follow safe injection practices
Perform Hand Hygiene

*How to perform hand hygiene*

- When hands are visibly soiled with blood or other body fluids, wash hands with *soap and water*
- If hands are not visibly soiled, use an *alcohol-based hand rub*

*Remember: hand hygiene is one of the most important ways for you to prevent the spread of infections*
Perform Hand Hygiene

When you should perform hand hygiene

- Before you touch a patient
- Before you inject or infuse a medication
- Before you cannulate a fistula/graft or access a catheter
- After you touch a patient
- After you touch blood, body fluids, mucous membranes, wound dressings, or dialysis fluids (e.g., spent dialysate)
- After you touch medical equipment or other items at the dialysis station
- After you remove gloves

Remember: perform hand hygiene between each patient or station
Use Personal Protective Equipment (PPE) Correctly

*For your own protection and to protect patients*

- Wear **gloves**, a **gown**, and/or **face protection** when you think you may come into contact with blood or other potentially infectious materials.

- Change gloves during patient care if the hands will move from a contaminated body-site to a clean body-site.

- Remove gloves after contact with a patient and/or the surrounding environment (including medical equipment).

- Do not wear the same pair of gloves for the care of more than one patient.
Follow Safe Injection Practices

• Medications are injected directly or indirectly into the patient’s bloodstream

• Any germs that have entered the medication vial or syringe can cause serious infections in the patient

• Germs also can be introduced at the time of injection (e.g. contaminated injection port)
Three things you need to know:

1. Needles and syringes are single use devices. They should not be used for more than one patient.
2. Do not administer medications from a single-dose vial or IV bag to multiple patients.
3. Perform hand hygiene and cleanse the access port before injecting into it.

Follow Safe Injection Practices

Saline bags are always single patient use
Lesson 3: Recommendations

Specific Infection Control Recommendations for Outpatient Hemodialysis Healthcare Workers
Specific Infection Control Precautions for Hemodialysis Healthcare Workers

- Wear gloves and other personal protective equipment (PPE) for all patient care
- Promote vascular access safety
- Separate clean areas from contaminated areas
- Use medication vials safely
- Clean and disinfect dialysis station between patients, exterior of dialysis equipment, bed cover, edge of bed, surface of contaminated wall and duct
- Perform safe handling of dialyzers
Wear Gloves During Patient Care

For your own protection

• Wear disposable gloves when caring for the patient or touching equipment at the dialysis station
• Wear gloves when cleaning surfaces in the environment or medical equipment
• Remember to remove gloves and perform hand hygiene between each patient or station, and if moving from a contaminated to clean area of the same patient or within the same dialysis station
Use Personal Protective Equipment (PPE)

*For your own protection*

- In addition to **gloves**, you should wear **gowns** and **face protection** to protect yourself as needed:
  - During initiation and termination of dialysis
  - When cleaning dialyzers
  - When handling lab samples
- PPE should be changed if it becomes dirty

Photo provided by Rosetta Jackson, used with permission
Basic Steps in Fistula/Graft Care

**Cannulation Procedure:**

1. Wash the site
2. Perform hand hygiene
3. Put on a new, clean pair of gloves
4. Wear proper face protection
5. Apply skin antiseptic and allow it to dry
6. Insert needle using aseptic technique
7. Remove gloves and perform hand hygiene

*Aseptic technique* means taking great care to not contaminate the fistula or graft site before or during the cannulation or decannulation procedure
Basic Steps in Fistula/Graft Care

Decannulation Procedure:

1. Perform hand hygiene
2. Put on a new, clean pair of gloves
3. Wear proper face protection
4. Remove needles using aseptic technique
5. Apply clean gauze/bandage to site
6. Compress the site with clean gloves
7. Remove gloves and perform hand hygiene
Basic Steps in Catheter Care

*Catheter Connection Procedure:*

1. Perform hand hygiene
2. Put on a new, clean pair of gloves
3. Wear proper face protection
4. Apply antiseptic to catheter hub and allow it to dry
5. Connect the catheter to blood lines using aseptic technique
6. Unclamp the catheter
7. Remove gloves and perform hand hygiene
Basic Steps in Catheter Care

_Catheter Disconnection Procedure:_

1. Perform hand hygiene
2. Put on a new, clean pair of gloves
3. Wear proper face protection
4. Disconnect the catheter from blood lines using aseptic technique
5. Apply antiseptic to catheter hub and allow it to dry
6. Replace caps using aseptic technique
7. Make sure the catheter remains clamped
8. Remove gloves and perform hand hygiene
Catheter Exit Site Care

1. Perform hand hygiene
2. Put on a new, clean pair of gloves
3. Wear a face mask if required
4. Apply antiseptic to catheter exit site and allow it to dry
5. Apply antimicrobial ointment
6. Apply clean dressing to exit site
7. Remove gloves and perform hand hygiene

Photo provided by Stephanie Booth, used with permission
Separate Clean Areas from Contaminated Areas

- **Clean areas** should be used for the *preparation, handling and storage* of medications and unused supplies and equipment
  - Your center should have **clean medication** and **clean supply** areas

- **Contaminated areas** are where **used supplies and equipment** are handled

- Do not handle or store medications or clean supplies in the same area as where used equipment or blood samples are handled

*Remember: Treatment stations are contaminated areas!*

Photo provided by Stephanie Booth, used with permission
Dedicate Supplies to a Single Patient

• Any item taken to a patient’s dialysis station could become contaminated

• Items taken into the dialysis station should either be:
  – Disposed of, or
  – Cleaned and disinfected before being taken to a common clean area or used on another patient

• Unused medications or supplies taken to the patient’s station should not be returned to a common clean area (e.g., medication vials, syringes, alcohol swabs)

Photo provided by Marshia Coe and Teresa Hoosier, used with permission
Safe Use of Medication Vials

- Prepare all individual patient doses in a clean area away from dialysis stations
- Prepare doses as close as possible to the time of use
- Do not carry medications from station to station
- Do not prepare or store medications at patient stations
- **CDC recommends that dialysis facilities:**
  - Use single-dose vials whenever possible and dispose of them immediately after use
Guidelines for Carrying Medications

- Do not use the same medication cart to deliver medications to multiple patients

- Do not carry medication vials, syringes, alcohol swabs, or supplies in pockets

- Be sure to prepare the medication in a clean area away from the patient station and bring it to the patient station for that patient only at the time of use
Cleaning and disinfection reduce the risk of spreading an infection.

Cleaning is done using cleaning detergent, water and friction, and is intended to remove blood, body fluids, and other contaminants from objects and surfaces.

Disinfection is a process that kills many or all remaining infection-causing germs on clean objects and surfaces.
- Use an EPA-registered hospital disinfectant
- Follow label instructions for proper dilution

Wear gloves during the cleaning/disinfection process.
Disinfecting the Dialysis Station

• All equipment and surfaces are considered to be contaminated after a dialysis session and therefore must be disinfected

• After the patient leaves the station, disinfect the dialysis station
  (including chairs, trays, countertops, and machines) after each patient treatment

  – Wipe all surfaces
  – Surfaces should be wet with disinfectant and allowed to air dry
  – Give special attention to cleaning control panels on the dialysis machines and other commonly touched surfaces
  – Empty and disinfect all surfaces of prime waste containers

Photo provided by Stephanie Booth, used with permission
Safe Handling of Dialyzers and Blood Tubing

- Before removing or transporting used dialyzers and blood tubing, cap dialyzer ports and clamp tubing.

- Place all used dialyzers and tubing in leak-proof containers for transport from station to reprocessing or disposal area.

- If dialyzers are reused, follow published methods (e.g., AAMI standards) for reprocessing.

*AAMI is the Association for the Advancement of Medical Instrumentation*
Lesson 4: Policies and Practices

Infection Control Policies and Practices for Outpatient Hemodialysis Facilities
Infection Control Policies and Practices for Dialysis Facilities

- Vaccination of dialysis staff and patients
- Preventing the spread of hepatitis B
- Preventing the spread of bacterial infections
Vaccine-Preventable Infections

• Influenza
  – Influenza or the “flu” is a respiratory infection that infects the nose, throat, and lungs
  – The flu is spread mainly by droplets that are made when people with flu cough, sneeze or talk
  – The single best way to prevent the flu is to get a flu vaccine each year

• Hepatitis B and C
  – Hepatitis B is a serious infection that affects the liver. It can cause acute (short-term) or chronic (long-term) infection and liver cancer
  – Hepatitis B virus is easily spread through contact with the blood or other body fluids of an infected person
  – Hepatitis B and C are blood borne viral infections that can cause chronic (life-long) disease involving inflammation (swelling) of the liver
• **Hepatitis B and C viruses can live on surfaces and be spread without visible blood**
Take Care of Yourself

Get Vaccinated

- Get the flu vaccine each year
- Complete the hepatitis B vaccine series
Vaccination and Routine Testing of Hemodialysis Patients

• Vaccinate all susceptible patients against:
  – Hepatitis B

• Recommended vaccines for patients include:
  – Influenza (inactivated)
  – Pneumococcal

• Conduct routine testing for:
  – Hepatitis B virus
  – Hepatitis C virus
Preventing the Spread of Hepatitis B

• Dialyze hepatitis B (HBsAg+) patients in a separate room using separate machines, equipment, instruments, and supplies
  – Be sure to use a separate gown when treating these patients

• Staff members caring for patients with hepatitis B (HBsAg+) should not care for HBV-susceptible patients at the same time (e.g., during the same shift or during patient changeover)

• HBsAg+ means hepatitis B surface antigen (a lab test for hepatitis B virus) was positive
• HBV-susceptible means anyone who has never been infected and lacks immunity to hepatitis B virus
Preventing the Spread of Bacterial Infections

- **After the patient leaves the station, disinfect the dialysis station including chairs, trays, countertops, machines and all contaminated area**
- Hemodialysis patients who might be at increased risk for spreading germs to other patients include those with:
  - An infected skin wound with drainage that is not contained by dressings
  - Fecal incontinence or uncontrolled diarrhea
- For these patients use the following precautions:
  - Wear a gown and gloves when you are caring for the patient and remove the gown and gloves when you are finished caring for the patient
  - Do not wear the same gown when caring for other patients
  - Dialyze the patient at a station with as few adjacent stations as possible (e.g., at the end or corner of the room)
- Patients with respiratory illness and a fever are at risk of spreading bacterial and viral respiratory infections
  - These patients should be dialyzed at least 6 feet away from other patient stations or any shared supplies
Lesson 5: Education

Educating your Patients and their Caregivers
How to Recognize an Infection

- Advise patients to inform you if they notice any of the following possible signs of infection:
  - Fever
  - The access site is:
    - Swollen (bulging),
    - red,
    - warm, or
    - has pus
  - Severe pain at the access site

*Remember: infections of the vascular access site can be life threatening*
Training and Education of Patients and their Caregivers

- When a new patient starts dialysis and on an annual basis, review:
  - Personal hygiene and hand hygiene technique
  - Patient responsibility for proper care of the access site and recognition of signs of infection
  - Recommended vaccinations (including hepatitis B, influenza, and pneumococcal)
  - Reasons for selecting a fistula or graft over a catheter to lower the risk of infection
Recap

Preventing Infections in Hemodialysis Settings

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Key Infection Prevention Practices

• Perform hand hygiene frequently and change gloves

• Maintain separate clean areas for supplies and medications and separate contaminated areas for used items

• Practice proper handling and delivery of patient supplies and medications

• Perform effective cleaning and disinfection of dialysis equipment and environmental surfaces

• Carefully handle medications and the patient’s vascular access to avoid contamination

_Remember: Use aseptic technique every time!_
Conclusion

• Infections that patients can get while receiving dialysis are serious and preventable!

• Healthcare workers like you following infection control precautions and other safe care practices are the key to prevention

• Infection prevention is everyone’s responsibility