Clinical pathways never replace clinical judgement. Care outlined in this pathway must be varied if it is not clinically appropriate for the individual client.

This form is to be used to assess patients on peritoneal dialysis who present with any of the following symptoms (tick as appropriate)
- Cloudy effluent
- Abdominal pain
- Febrile
- Systemically unwell

**Assessment**
- Clinically assess the patient
- If temperature above 38°C collect blood cultures
- Inspect exit site
  - Swab site if signs of infection
- Collect sterile sample of PD fluid
  - Metro: Collect minimum 60 mL of dialysate effluent (10 mL for cell count, 50 mL for gram stain, and culture / sensitivity)
  - Sample to be taken to local laboratory immediately. Request STAT cell count & differential, gram stain, culture / sensitivity
  - Non metro: Culture / sensitivity in anaerobic and aerobic bottles
    - Specimen should arrive within 6 hours to laboratory
    - If unable to process within 6 hours, add 5mL to EDTA collection tube (purple top)
- Commence immediate Empiric Treatment using table below
- Admit/transfer patient if any of the following (tick as appropriate below):
  - Fever
  - Significant Pain
  - Unable to perform own dialysis
- Contact the Paediatric Nephrologist / Peritoneal Dialysis Unit as soon as practical

**Dosing regimen for empiric treatment of suspected peritonitis in children on PD**

NB. All antibiotics given intraperitoneally
- MRSA negative patients - use cefepime as monotherapy or cefazolin + gentamicin, if cefepime not available.
- Known/suspected MRSA positive patients - use vancomycin + gentamicin for empiric treatment*.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Initial Dosing SINGLE DWELL ONLY</th>
<th>Subsequent Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APD</td>
<td>CAPD</td>
</tr>
<tr>
<td></td>
<td>All cycle exchanges</td>
<td>Daytime dwell</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- cefepime</td>
<td>500 mg/L</td>
<td>125 mg/L</td>
</tr>
<tr>
<td>- cefazolin</td>
<td></td>
<td>125 mg/L; increase last fill</td>
</tr>
<tr>
<td></td>
<td></td>
<td>volume to 50% of usual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>night time dwell volume</td>
</tr>
<tr>
<td>Gentamicin*</td>
<td>0.6 mg/kg (max 50mg)</td>
<td>-</td>
</tr>
<tr>
<td>Vancomycin*</td>
<td>30 mg/kg (max 1.5g)</td>
<td>-</td>
</tr>
</tbody>
</table>

* If ongoing vancomycin or gentamicin treatment required: Vancomycin - check blood level on day 3 and re-dose vancomycin if serum level <15mg/L; Gentamicin - check level daily and redose if serum level <1mg/L.

Nilstat 500,000u (1 tab) three times daily for duration of antibiotic treatment

**Signature Log**
To be completed by all staff who initial this pathway

<table>
<thead>
<tr>
<th>Name (print)</th>
<th>Designation</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>
**Immediate Treatment**

0–6 hours
- Start intraperitoneal antibiotics as soon as possible
- Allow to dwell for at least 6 hours
- Ensure gram positive and gram negative coverage
- Continue usual PD regimen

6–8 hours
- Determine and prescribe ongoing antibiotic treatment
- Ensure follow-up arrangements are clear or patient admitted
- Await sensitivity results

**Transfer**
- If patient remains unwell may need to be transferring to other facility

**Empiric Treatment Following Culture Results**

If PD Fluid WCC above $100 \times 10^6/L$ of which 50% are polymorphonuclear neutrophils

**Diagnosis of Peritonitis is made**

**Antibiotic Regimen depends on the results of the culture. Follow the links below to locate the correct regimen.**

- Staphylococcus aureus
- Enterococcus/Streptococcus
- Other gram positive organisms
- Pseudomonas species
- Single gram-negative
- Polymicrobial peritonitis day 1–3
- Culture negative on day 1 & 2
- If Gram stain shows fungal elements, remove catheter

**Plan of Care**

- Plan 1 Go to Page 3
- Plan 2 Go to Page 4
- Plan 3 Go to Page 5
- Plan 4 Go to Page 6
- Plan 5 Go to Page 7
- Plan 6 Go to Page 8
- Plan 7 Go to Page 9
- Plan 8 Go to Page 10

Consider re-training after successful peritonitis treatment
Staphylococcus aureus on culture

• Continue gram-positive coverage based on sensitivities
• Stop gram-negative coverage
• Assess exit site again

Flucloxacillin-sensitive or nMRSA S. aureus

Methicillin resistant S. aureus (MRSA)

• Adjust coverage to vancomycin
• Check blood level on day 3 and re-dose if serum level <15mg/L

• Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5
• PD fluid collection and send for cell count and culture at day 3–5

Clinical improvement

No clinical improvement by 5 days on appropriate antibiotics

- Continue antibiotics
- Duration of therapy 21 days

Remove catheter
Enterococcus/Streptococcus on culture

- Discontinue empiric treatment
- Start continuous ampicillin 125mg/L each bag; consider adding aminoglycoside for enterococcus
- Note: Ampicillin and Aminoglycoside cannot be given in the same bag. Omit Ampicillin when Gentamicin is added to one bag each day.

- If ampicillin resistant, start vancomycin
- Check blood level on day 3 and re-dose vancomycin if serum level <15mg/L
- If vancomycin resistant enterococcus (VRE), seek Infectious Disease opinion

Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5:
- Symptoms resolved
- Bags clear

Clinical improvement

Continue antibiotics; duration of therapy:
- 14 days (streptococcus)
- 21 days (enterococcus)

No clinical improvement by 5 days on appropriate antibiotics

- Remove catheter
- Patient to remain on treatment for 14 days after catheter removal
Other gram-positive organisms including coagulase negative staphylococcus on culture

- Continue gram-positive coverage based on sensitivities
- If cefepime used, consider ‘stepping down’ therapy to first generation cephalosporin if sensitive
- Stop gram-negative coverage

Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5:
- Symptoms resolved
- Bags clear

Clinical improvement
- Continue antibiotics
- Duration of therapy: 14 days

No clinical improvement by 5 days on appropriate antibiotics
- Remove catheter
- Patient to remain on treatment for 14 days after catheter removal
Pseudomonas species on culture

Without catheter infection (exit-site/tunnel)
- Treat with gentamicin and ceftazidime if sensitive - otherwise seek ID advice
- Check levels daily on redose if serum trough level < 1mg/L.

Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5:
- Symptoms resolved
- Bags clear

Clinical improvement
- Continue antibiotics
- Duration of therapy: 21 days

No clinical improvement by 5 days on appropriate antibiotics
- Remove catheter
- Patient to remain on treatment for 21 days after catheter removal

With catheter infection (exit-site/tunnel) current or prior to peritonitis
- Remove catheter
- Patient to remain on treatment for 21 days after catheter removal
Other single gram-negative organism on culture

E. coli, Proteus, Klebsiella
- Adjust antibiotics to sensitivity pattern
- If cefepime used, consider 'stepping down' therapy to first generation cephalosporin if sensitive

Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5:
- Symptoms resolved
- Bags clear

Clinical improvement
- Continue antibiotics
- Duration of therapy 21 days

No clinical improvement by 5 days on appropriate antibiotics
- Remove catheter
- Patient to remain on treatment for 14 days after catheter removal

Stenotrophomonas
- Treat with trimethoprim / sulphamethoxazole 4mg/kg of trimethoprim component twice daily orally (max 160mg/dose)

Assess clinical improvement at days 3–5:
- Symptoms resolved
- Bags clear

Clinical improvement
- Continue antibiotics for 28 days
- No need to change
Polymicrobial peritonitis: days 1–3

Multiple gram-negative organisms or mixed gram negative/gram positive
  • Consider GI problem
  • Add oral metronidazole
  • Discuss ongoing antibiotic management with Infectious Disease Consultant
  • Obtain urgent surgical assessment
  • In case of laparotomy indicating intra-abdominal pathology/abscess, remove catheter
  • Continue antibiotics for 21 days

Multiple gram-positive organisms
  • Touch contamination
  • Consider catheter infection
  • Continue therapy based on sensitivities – duration 21 days

Without exit site or tunnel infection
  • Continue antibiotics
  • Duration of treatment for a minimum 21 days

With exit site or tunnel infection
  • Remove catheter
Culture negative on day 1 and 2

Continue initial therapy

Day 3: Culture still negative
Clinical assessment
Repeat PD Fluid white cell count and differential

Infection resolving, Patient improvement clinically

- Discontinue gentamicin and continue with/change to 1st generation cephalosporin for 14 days

Infection not resolving

- Special culture technique for unusual causes (e.g. mycobacteria, legionella)
- Consider fungi

Now culture positive

- Adjust therapy according to sensitivity patterns
- Duration of therapy based on organism identified

Still culture negative

- No clinical improvement after 5 days, surgically remove catheter
- Continue antibiotics for at least 14 days after catheter removal

Clinical improvement

- Continue antimicrobial
- Duration of therapy 14 days
Fungi identified on culture or Gram stain

Remove catheter immediately

Commence oral fluconazole - 6 mg/kg/day (maximum: 400mg daily)

Seek infectious diseases opinion

Direct antifungal agent according to infectious disease physician advice (see appendix 1 for antifungal options)

Therapy should be continued for 14 days after removal of catheter
# Antibiotic Dosing Recommendations for the Treatment of Peritonitis
All doses intraperitoneal unless otherwise stated

<table>
<thead>
<tr>
<th></th>
<th>Continuous(^a)</th>
<th>Intermittent(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loading dose</td>
<td>Maintenance dose</td>
</tr>
<tr>
<td><strong>Aminoglycosides (IP)^b</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gentamicin</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Cephalosporins (IP)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cefazolin</td>
<td>500 mg / L</td>
<td>125 mg / L</td>
</tr>
<tr>
<td>Cefepime</td>
<td>500 mg / L</td>
<td>125 mg / L</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>500 mg / L</td>
<td>250 mg / L</td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>500 mg / L</td>
<td>125 mg / L</td>
</tr>
<tr>
<td><strong>Glycopetides (IP)^b</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vancomycin</td>
<td>1000 mg / L</td>
<td>25 mg / L</td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>400 mg / L</td>
<td>20 mg / L</td>
</tr>
<tr>
<td><strong>Penicillins (IP)^b</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ampicillin</td>
<td>-</td>
<td>125mg / L</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aztreonam (IP)</td>
<td>1000 mg / L</td>
<td>250 mg / L</td>
</tr>
<tr>
<td>Imipenem-cilastin (IP)</td>
<td>250 mg / L</td>
<td>50 mg / L</td>
</tr>
<tr>
<td>Linezolid (PO)</td>
<td>&lt;5 Years: 10 mg / kg / dose given three times daily 5 - 11 Years: 10 mg / kg / dose given twice daily ≥ 12 Years: 600 mg / dose, given twice daily (maximum:1.2 g daily)</td>
<td></td>
</tr>
<tr>
<td>Metronidazole (PO)</td>
<td>10 mg / kg / dose given three times daily (maximum:600 mg daily)</td>
<td></td>
</tr>
<tr>
<td>Rifampicin (PO)</td>
<td>5 - 10 mg / kg / dose given twice daily (maximum: 600 mg daily)</td>
<td></td>
</tr>
<tr>
<td><strong>Antifungals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluconazole (IP, IV or PO)</td>
<td>6 mg/kg every 24h (maximum: 400mg daily)</td>
<td></td>
</tr>
<tr>
<td>Caspofungin (IV only)</td>
<td>70 mg / m(^2) on day 1 (maximum: 70 mg daily)</td>
<td>50 mg / m(^2) daily (maximum: 50 mg daily)</td>
</tr>
</tbody>
</table>

\(^a\) For continuous therapy, the exchange with the loading dose should dwell for 3 - 6 hours; all subsequent exchanges during the treatment course should contain the maintenance dose. For intermittent therapy, the dose should be applied once daily in the long-dwell, unless otherwise specified.

\(^b\) Aminoglycosides and penicillins should not be mixed in dialysis fluid because of the potential for inactivation.

\(^c\) If ongoing treatment is required, check level daily and redose gentamicin if serum level <1mg/L.

\(^d\) In patients with residual renal function, glycopeptide elimination may be accelerated. If intermittent therapy is used in such a setting, the second dose should be time-based on a blood level obtained 2-4 days after the initial dose. Re-dosing should occur when the blood level is <15 mg / L for vancomycin. Intermittent therapy is not recommended for patients with residual renal function unless serum levels of the drug can be monitored in a timely manner.

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