Protocol for exit-site care and treatment of exit-site infections in peritoneal dialysis

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PURPOSE	The purpose of this protocol is to support the management of exit site infections in patients having peritoneal dialysis.
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Information for:	All staff involved in the care of patients receiving peritoneal dialysis.

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Background:

Exit site infections in peritoneal dialysis (PD) can lead to tunnel infections, peritonitis and catheter loss. PD units routinely educate their patients on good exit site care and hand hygiene. Prophylaxis using daily application of Mupirocin cream to the skin around the exit site is practised by many units and has been shown to be effective in reducing *Staphylococcus aureus* (*S. aureus*) exit site infections and peritonitis. Other reports have suggested an increase in exit site infections related to Gram negative organisms such as Pseudomonas species when Mupirocin is routinely used (ISPD, 2010).

Audit undertaken in our unit confirms increasing incidence of exit site infections related to gram negative organisms. In the 3 years from April 2010 to April 2013, the proportion of gram negative exit site infections increased from 19% (2010) to 48% (2011) and 42% (2012) (Fig 1).

The current renal association guidelines (2010) suggest the use of empiric therapy with oral antibiotics that will cover *Staphylococcus aureus* and *Pseudomonas aeruginosa*. This document has been updated based on the current literature on causative organisms, prevention and treatment of exit site infections and local microbiology.

Routine exit site care

Routine exit site care by the patient begins when the exit site is well healed and after they are trained. Prior to this exit site care is performed by registered nursing staff.

- Excellent hand hygiene is important before any examination of the exit site. Hand washing for 1-2 minutes with antibacterial soap is recommended. The use of 70% alcohol based gel as an effective hand cleansing agent is recommended. The quantity applied should take at least 15 seconds of hand rubbing to dry. Patients should use Octenisan (neat solution) for daily exitsite cleaning.
- All PD patients should use Bactroban 2% nasal ointment* to the skin around the exit-site on a daily basis unless specified. This measure reduces the rates of *S. aureus* exit-site infection and peritonitis. (Note: Antibiotic ointments containing polyethylene glycol base should not be used at the exit site of polyurethane catheters because of risk of deformation of the catheter and subsequent rupture. * Bactroban 2% nasal ointment does not contain polyethylene glycol.)

Definitions of exit-site, colonisation and tunnel infections

1) Exit-site infection

Purulent discharge from the exit site indicates the presence of infection. Erythema and pain around the catheter may or may not represent infection.

Peri-catheter erythema without purulent discharge is sometimes an early indication of infection but can also be a simple skin reaction especially after recent trauma. A clinical judgement should be made to either start on antibiotic therapy or to follow carefully. In patients with just erythema, the medical staff may defer treatment until the results of culture and sensitivity are available. Empiric antibiotic therapy must be considered especially if there is a purulent discharge.

2) Colonisation

A positive culture in the absence of an abnormal appearance is indicative of colonisation and intensification of exit site cleaning should be advised (exit site cleaning should be increased to daily if patients are cleaning on alternate days).

3) Tunnel infection

A tunnel infection may present as erythema, oedema or tenderness over the subcutaneous pathway. It usually occurs in the presence of exit-site infection. Admission to hospital for commencing IV antibiotics must be considered.

Treatment of exit site infection

Initial empiric treatment should cover for S.aureus and P.aeruginosa

Day 0

Severe infection

If the patient has severe infection as indicated by pyrexia, purulent discharge, erythema with tracking along the sub-cutaneous tunnel,

- Obtain swab of the exit-site and send it for culture and sensitivity (C & S).
- Check whether peritoneal fluid is cloudy and consider sending specimen for cell count and C & S (refer also to Trust Protocol for the Treatment of Peritonitis in Patients on Peritoneal Dialysis).
- Administer intravenous (IV) antibiotics: IV Vancomycin 1gm or 400mg Teicoplanin (if allergic to Vancomycin) and IV Gentamicin 120mg (may affect residual renal function) or IV Meropenem 1gm.
- In severe cases, patients may require admission following assessment in the PD unit.

In mild to moderate infection

- Commence Flucloxacillin 500mg qds orally for one week. If allergic to penicillin, use Clarithromycin 500 mg bd orally for one week.
- In addition, empiric therapy should also include Ciprofloxacin 250mg twice a day (if not allergic) for one week to cover for gram negative organisms.



Note:

Antibiotics may interact with oral anti-coagulation and patient may require close monitoring of INR.

treatment

Day 3-4

Obtain results of culture and sensitivity

a) If no growth on cultures

- Discontinue antibiotics after 1 week if the exit site looks healthy
- Continue cleaning the exit-site with Octenisan and Bactroban 2% nasal ointment as described above.

Common organisms causing exit-site infection

The most common and serious exit-site infections are related to *S. aureus* and Pseudomonas aeruginosa (*P. aeruginosa*). These organisms are often associated with tunnel infections and can also lead to peritonitis. Aggressive management is indicated in the treatment of these organisms.

b) Staphylococcus aureus

- Oral Flucloxacillin 500mg four times a day for 2 weeks as a minimum or 3 weeks if slow to resolve should be used.
- In patients allergic to Penicillin, oral Clarithromycin 500mg bd to be used for 2-3 weeks.
- Commence on 'Staph pack' which includes the following: Bactroban 2% nasal ointment to be applied to the nares thrice a day for 5 days and Octenisan (body and hair)washes daily for 5 days. (Note: separate Bactroban 2% ointment tubes to be used for the nose and the exit site).
- Ensure *S.aureus* isolate is sensitive to Mupirocin.

c) Pseudomonas aeruginosa

- *P. aeruginosa* exit-site infections can be difficult to treat. Oral Ciprofloxacin is recommended at a dose of 500mg twice daily to be continued for 3 weeks. (Note: Absorption of quinolones can be affected if given concomitantly with sevelemer or oral iron or calcium tablets. Quinolone should be taken 2 hours before the administration of these drugs).
- If resolution of the infection is slow, a second anti-pseudomonal agent such as intra-peritoneal (IP) Gentamicin or IV Meropenem can be used after discussion with the microbiologist.

d) Methicillin- Resistant Staphylococcus aureus (MRSA)

- Discontinue Flucloxacillin or Clarithromycin
- Administer IP Vancomycin (30mg/Kg maximum 3gms)
- Discuss with microbiologist regarding use of Rifampicin.
- Arrange for further dose of IP Vancomycin for day 5 and day 10 (15mg/Kg) and check Vancomycin levels.
- Commence on 'Staph pack' which includes the following: Bactroban 2% nasal ointment to be applied to the nares thrice a day for 5 days and Octenisan (body and hair) washes daily for 5 days.
- Do full MRSA screen post treatment.

e) Other organisms

Exit-site and tunnel infections can also be caused by a number of other organisms such as diphtheroids, anaerobic organisms, streptococci and fungi. Antibiotic treatment should be altered based on the culture and sensitivity report and may need discussion with the microbiologist.

Local care of exit-site during an episode of infection

a) For Gram positive organisms:

- Continue using Octenisan (neat) for cleaning exit site.
- Ensure that the patient uses Bactroban 2% nasal ointment to the skin around exit site on a daily basis.

b) For Gram negative infections

- Continue using Octenisan (neat) for cleaning exit site
- Stop using bactroban 2% nasal ointment for exit site.
- Use Gentamicin eye drops (0.3%) 3 drops applied around the exit site daily for 6 weeks.
- Re- swab 2 weeks after stopping Gentamicin eye drops.

Over granulation tissue around exit-site

- Send exit-site swab for C&S.
- Review with PD nurses.

Follow up

- Arrange follow up for 2-3 weeks after completing the course of antibiotics to assess exit site.
- If the cuff of the catheter is exposed, liaise with the Consultant Nephrologist to shave the cuff as this might reduce exit-site infections.

PD catheter removal may be considered in

- 1) Patients with non resolving tunnel infection
- 2) Exit site infection and peritonitis with the same organism (except coagulasenegative staphylcoccus as this responds readily to treatment).
- 3) Un-resolving exit site infections even after prolonged course of antibiotics.



Exit site infection-Audit 2010-2013

References:

ISPD (2010) Peritoneal dialysis-related infections recommendations: 2010 update (ISPD Guidelines). **Peritoneal Dialysis International** 30,393-423.

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