TREATMENT OF PERITONEAL DIALYSIS (PD) RELATED PERITONITIS

WA HOME DIALYSIS PROGRAM (WAHDIP) GUIDELINES

General Principles

1. PD related peritonitis is an EMERGENCY – early empiric treatment followed by close review is essential

2. When culture results and sensitivities are known, antimicrobial therapy should be adjusted to narrow-spectrum agents as appropriate

3. Intraperitoneal (IP) administration is superior to intravenous (IV) dosing in treatment of peritonitis

4. Intermittent and continuous dosing are equally efficacious

5. Selection of antimicrobials must be made in light of both patient’s and program’s history of micro-organisms and susceptibilities

6. Aminoglycosides, cephalosporins and vancomycin can be mixed in the same dialysis bag without loss of bioactivity

7. Some common definitions for peritonitis can be found below:
   a. **Recurrent** – an episode that occurs within four weeks of completion of therapy of a prior episode but with different organism
   b. **Relapsing** – an episode that occurs within four weeks of completion of therapy of a prior episode with the same organism or one sterile episode (relapsing episodes should NOT be counted as another peritonitis when calculating peritonitis rates)
   c. **Repeat** – an episode that occurs more than four weeks after completion of therapy of a prior episode with the same organism
   d. **Refractory** – failure of the effluent to clear after five days of appropriate antimicrobials
   e. **Catheter Related Peritonitis** – peritonitis in conjunction with an exit-site or tunnel infection with the same organism or one site sterile

A senior Renal Physician MUST be contacted if there are any questions pertaining to the treatment of PD related peritonitis
TREATMENT OF PERITONEAL DIALYSIS (PD) RELATED PERITONITIS

**INITIAL EMPIRIC MANAGEMENT OF PD RELATED PERITONITIS**

- All PD patients who present with a cloudy PD drain bag require **IMMEDIATE** antimicrobial treatment

1. Send the whole bag of cloudy PD fluid for laboratory testing  
   \(\text{(Gram stain, MC&S, WCC & differential)}\)
2. Commence antimicrobial treatment covering  
   Gram-positive, Gram-negative organisms and yeast

<table>
<thead>
<tr>
<th>Gram-positive coverage</th>
<th>Gram-negative coverage</th>
<th>Yeast coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intra-peritoneal vancomycin</strong></td>
<td><strong>Intra-peritoneal gentamicin</strong></td>
<td><strong>Oral nystatin</strong></td>
</tr>
</tbody>
</table>
| As a single STAT dose 2 grams | As a single STAT dose  
   40 mg \(<\) 60kg  
   80 mg \(\geq\) 60 kg | 1 tablet/capsule  
   (500,000 units)  
   QID  
   for duration of IP therapy |

Both intra-peritoneal antimicrobials to be placed in the same bag and left to dwell for a minimum of 6 hours

1. Monitor patient’s clinical condition – clarity of PD fluid, abdominal pain, fluid status
2. Follow up results of microbiological testing
3. Liaise with Renal Physician to determine appropriate subsequent management

Patients receiving more than one dose of gentamicin or vancomycin should have plasma levels monitored for adequacy and non-toxicity.
### SUBSEQUENT MANAGEMENT OF PD RELATED PERITONITIS: DIRECTED BY CULTURE RESULTS

- **Gram-positive isolate or culture negative**

  Continue vancomycin treatment for Gram-positive organisms. Otherwise treat as directed by the results of culture and susceptibilities in consultation with a specialist, if necessary.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Treatment Plan</th>
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</table>
| Culture negative               | • Stop gentamicin  
                                | • Continue IP vancomycin  
                                |   Dose: 2 grams  
                                |   Frequency: weekly  
                                |   Duration: 14 days |
| **Staphylococcus species**     | • Stop gentamicin  
                                | • Continue IP vancomycin or as directed  
                                |   Dose: 2 grams  
                                |   Frequency: weekly  
                                |   Duration: 21 days |
| **Corynebacterium species**    |                                                                                  |
| **Enterococcus**               | • Continue IP vancomycin or as directed  
                                |   Dose: 2 grams  
                                |   Frequency: weekly  
                                |   Duration: 21 days  
                                | • Continue IP gentamicin 40 mg  
                                |   Frequency: each day  
                                |   Duration: 7 days |
| **Streptococcus species**      | • Stop IP gentamicin  
                                | • Continue IP vancomycin or as directed  
                                |   Frequency: weekly  
                                |   Duration: 14 days |
| Polymicrobial Gram +ve (without ESI/tunnel infection) | • Based on susceptibilities  
                                                |   Frequency: as advised  
                                                |   Duration: as advised |
## TREATMENT OF PERITONEAL DIALYSIS (PD) RELATED PERITONITIS

### SUBSEQUENT MANAGEMENT OF PD RELATED PERITONITIS: DIRECTED BY CULTURE RESULTS

- **Gram-negative isolates**

*Treatment should be directed by the results of culture and susceptibilities in consultation with a specialist, if necessary.*

<table>
<thead>
<tr>
<th>Organism Description</th>
<th>Treatment Plan</th>
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</table>
| **Pseudomonas aeruginosa**                                                           | - Stop IP vancomycin and IP gentamicin  
  - If susceptible, commence oral ciprofloxacin 500 mg and IP cefepime or IP ceftazidime 1 gram  
    Frequency: daily  
    Duration: 21 days                                                                 |
| **Gram-negative organism (E.coli, Proteus or Klebsiella) - single species isolated** | - Stop IP vancomycin and IP gentamicin  
  - If susceptible, commence oral ciprofloxacin 500 mg and IP cephazolin or IP cefepime or IP ceftazidime 1 gram as per susceptibility  
    Frequency: daily  
    Duration: 14 to 21 days                                                                 |
| **Stenotrophomonas**                                                                | - Stop IP vancomycin and IP gentamicin  
  - Consult with an Infectious Disease physician/microbiologist in every case                             |
| **Polymicrobial Gram-negative peritonitis**                                         | - Commence IV piperacillin/tazobactam and IP amoxycillin  
  - Continue IP gentamicin as per susceptibility  
    Doses: as advised  
    Frequency: as advised  
    Duration: 14 days                                                                 |
# Subsequent Management of PD Related Peritonitis

## High-risk Peritonitis

- **Please contact renal physician** (may warrant PD catheter removal)

## Adjuvant Treatment

### Staphylococcus aureus (MSSA or MRSA) with exit site /tunnel infection
- Seriously consider catheter removal in refractory exit site infection (ESI)
- **Adjuvant Treatment** continue antimicrobials for at least 14 days after catheter removal

### Pseudomonas aeruginosa with exit site /tunnel infection
- Seriously consider catheter removal in refractory ESI
- **Adjuvant Treatment** continue antimicrobials for at least 14 days after catheter removal

### Fungal Peritonitis
- **IMMEDIATE** catheter removal required
- Consult with an Infectious Diseases physician
- **Adjuvant Treatment** commence antifungal therapy for 10-14 days after catheter removal

### Polymicrobial Gram-negative enteric organisms
- Consider enteric source and investigate source of contamination
- Systemic antimicrobial therapy usually required
- **Adjuvant Treatment** continue antimicrobials for at least 14 days after catheter removal

### Mycobacterial Peritonitis
- Seriously consider catheter removal
- Consult with an Infectious Diseases physician
- **Adjuvant Treatment** continue antimicrobials for at least 14 days after catheter removal
TREATMENT OF PERITONEAL DIALYSIS (PD) RELATED PERITONITIS

INDICATIONS FOR CATHETER REMOVAL FOR PERITONEAL DIALYSIS-RELATED INFECTIONS

- Refractory peritonitis
- Relapsing peritonitis
- Refractory exit-site and tunnel infection
- Fungal peritonitis
- Catheter removal may also be considered for
  - repeat peritonitis
  - mycobacterial peritonitis
  - multiple enteric organisms

STABILITY OF ANTIMICROBIALS

The stability of antimicrobials will vary with different PD solutions. Please check the manufacturer’s recommendations with regard to antimicrobial stability in PD solutions. It is also important to consider drug compatibility if adding more than one antimicrobial into a PD solution.

REFERENCES

- Therapeutic Guidelines: Antibiotic Version 14 2010
- ISPD Guidelines, Peritoneal Dialysis-Related Infections Recommendations: 2010 Update
- ISPD Position Statement on Reducing the Risks of Peritoneal Dialysis-Related Infections: 2011
- Kam-Tao P; Szeto C; Piraino B; Bernardini J; Figueiredo A; Gupta A; Johnson D; Kuijper E; Lye W; Salzer W; Schaefer F; Struijk D. ISPD Guidelines/Recommendations Peritoneal Dialysis-Related Infections Recommendations:2010 Update. *Peritoneal Dialysis International* 2010 30 pp393-423
- Wong P; Lo K; Tong G; Chan S; Lo M; Mak S; Wong A. Prevention of fungal peritonitis with nystatin prophylaxis in patients receiving CAPD. *Peritoneal Dialysis International* 2007 27 pp531-536
- CARI Guidelines: Treatment of peritoneal dialysis-associated fungal peritonitis 2004

CONSULTATION

Infectious Diseases Physicians can be contacted for consultation on the following numbers:

Fremantle Hospital   (08) 9431 3333
Royal Perth Hospital (08) 9224 2244
Sir Charles Gairdner Hospital  (08) 9346 3333
These guidelines were prepared by the Western Australian Committee for Antimicrobials of the Western Australian Therapeutics Advisory Group

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