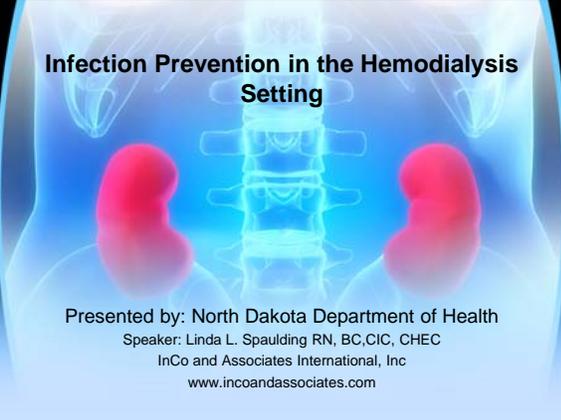


Infection Prevention in the Hemodialysis Setting



Presented by: North Dakota Department of Health
Speaker: Linda L. Spaulding RN, BC,CIC, CHEC
InCo and Associates International, Inc
www.incoandassociates.com

HD Infection Prevention and Control Program

- Role of the IP
 - Oversight of infection prevention
 - Development of new and ongoing staff education
 - Facilitation of performance improvement projects
 - Periodic surveillance to assess risk
- Work closely with the entire HD team
- Each HD team member must be accountable
- In Hospital Dialysis
- Outpatient and Home Care settings

Epidemiology of Infections among Hemodialysis Patients

- December 31, 2006
 - 327,754 patients on maintenance HD
 - Most being treated in outpatient settings
 - These setting do not have ready access to infection preventionist (IP)
 - This IP can not provide the same level of services as a certified IP
- 1993-2006 hospitalization rates of HD patients for infections increased by 34%
 - Rate of vascular access infections more than doubled.
 - Pneumonia 7.3%
 - Bacteremia/septicemia 31%
 - Cellulitis 20.3%
- Infections are the 2nd leading cause of death

Reasons for Infection

- Depressed immune system
- High prevalence of diabetes
- Exposure to other patients in the HD facility
- Frequent hospitalization, invasiveness of the HD procedure

Infection Associated Risks

- *Staphylococcus aureus*
 - Temporary central venous catheters
 - Sepsis
 - Bacterial seeding
 - Increased morbidity
 - Removal/replacements of implants
 - Compression spine fractures
 - Antibiotic usage
- Pneumococcal pneumonia
 - Pneumovax
- Multidrug-resistant organisms (MDROs)
 - MRSA, VRE, KPC, ESBL, Ab
 - *Clostridium difficile*

Exposure to Bloodborne Pathogens

- Standard Precautions
 - Hepatitis B (HBV)
 - Hepatitis C (HCV)
 - Human Immunodeficiency virus (HIV)
- Decrease risk of acquiring HBV
 - Widespread use of HBV vaccine
 - Testing of blood transfusions for HBsAg
 - Reduced need for transfusions in CKD

Environmental Factors

- HBsAg positive patients
 - Virus can survive in the environment for >1 week in dried blood
 - HBV virions on environmental surfaces without visible blood.

Uniqueness of Outpatient HD Centers

- Treatment is in the same center for months or years
 - Not curative but life-sustaining
- Treated in 3-4 shifts per day
- Care is done by certified dialysis technicians
 - Under the supervision of dialysis trained registered nurse
- Staffing 1 nurse for 12 patients per shift
 - 1 patient care technician for every 4 patients
- Design plans
 - Open plan
 - Pods

Key Measures to Reduce the Risk of Infection

- Environmental and equipment cleaning/disinfection
 - EPA registered hospital disinfectants
 - Labeled tuberculocidal or with specific claims for HIV or HBV
 - Follow label instructions to decontaminate spills of blood and other body fluids
 - Standard cleaning and disinfection protocols and EPA-registered hospital disinfectants for confirmed or suspected MDROs
 - Friction, clean and disinfect high-touch surfaces
 - HD chairs
 - HD machines
 - Tables
 - Carts
 - Bedside commodes

Key Measures to Reduce the Risk of Infection

- Contact precautions
 - Use disposable patient-care items
 - Blood pressure cuffs
 - » Minimizes the possibility for cross-contamination with MDROs
- Items taken into the patients station should be disposed of after use
 - Dedicated for use on a single patient and cleaned and disinfected before being taken to a common clean area or used on another patient
- Nondisposable items that cannot be comprehensively cleaned and disinfected
 - Adhesive tape
 - Cloth-covered blood pressure cuffs
 - Should be dedicated for use on a single patient

Environmental and Equipment Cleaning/Disinfection

- Inactivating *C. difficile*
 - Use hypochlorite-based products
 - for disinfection of environmental surfaces
 - Patient-care areas where surveillance and epidemiology indicate ongoing transmission of *C. difficile*
- Use microfiber cloths and mops if possible
 - More effective cleaning products than regular cotton cleaning cloths
- External pressure transducer filters/protectors
 - Changed after each patient treatment
- Items taken into each patient station should be dedicated as single use or cleaned and disinfected before taken to a common clean area or to another patient

Cleaning and Disinfection of Environmental Surfaces

- Physical cleaning of surfaces
 - Soap and water
 - Friction
- Combined cleaning and disinfecting remove and kill vegetative microorganism on surfaces
- Disinfection is not effective in the presence of dirt, blood or other bioburden
- Goal of cleaning is to remove bioburden and the majority of pathogens
- Non critical surfaces dialysis bed or chair, countertops, external surfaces of dialysis machines should be disinfected with an EPA registered disinfectant
- If there is visible blood an EPA registered tuberculocidal agent with specific label claims for HBV and HIV should be used

Environmental and Equipment Cleaning/Disinfection

- External venous and arterial pressure transducer filters/protectors should be changed after each patient treatment and should not be reused.
 - Internal filters do not need to be changed routinely between patients
- Internal HD machine dialysate pathway should be subjected to heat disinfection at the end of each treatment day
- Blood leak
 - Disinfection of the internal HD machine pathway must be performed prior to on a successive patient

Reprocessing and Reuse of Hemodialyzer

- Follow the FDA
 - “Guidance for Hemodialyzer Reuse Labeling” Oct. 6, 1995
 - Following manufacturer recommendations for cleaning, rinsing, disinfecting and testing the dialyzer
 - Percentage of centers practicing reuse declined after 1997 to 63% in 2002
 - 2005 -61% of patients were being treated with single-use dialyzers
 - Reuse and Reprocessing must follow all applicable AAMI standards to receive CMS reimbursement

Hand Hygiene

- Alcohol-based hand rub
 - Entrance to the patient’s room or at the bedside
 - Pocket containers
- Perform hand hygiene
 - Before and after contact with patient or patient environment
 - After removing gloves
- If hands are visibly soiled use soap and water
- No artificial fingernails or extenders for direct care staff

Immunizations and Tuberculosis

- Vaccine status of all patients
 - Vaccine for HBV, tetanus, pneumococcal disease, and influenza
- CDC recommends
 - One-time baseline screening of HD patients for TB
 - Plus anytime an exposure is suspected
 - Employees must receive immunization for measles, mumps, rubella, pertussis, diphtheria, tetanus MMR, be offered HBV and influenza immunization
 - Screened for TB per local regulations (usually annually)

Medication/Infection Safety

- Single-dose vials
 - One patient and should not be re-entered
- Parenteral medications should be prepared in a designated clean area away from patient treatment stations
- Do not use medication carts to transport medications to patient stations
- Scrub the hub of intravenous tubing and medication vials prior to accessing
- Use aseptic technique when preparing/handling parenteral medication/fluids
- Never use infusion supplies such as needles, syringes, flush solutions, administration sets, or IV fluids on more than one patient.

Pre and Postsurgical Infection Prevention

- Hair removal – clippers not razor
- Antiseptic impregnated postoperative dressings for fistulas/grafts
- Active surveillance testing for MRSA and decolonization should be performed as indicated (preop)
- Preoperative antiseptic bathing/showering

Standard/Transmission Based Precautions

- Respiratory etiquette
- Standard Precautions
- Patient with possible airborne disease
 - Masked immediately
 - Geographically separated from other patient (single room)
- HBV isolation for all patients known to be HBsAg positive
- Contact precautions for all patients with known or suspected MDRO

Vascular Access

- Move from temporary CVC to permanent AV fistula or AV graft when possible
- Full barrier precautions and skin antiseptics with chlorhexidine (CHG) prior to insertions of HD CVC
- Routine use of CHG impregnated bathing cloths
- CHG impregnated insertion site dressing for HD central catheters
- Prophylactic use of antimicrobial catheter locking solution
- Soak the hub of HD catheters in povidone-iodine solution or wrap with gauze saturated with povidone-iodine solution for 5 minutes prior to removing the cap
- Application of povidone-iodine or triple antibiotic ointment for HD catheter exit site dressings after dialysis session.

Water Treatment

- Association for Advancement of Medical Instrumentation (AAMI) standards
 - Quality assurance performance of devices and equipment used to
 - treat
 - Store
 - Distribute water in HD centers
 - Preparation of concentrates and dialysate
 - Conduct microbiological testing specific to water in dialysis setting
 - Disinfect water distribution systems in dialysis settings on a regular schedule

