On-line education from the EDTNA/ERCA Education Board
Clinical topic for October 2003

Infection Control

This is the ninth in the series of online initiatives from the Education Board. You are invited to read and review the following articles and websites. Sections 1-4 are to update your general knowledge on infection control, and section 6 contains a summary of best practice guidelines in infection control. You should then evaluate your knowledge and learning by reflecting on possible improvements to patient care in your unit, by answering the questions at the end of the section 7.

If you are updating your knowledge and wish to include the number learning hours that you have sent on this work, complete section 7 and include your answers in your Professional Portfolio. The EDTNA/ERCA Professional Portfolio is available free to members from Head Office (translated into 9 languages). See the following reference for further details on using a professional portfolio:


Introduction

Many advances have been made in the care and treatment of those with renal insufficiency and end-stage renal failure in recent years. However, infection is still the second highest cause of death, after cardiovascular causes, with 71.6% of this mortality is caused by septicaemia (USRDS 1999). Indeed mortality associated with sepsis is 50 times greater in renal patients than that seen in the general population. It accounts for around 30% of all hospital admissions (Sarnak 2000). Additionally, in the haemodialysis population between 25-50% of infections are associated with vascular access, most notably central venous catheters (CVCs) causing major morbidity rates for these patients (Rickard 2001).

This module will consider:

1. Vascular access management to prevent infection
2. The treatment and control of Peritoneal Dialysis infections
3. The emergence of resistance to antibiotic therapy.
4. Possible viral infections that may be present in the patients.

1. Vascular access management to prevent infection

Research undertaken by Stevenson (2002) noted that epidemiological data clearly establishes that a major risk for vascular access infections is the type of access used for haemodialysis, with temporary catheters demonstrating the greatest risk and native arterio-venous fistulae the least risk.

Indeed staff - patient ratios have been demonstrated to play an important contribution to infection rates in dialysis units. Taylor’s study in 1998 reviewed an increasing haemodialysis bacteraemia concluding that this was associated with reliance on central venous catheters (CVCs) for vascular access.
The European Best Practice Guidelines (2002) state that

…‘staff training for fistula cannulation is mandatory to avoid poor needle insertion’,…and that,…‘catheter connection, disconnection and interventions should be performed under aseptic conditions by trained dialysis staff with the patient and the nurse wearing a surgical mask.’ Indeed this theme is also taken up in the K/DOQI guidelines below. Review these now.

**K/DOQI™ Clinical Practice Guidelines for Vascular Access:** Update 2000

- Prevention of Complications: Infection
- Management of Complications: When to Intervene
- Management of Complications: Optimal Approaches for Treating Complications


2. The treatment and control of Peritoneal Dialysis (PD) infections

Whilst body fluids are not accessed for dialysis in the same way for PD, infection may impact on the efficacy of PD, and prevent the patient using it successfully in the longer term. Review the resources below.

**National Kidney Foundation Dialysis Outcomes Quality Initiative (DOQI):**

*Guideline 22- Measurement of PD Technique Survival,*

**International Society for Peritoneal Dialysis**

*Treatment Guidelines, Training Plans, and QA Protocols*

*Diagnosis, Treatment, and Prevention of Spontaneous Bacterial Peritonitis.*

Juan Rodés

**Chronic PD exit site care**

**Maintaining healthy peritoneal catheter access**

You can find out about further Peritoneal Dialysis catheter and peritonitis infection prevention and treatment in our [sixth EB Internet education module on PD](#)

3. The emergence of resistance to antibiotic therapy

Something that is giving cause for concern is the emergence of resistance to traditional antibiotic therapy when treating infection. The patient’s infection does sometimes not respond, leaving them with the infection, but with limited options as to what may be used to treat their symptoms.
The following resources discuss this topic in more depth. Review these and the recommendations.

**FDA Task Force on Antimicrobial Resistance** - from the U.S. Department of Health and Human Services

**Mechanisms of resistance to antimicrobials** from The WorldWide Anaesthetist

**Staphylococcus aureus Resistant to Vancomycin --- United States, 2002** - from the CDC Morbidity and Mortality Weekly Report

4. Viral infections

Petrosillo (2001) demonstrated how understaffing situations in the clinical environment increased the risk of HCV infection occurrences through nosocomial transmission, and that higher rates of infection generally occur when new or inexperienced staff manipulate vascular access. The resources below consider recommendations for vaccination, and the protection and care of staff.

**Influenza vaccination**

**Influenza Vaccination and Reduction in Hospitalisations for Cardiac Disease and Stroke among the Elderly** - abstract from the New England Journal of Medicine (NEJM) - April 3, 2003

**US CDC Issues Flu Recommendations for 2003-2004 Season**

**Personnel protection**

**Needlestick Prevention** from OSHA

Guidelines for managing health care workers exposed to blood or other body fluids that might contain blood-borne viruses. The update addresses, among other things, timely administration of hepatitis B immune globulin and hepatitis B vaccine, appropriate testing for hepatitis C exposure, and new information on prophylaxis after exposure to human immunodeficiency virus (HIV). Article from the Cleveland Clinic Journal of Medicine (pdf).

**HIB, HIC, HIV protection/prevention**

**Universal Precautions** from the National Institute of Health

**National Hepatitis C Prevention Strategy** : 34 page file from the CDC

**Control Measures for Hepatitis B in Dialysis Centers** - CDC Hospital Infections Programme

Issues in Healthcare Settings: **Infectious Diseases** from the CDC

5. Conclusion

Many renal units are utilising policy documents and risk assessment exercises in order to plan the management and prevention of infections. However to rely on
national or international guidelines only to inform care would seem to ignore the very individual needs of those who we are seeking to protect – the staff and patients. An individual approach to the needs and challenges of individual renal units uses the broader guidelines to develop local protocol and audit measures in the prevention and control of the particular dynamics of their renal environment.

6. Summary of good practice in the prevention of infection in renal units

Universal precautions should include:

- Patients awaiting the start of dialysis should be immunised against Hepatitis B virus (HBV) as soon as possible while their plasma creatinine remains relatively low.
- All long-term dialysis patients should be immunised against HBV.
- Testing for HBV, HCV should take place every 3 months, and for HIV annually, once the patient’s consent has been obtained.
- Only staff demonstrating their own HBV immunity should care for HBV positive patients. And wherever possible staff should only care for those infected with BBVs during one shift.
- Patients positive to Hepatitis B (HBV) and Hepatitis C (HCV) should be dialysed in separate rooms, and those with HIV should be considered for segregation.
- All units should have a documented infection control policy that should include the nasal screening for staphylococcus aureus.
- Patients using a temporary vascular access should have 2% mupirocin ointment or providone iodine ointment applied post cannulation and at the end of each dialysis session.
- PD patients positive to staphylococcus aureus should have mupriocin cream applied to their exit site.
- Concentrates and water used for haemodialysis should meet the standards set out in the best practice guidelines.
- All dialysis units should collect data on infectious diseases related to CVCs and grafts for internal audit.
- Fluids for PD are to meet the European standards for quality.

7. Review questions

- What are the recommendations for the care and management of temporary and permanent HD catheters?
- Which patients in the renal care areas need to be isolated?
- What are the recommendations for the role of staff who are positive to a blood-borne virus (BBV)?
- What are the recommendations for the management of those who have Hepatitis B? How does this compare with your practice?
- What care in your unit may need review after evaluating the best-practice infection control practices described above?

References:


renal disease compared to the general population. *Kidney International, 58, 1758-1764(B).*


**Additional Interesting Reading**

- **Staphylococcus aureus infections in dialysis patients: focus on prevention.** Piraino B. ASAIO J 2000 46: S13-17. Link to [abstract](#).


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