DEFINITION

To provide the guidelines needed for the prevention of infection transmission among chronic dialysis patients. These guidelines include recommendations for the management of equipment, water supply, screening, monitoring of patients and HCWs and other related activities.

REFERENCES

2. Association for Professionals in Infection Control (APIC) and Epidemiology, Inc. (2009). Chapter 48: Dialysis. In APIC Text of infection control and epidemiology (3rd ed.)

COMMENTS

1. Hemodialysis was introduced first in 1940, and until the early 1960s, it was used exclusively for the treatment of acute renal failure. Subsequently, with the development of advanced technology in dialysis equipment, the use of both hemodialysis and peritoneal dialysis has increased. Dialysis is a hazardous process, and adverse reactions may occur due to chemical or microbial contamination during the process of dialysis.
2. Patients with end-stage renal failure necessitating the use of dialysis are more susceptible to infections due to their immune system dysfunction and the use of artificial organs made of foreign material. The renal condition of many of these patients is the consequence of an original disease that affects the immune system (e.g., diabetes mellitus and systemic lupus erythematosus).
TERMS

1. Dialysis is a process that replaces the normal function of the kidney by removing toxins and excess fluids from the bloodstream. There are two types of dialysis: hemodialysis and peritoneal dialysis.
2. Hemodialysis (HD) is a process that involves circulating the patient's blood outside of the body through an extracorporeal circuit (ECC), where it is separated from dialysis fluid by an artificial semi-permeable membrane.
3. Peritoneal dialysis, uses the patient's peritoneum, or the lining of the abdomen, to dialyze waste products from the patient's blood.

PROCEDURE

A. Infectious complications

1. Dialysis

In general, the hemodialysis system consists of a water supply, a system for mixing water and concentrated dialysis fluid and a machine to pump the dialysis fluid through the artificial kidney. This aqueous environment provides a good growth medium that can result in the massive accumulation of Gram-negative bacteria, which can have direct and indirect infectious complications for patients such as septicemia and a pyrogenic reaction to bacterial endotoxins.

a. Non-tuberculous mycobacteria, which have the capability of multiplying in aqueous environments, can cause some infectious complications for dialysis patients.

b. The process of hemodialysis requires vascular access for prolonged periods; hence, these patients are at high risk for vascular access infection.

c. Such an infection is usually caused by S. aureus, coagulase-negative staphylococci, Gram-negative bacilli, non-staphylococcal gram-positive cocci (including enterococci), or fungi.

d. Bacterial infections, especially those involving vascular access, are considered the most frequent infectious complications of hemodialysis and the most common cause of morbidity and mortality among patients undergoing hemodialysis.

2. Peritoneal dialysis (PD)

PD is associated with several infection risks and complications involving the catheter exit site (exit site infection), infection of the subcutaneous catheter (tunnel infection), and peritonitis. Peritonitis is considered the most serious complication and leads to the destruction of the peritoneal membrane and a shift to hemodialysis treatment. Studies have suggested that PD patients who use automated cycles are less prone to infections. The most commonly diagnosed pathogens involved with peritoneal dialysis infections are:

a. Gram-positive bacteria as a group (including S. epidermedis and S. aureus) are the most common etiologic agents causing peritonitis, complicating conventional PD. Patients who are nasal carriers of S. aureus are at a high risk for exit site infection and peritonitis.

b. Gram-negative bacteria: These are found on the skin and in the gastrointestinal tract, the urinary tract, contaminated water, and disinfectant solutions. Automated peritoneal dialysis machines can serve as a reservoir for pathogens (e.g., Pseudomonas spp. and non-tuberculous mycobacteria).
c. Fungi: The fungal infections are usually difficult to eradicate and require early removal of the catheter. One of the predisposing factors for fungal infection is prior use of antibiotic therapy.

B. Water supply

Dialysis centers use water from the public supply, which despite being chlorinated, is usually contaminated with bacteria (e.g., Gram-negative bacteria, non-tuberculous mycobacteria and certain types of blue-green algae). Endotoxins produced by Gram-negative bacteria may reach levels high enough to produce a pyrogenic reaction in patients undergoing dialysis.

1. Water treatment system
   Water used for the production of dialysis fluid must be treated adequately by reverse osmosis (RO) to remove chemical contaminants. It should be also filtered to prevent bacterial contamination. Used filters should be frequently and regularly changed and/or disinfected according to the manufacturer’s instructions.

2. Distribution system
   a. This system delivers dialysis fluids to each dialysis machine and consists of plastic pipes and appurtenances. This distribution system plays a role in microbial contamination because pipes that are larger diameter and longer than necessary are frequently used to control the required fluid flow. This scenario increases both the total volume and the wetted surface area of the system and decreases the fluid velocity, which allows Gram-negative bacteria to multiply rapidly and colonize the wetted surfaces of the pipes. Such colonization leads to the formation of biofilms, which are usually difficult to remove or disinfect.
   b. To ensure adequate disinfection of the distribution system, the system should be routinely disinfected at least weekly. Furthermore, the system should be designed in a way that facilitates adequate disinfection and prevents fluids from being trapped and serving as a reservoir for bacteria. Use of an ultra-filter at the outlet of the storage tank of the distribution system is recommended.

3. Regular monitoring of the system
   Standard microbial assay methods to test for waterborne microorganisms should be performed at least monthly and after disinfection of the system or after maintenance work.
   Tests should be repeated if counts are elevated [i.e., more than 200 colony forming units per milliliter (CFU/ml)]. There should be written procedures regarding water monitoring and a plan of action if excessive contamination is found.

C. Disinfection of the dialysis system:

1. The purpose of the disinfection procedures for the dialysis system is not only to prevent the multiplication of waterborne bacteria to a significant level but also to eliminate bloodborne viruses.

2. The routine disinfection of isolated components of a dialysis system is usually inadequate, and consequently, the complete dialysis system (water treatment system, distribution system and dialysis machine) should be considered during the disinfection procedures. For single-pass machines, the disinfection process should be performed at the beginning and end of the shift. Disinfection processes should be performed after each use for batch recirculating machines.

3. The rinse water, which usually contains some Gram-negative bacteria, should not be permitted to stand overnight; otherwise, the water will contain significant microbial
contamination and nullify the disinfection procedure. Different types of disinfectants are used for the purpose of disinfecting dialysis systems. The manufacturer’s instructions should be followed for both the machines and the disinfectants.

D. Dialysis facility

1. At least one separate room for dialyzing patients with positive HBsAg.
2. Adequate storage rooms for clean and sterile supplies.
3. A designated room for disinfection of portable dialysis equipment.
4. A dirty (soiled) utility room with a sluice for disposal of blood or body fluid.
5. Handwashing sinks must be close to the nurse station and patient treatment areas. One handwashing sink for every four (4) dialysis chairs.
6. Alcohol hand rub in a wall-mounted dispenser or tabletop pump bottles should be available for hand hygiene.

E. Record keeping

1. A properly kept recording system is essential in the dialysis unit for better surveillance and follow-up purposes.
   a. The patient records in the dialysis unit should include the following:
      i. Lot number of all blood and blood products used.
      ii. Name or number and location of the machine used for each dialysis session.
      iii. Names of staff members assigned for the patient during each dialysis session.
      iv. Any mishaps, including dialysis machine malfunction and blood leaks.
   b. A log for all incidents sustained by patients and staff, such as needlestick injury.
   c. A log for all hepatitis serology results for patients.

F. Housekeeping

1. Dialysis units are considered high-risk areas due to the nature of the procedures performed and the immune status of the patients; thus, housekeeping should serve two tasks: removal of soil and waste to prevent the accumulation of infectious material and maintaining a clean environment for better patient care.
   a. Special training should be given to housekeeping personnel working in the dialysis unit.
   b. The patient care area should be utilized efficiently by arranging the required items, discarding the unneeded ones and removing excess tubes and wires on the floor.
   c. All personnel should wear gloves and gowns during work and when handling contaminated items.
   d. Chairs and beds should be cleaned and disinfected with hospital-approved disinfectants between patients.
   e. Separate cleaning tools should be used for cleaning the area designated for patients with bloodborne diseases.
   f. Linens should be used on chairs and beds and should be changed after each patient.
   g. Chairs and beds should be cleaned with hospital-approved disinfectant after each use.
   h. Soiled linens and other laundry items should be placed in water-soluble bags before sending to the laundry.
   i. Or soiled linen should be collected in such a way as to keep the heavily soiled portion contained in the center by folding or rolling the soiled part.
G. Waste management:
1. Disposable items should be placed in strong leak-proof bags; double bagging is only necessary when contamination of the outer surface occurs.
2. Disposable used needles and sharp items should be discarded in hospital-approved puncture-proof sharps containers.
3. All used disposable items should be discarded according to the waste management policy.

H. Infection control practices in the dialysis unit:
Infection control recommendations for the prevention of hospital-acquired infections in hemodialysis patients:
1. Use Standard Precautions for all patients, regardless of their known or presumed infectious status (Refer to policy ICM II-03 Standard Precautions)
2. Hand Hygiene (Refer to policy ICM II – 04 Hand Hygiene)
   a. Before and after handling dialysis machine
   b. Before and after performing non-invasive techniques
   c. Before performing any invasive procedure such as inserting a circulatory access, CV lines and peritoneal catheters
   d. Before and after connecting the patient to the dialysis machine through the AV fistula
   e. Before donning gloves and after removal of gloves
   f. After leaving a particular patient’s dialysis station and before dealing with another patient’s station
3. Gloves
   a. Use non-sterile disposable gloves when performing non-invasive procedures or when cleaning or disinfecting instruments or the environment, including the dialysis machine.
   b. Use sterile gloves when performing invasive procedures or connecting the patient to the dialysis machine.
4. Personal protective equipment (PPE)
   a. Personnel should always wear protective equipment (fluid-resistant gown, mask, and eyewear) to prevent exposure to blood in the event that there is rupture of the hemodialyzer membrane and/or a disconnection or rupture of tubing.
   b. Water-proof aprons or gowns should be worn if the nurse is located within the patient station providing any service.
   c. It is advisable for staff to wear protective eyeglasses and surgical masks during procedures in which splashing of blood is anticipated.
   d. Staff should change gowns between patients, and the gowns should be discarded at the end of the day.
   e. Staff should not drink, eat or smoke in the dialysis treatment area.
   f. Crowding of patients and staff should be avoided; give enough space for the easy movement of staff, placement of equipment and cleaning of the environment.

I. Bloodborne viral infections
In the dialysis unit, both patients and staff are at high risk of acquiring bloodborne viral infections. Viral hepatitis is a major complication of hemodialysis, and several agents such as Hepatitis B, C, and D are involved.
Recent studies have proven that HIV is significantly less efficiently transmitted than Hepatitis B virus.
1. Hepatitis B (HBV) infection
   a. Mode of Transmission of Hepatitis B
      i. Chronically infected patients are the primary source of transmission. HBV is considered to be a resistant virus, is relatively stable in the environment, and remains viable for at least seven days on environmental surfaces at room temperature.
   b. Dialysis staff members may acquire the infection by
      i. Accidental needle puncture through intact skin.
      ii. Infected plasma, serum or contaminated environmental surfaces through breaks in the skin such as abrasions, cuts, or scratches.
      iii. Introduction of infected serum or plasma into mucosal membranes (e.g., the splashing of blood onto the mouth or eyes).
   c. Dialysis patients may become infected through the following means
      i. Internally through contaminated dialysis equipment (e.g., venous pressure gauges, isolators or filters).
      ii. Externally through contaminated dialysis machines, including their surfaces, control knobs or intravenous poles.
      iii. Improperly prepped or contaminated injection site.
      iv. Through breaks in the skin or mucous membranes.
      v. Contaminated items and surfaces such as clamps, scissors, telephones or walls.
      vi. Improper handling of multiple-dose medication vials and intravenous solutions.
      vii. The dialysis staff (contaminated hands, gloves and other objects).
   d. Screening
      All patients in the dialysis unit should be screened for hepatitis B surface antigen (HBsAg) and anti-HBs, HBc and HCV Ab when they join the unit, to determine their serologic status, and then tested periodically according to the following table.

<table>
<thead>
<tr>
<th>Patient Status</th>
<th>On Admission*</th>
<th>Monthly</th>
<th>Semi-annual</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>HBsAg, anti-HBc(total), anti-HBs, anti-HCV, ALT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HBV susceptible, including nonresponders to vaccine</td>
<td>HBsAg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-HBs positive (&gt; 10 mlU/mL), anti-HBc negative</td>
<td>No additional HBV testing needed</td>
<td>Anti-HBs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-HBs and anti-HBc positive</td>
<td>No additional HBV testing needed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-HCV negative</td>
<td>ALT</td>
<td></td>
<td></td>
<td>Anti-HCV</td>
</tr>
</tbody>
</table>

*Results for HBV testing should be known before the patient begins dialysis.
HBsAg, Hepatitis B surface antigen; anti-HBc, antibody to hepatitis B core antigen; anti-HBs, antibody to hepatitis B surface antigen; anti-HCV, antibody to hepatitis C virus; ALT, alanine aminotransferase.

e. Hepatitis B Vaccination
   i. Hepatitis B vaccination is recommended for all susceptible patients and staff in the hemodialysis unit.
   ii. Vaccination includes three IM doses, with the second and the third doses given at one and six months, respectively. Test for anti-HBs 1 to 2 months after the last dose.
iii. If anti-HBs levels are below 10 mIU/ml, revaccinate with 3 additional doses.
iv. Patients who are anti-HBc and HBsAb+ do not require further testing.
v. Patients who are only positive for HBsAb require annual anti-HBs testing and a booster if anti-HBsAb levels decline to less than 10 mIU/ml (APIC Chapter 48, p. 14).

f. Management of Hepatitis B virus-positive patients
   i. Isolate HBsAg-positive patients in a designated or separate room for treatment with dedicated machines, equipment, instruments, supplies, and medications. These equipment and supplies must not be used on HBV-susceptible patients.
   ii. These patients should be dialyzed at a station away from adjacent stations (e.g., at the end or corner of the unit).
   iii. HCWs caring for HBsAg-positive patients should not care for susceptible patients at the same time, including during the period when dialysis is terminated for one patient and initiated for another.
   iv. HCWs should not attend to both HBsAg-positive and HBV-susceptible patients during the same shift.
   v. Machines used on an HBsAg-positive patient must be disinfected using manufacturer’s recommendations and should not be included in the dialyzer reuse program.
   vi. External surfaces should be cleaned using hospital-approved disinfectant.
   vii. A specific dialysis machine, bed, chair, and supply tray (including tourniquet, antiseptics and blood pressure cuff) should be assigned for each patient.
   viii. Disposable, single-use external venous and external pressure transducer filters/protectors should be used once for each patient and discarded. These items should not be reprocessed or reused.
   ix. Non-disposable items such as clamps and scissors should be appropriately cleaned and disinfected or sterilized before use with another patient.
   x. When multiple-dose medication vials are used, doses should be prepared and labeled in a clean area away from the dialysis stations and should be delivered separately to each patient.
   xi. Do not use common medication carts to deliver medications to patients. Trays should be used to deliver medications to individual patients. These trays must be cleaned and disinfected between patients.
   xii. Patients should not share food or utensils with other patients or staff.
   xiii. HCWs should change PPE and perform hand hygiene between patients.

g. HBsAg seroconversion
   i. Report HBsAg-positive seroconversion to the local health department as required by law or regulation.
   ii. When a seroconversion occurs, review all patients’ routine laboratory test results to identify additional cases.
   iii. Investigate potential sources for infection to determine whether transmission may have occurred within the dialysis unit. Review newly infected patients’ recent medical history (e.g., blood transfusion, hospitalization) and history of high-risk behavior (e.g., hypodermic drug use, sexual activity) as well as the unit practices and procedures.
   iv. In patients newly infected with HBV, HBsAg is often the only serologic marker detected; repeat HBsAg testing and test for anti-HBc (including anti-HBc IgM) 1
to 2 months later. Six months later, repeat HBsAg testing and test for anti-HBs to
determine clinical outcome and the need for counseling, medical evaluation, and
vaccination of the patient’s contacts.
v. Patients who become HBsAg-negative are no longer infectious and can be
removed from isolation.

2. HCV Infections
a. Mode of transmission
HCV is most efficiently transmitted by percutaneous exposure to infectious blood. A
chronically infected person is central to transmission, which occurs because of
inadequate infection control practices and cross-contamination among patients.
b. Screening
i. Screening of patients for HCV should be performed upon admission to determine
the prevalence of the virus in the hemodialysis unit.
ii. Screening for ALT and anti-HCV should be carried out upon admission, with anti-
HCV-negative patients screened monthly for ALT and semi-annually for anti-
HCV.
c. Management of HCV infection
i. HCV transmission within the dialysis environment can be prevented by strict
adherence to the infection control precautions recommended for all hemodialysis
patients.
ii. Although the isolation of HCV-infected patients is not recommended, routine
testing for ALT and anti-HCV is important for monitoring transmission within
centers and ensuring that appropriate precautions are being properly and
consistently used.
iii. HCV-positive persons should be evaluated (by consultation or referral, if
appropriate) for the presence or development of chronic liver disease according
to current medical practice guidelines.
iv. HCV-positive patients should receive information concerning how they can
prevent further harm to their liver and prevent transmitting HCV to others.
v. Persons with chronic liver disease should be vaccinated against hepatitis A, if
susceptible.
d. HCV-negative patients
i. Monthly ALT testing will facilitate the timely detection of new infections and
provide a pattern from which to determine when exposure or infection may have
occurred.
ii. In the absence of unexplained ALT elevation, testing for anti-HCV every 6
months should be sufficient to monitor the occurrence of new HCV infections.
iii. If unexplained ALT elevation is observed in patients who are anti-HCV negative,
repeated anti-HCV testing is warranted. If unexplained ALT elevation persists in
patients who repeatedly test anti-HCV negative, testing for HCV RNA should be
considered.
e. Anti-HCV seroconversion
i. Report anti-HCV-positive seroconversion to the local health department as
required by law or regulation.
ii. When a seroconversion occurs, review all other patients’ routine laboratory test
results to identify additional cases.
iii. Perform additional testing as indicated later in this section.
iv. Investigate potential sources for infection to determine if transmission may have
occurred within the dialysis unit; review newly infected patients' recent medical
history (e.g., blood transfusion, hospitalization) and history of high-risk behavior
(e.g., hypodermic drug use, sexual activity) as well as unit practices and
procedures.
v. If patient(s) seroconvert from anti-HCV-negative to anti-HCV-positive during a 6-month period, frequent monitoring (every 1 to 3 months) of all patients may be indicated for a limited time to detect additional infections. If no additional cases are identified, semi-annual testing can be resumed (APIC Chapter 48, p 15).

3. Hepatitis D infections
   a. Delta Hepatitis is caused by hepatitis delta virus (HDV), which causes infection only along with active HBV infections either as a co-infection or superinfection.
   b. Screening
      i. Routine testing of hemodialysis patients is not recommended.
      ii. Prevention of HBV transmission will reduce the risk of HDV infection in HBV-susceptible patients.
   c. Management of HDV infection
      i. Patients known to be infected with HDV should be isolated from all other dialysis patients, including HBV-positive patients, and should receive dialysis on dedicated machines (APIC Chapter 48, p 14).
      ii. Routine screening for HDV is only indicated if there is a patient who is known to be infected with HDV or evidence of transmission within the dialysis unit.

4. HIV infections
   a. Mode of transmission
      i. HIV is transmitted by blood and body fluids.
   b. Screening
      i. Routine testing for HIVAb for the purpose of infection control is not recommended.
      ii. HIV patients do not require isolation from other patients or separate dialysis on dedicated machines.
   c. Management of HIV infection
      i. Patients with risk factors for HIV infection should be tested so that if they are infected, they can receive proper medical care and counseling regarding preventing the transmission of the virus.
      ii. Infection control practices such as standard precautions and hand hygiene are sufficient to prevent HIV transmission between patients.
      iii. Patients with risk factors should be tested. If found to be positive, they should receive counseling and medical care.

J. Vaccination against *Pneumococcus*, influenza, and HAV
   1. The pneumococcal polysaccharide vaccine is indicated in chronic renal failure patients. A second dose of the vaccine should be administered 5 or more years after the first dose.
   2. A yearly influenza vaccination is recommended to prevent influenza and its associated severe complications.
   3. There are no specific recommendations for HAV vaccination for hemodialysis patients. The inactivated killed vaccine is recommended for persons with chronic liver disease (HCV and HBV infection), given in 2 doses 6 months apart.

K. Prevention and management of bacterial infections
   1. Follow published guidelines for the judicious use of antimicrobials, particularly vancomycin, to reduce selection for antimicrobial-resistant pathogens.
   2. Infection control practices such as standard precautions and hand hygiene are sufficient to prevent disease transmission for patients infected or colonized with pathogenic bacteria, including antimicrobial-resistant strains.
   3. A single isolation room is recommended for patients who may be at increased risk for transmitting pathogenic bacteria. Such patients include those with either
a. An infected skin wound with drainage that is not contained by dressings (the drainage does not have to be culture positive for VRE, MRSA, or any specific pathogen) or
b. Fecal incontinence or diarrhea not successfully controlled with personal hygiene measures.
c. For these patients, consider using the following additional precautions:
   i. staff members treating the patient should wear a separate gown over their usual clothing and remove the gown when finished caring for the patient
   ii. dialyze the patient at a station with as few adjacent stations as possible (e.g., at the end or corner of the unit).
d. If a private room is not possible, separation of patients and staff, strict adherence to standard precautions and meticulous environmental cleanliness is recommended.
e. Comply with standard and isolation precautions for patients with any antimicrobial-resistant pathogen.

L. Hemodialysis staff members
   1. Routine testing of staff members is not recommended for HBV except when required to document response to HBV vaccination.
   2. In addition, routine testing of staff for HCV, HDV, or HIV is not recommended.

M. Patient monitoring
   The patient’s temperature should be monitored before and after dialysis to detect early signs of a pyrogenic reaction. Any fever (> 37.8°C) or rigors should be investigated by:
   a. Clinical assessment of the patient to rule out other causes of fever (e.g., pneumonia).
   b. Culturing of blood samples.
   c. Culturing of other body fluids or secretions if suspected to be the source of infection.
   d. Culturing of the dialysate (on the downstream side) using quantitative and qualitative bacteriologic assays.

N. Education
   1. A continuous educational program regarding infection control should be instituted in dialysis units for patients and staff. The program should highlight the following points:
   2. Nursing Education
      a. The most common pathogens causing infections in dialysis patients.
      b. Principles and practices of infection control (aseptic technique, hand hygiene and standard precautions) to prevent the transmission of microorganisms both in the dialysis unit and at home.
   3. Patient Education
      a. Patients should be instructed to keep the access site clean and dry at all times. The importance of personal hygiene and its possible relation to access site infections should be emphasized.
      b. Patients should be instructed about the proper way to care for the access site and to recognize and report any signs and symptoms of infection immediately. These signs include fever, chills, pain, and redness or drainage around the access site.

O. Infection control recommendations for peritoneal dialysis at home
   1. Continuous ambulatory peritoneal dialysis (CAPD), continuous cyclic peritoneal dialysis (CCPD), and nocturnal intermittent peritoneal dialysis (NIPD) all are self-administered treatment done at home. Care to prevent infection during the process of dialysis is of high importance.
2. When replacing the solution or removing it, this process should be done under the following precautions:
   a. The room should not be crowded; no more than two attendants should be in the room.
   b. The room should be clean.
   c. The bed sheets should be clean.
   d. The patient should be kept away from air drafts.
   e. The patient should be hygienically clean and wearing clean clothes.
   f. The care provider should:
      i. Not be complaining of fever, upper respiratory tract infection, skin infection, eye discharge or diarrhea.
      ii. Wear clean clothes.
      iii. Cut nails short.
      iv. Wash hands thoroughly with soap and water and then dry hands using a clean towel.
      v. Avoid touching surfaces and items not related to the procedures to avoid contamination of his/her hands.
   g. During the process, smoking and unnecessarily talking are not permitted.
   h. Sterile supplies (e.g., clamps, gauze) should be used.
   i. The site of the peritoneal catheter should be cleaned using a proper antiseptic solution.
   j. Used disposable items should be discarded directly in a separate yellow bag, and the area should be kept clean.
   k. Finally, the hands of the care providers and the helpers should be washed using soap and water.
   l. The treating physician should be informed about any complaint, for example, redness at the site of infection, fever, or change in the color of the fluid drained.
   m. Continuous care of the site of insertion between dialysis sessions should be as follows:
      i. The site should be kept covered using sterile gauze.
      ii. When taking a bath, the site should be covered using a plastic bag to avoid wetting of the gauze and to prevent water from entering through the catheter into the peritoneal cavity.
   n. Vaccination against Hepatitis B is preferable for both the patient and the care provider.