POLICY UNDER REVIEW
Please note that this policy is under review. It does, however, remain current Trust policy subject to any recent legislative changes, national policy instruction (NHS or Department of Health), or Trust Board decision. For guidance, please contact the Author/Owner.

<table>
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<tr>
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<th>Clinical Guideline for the treatment of CAPD Peritonitis</th>
</tr>
</thead>
<tbody>
<tr>
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<td>9 December 2016</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>9 December 2016</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>9 March 2020</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Dr Steve Dickinson, Renal Consultant, and Dr Paul Johnston, Renal Consultant</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 253241</td>
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<td>Clinical Guideline for the treatment of Peritoneal Dialysis Peritonitis, Peritoneal Dialysis, peritonitis, CAPD, APD</td>
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<td>Target Audience</td>
<td>RCHT</td>
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<td>Medical Director</td>
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<td>Date revised:</td>
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<td>Renal consultants - has been agreed by the four substantive renal consultants.</td>
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<td>Divisional Manager confirming approval processes</td>
<td>Sheena Wallace Medical Services Associate Director</td>
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<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not required</td>
</tr>
<tr>
<td>Name and Signature of Divisional/Directorate Governance Lead confirming approval by specialty and divisional management meetings</td>
<td>{Original Copy Signed}</td>
</tr>
</tbody>
</table>
Signature of Executive Director giving approval | {Original Copy Signed}
--- | ---
Publication Location (refer to Policy on Policies – Approvals and Ratification): | Internet & Intranet ✓ Intranet Only
Document Library Folder/Sub Folder | Clinical Guidelines, Emergency Guidelines, Acute Medicine, Renal Medicine, General Medicine
Links to key external standards | n/a
Related Documents: | n/a
Training Need Identified? | No

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CLINICAL GUIDELINE FOR THE TREATMENT OF CAPD PERITONITIS

Summary.

1. Please see section 2 below- “The Guidance”.
Aim/Purpose of this Guideline

This guideline has been written to guide the management of adults with peritoneal dialysis peritonitis. Patients carrying out peritoneal dialysis (PD) are either performing Continuous Ambulatory Peritoneal Dialysis (CAPD) or Automated Peritoneal Dialysis (APD).

2. The Guidance

Patients with peritonitis usually present with cloudy fluid and abdominal pain. However, peritonitis should always be included in the differential diagnosis of the PD patient with abdominal pain, even if the effluent is clear, as a small percentage of patients present in this fashion.

Symptoms:
- Abdominal pain 95%,
- Nausea/vomiting 30%,
- Feverish sensation 30%,
- Constipation/diarrhoea 15%.

Signs:
- Cloudy peritoneal fluid 99%, Abdominal tenderness 80%,
- Rebound tenderness 15-50% (highly variable), Pyrexia 33%,
- Leucocytosis 25%.

Differential Diagnosis of Cloudy PD effluent fluid:

**Culture-positive infectious peritonitis**

- Infectious peritonitis with sterile cultures Chemical peritonitis
- Eosinophilia of the effluent
- Haemoperitoneum
- Malignancy (rare)

Chylous effluent (rare)

Specimen taken from “dry” abdomen

**Suspected diagnosis PD peritonitis:**

If a diagnosis of peritonitis is suspected, advise the patient to save the original cloudy bag and come straight into hospital, bringing the original cloudy bag with them. Patients to
report to Home dialysis unit (ext 2863) between 08.00 and 16.00 Mon-Fri and Grenville ward (ext 2010) any other time.

A patient’s first contact with health services may be at the Emergency Department, their GP and hence admission via MAU, or by phoning Grenville (renal) ward. Patients who are systemically unwell will need to be admitted and should be managed initially in ED or MAU, with the assistance of the Grenville ward staff. Some patients who are otherwise well could be assessed initially on the Home Dialysis unit or on Grenville Ward.

To establish the diagnosis PD or Grenville nursing staff from the renal ward will take a 50mls sample of the dialysate from the original cloudy bag and divide this into a sterile universal container (30mls), and two blood culture bottles (10mls each) and send to Microbiology.
Request on PD fluid: An urgent cell count,
Urgent gram stain,
Culture and sensitivity

Peritonitis is confirmed if the fluid contains >100 white cells/μl (PMN). If the count is <100, ask before initiating treatment.

If the patient is severely unwell, initiate treatment as soon as cultures have been sent and include blood cultures. If in doubt treat.

Reasons to consider in-patient treatment:

- Systemically unwell
- Immunosuppressed
- Gram negative infections
- Elderly/frail/lives alone
- Worried about condition
- Deterioration despite treatment

If the patient is going to be discharged out of hours,

- Check with the on-call renal consultant
- Leave a message for the PD nurses
- Check contact details of the patient
- Ensure somebody is with the patient
Initial Treatment of peritoneal dialysis peritonitis in patients carrying out CAPD:

The PD nursing team will ideally obtain results of cell count and Gram stain before initiating treatment. However, if the patient presents out of hours, or if the patient is unwell, then commence ‘no organisms seen protocol’ pending results, i.e. Intraperitoneal vancomycin and oral ciprofloxacin. PD = Peritoneal Dialysis. IP = Intraperitoneal.

**Antibiotics:**

- **Ciprofloxacin:** 1 g orally followed by 500 mg bd, administered at least 2 hours after phosphate binder use.

- **Vancomycin:** Given intraperitoneally (IP) according to weight, doses range from 1.5 – 2.5g.

<table>
<thead>
<tr>
<th>Weight</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60 kg</td>
<td>1.5g IP (mixed with 20mls sterile)</td>
</tr>
<tr>
<td>60-80 kg</td>
<td>2.0g IP</td>
</tr>
<tr>
<td>&gt; 80 kg</td>
<td>2.5g IP water for injections Use the patient’s next usual bag. Allow to dwell for 6 hours.</td>
</tr>
</tbody>
</table>
The Vancomycin dose should last approximately 7 days unless the patient has significant native renal function (as suggested by a urine output of >500 ml/day). The patient must therefore attend the renal unit on day 4 (Grenville ward if day 4 is a Sunday) for a serum Vancomycin level.

Vancomycin level < 15 mg/L: give further dose on day 5 and continue with dosing every 5 days

> 15 mg/L: give further dose on day 7 and continue with dosing every 7 days
Gentamicin: Guidelines based around the International Society for Peritoneal Dialysis (ISPD) recommendations with an intermittent dose of 0.6 mg/kg added to one bag per day with adjustments made for target therapeutic range and for the presence or absence of significant native renal function (defined as urine output of >100 mls per day). A continuous treatment regime adding gentamicin to all prescribed bags is also included for patients for whom an intermittent gentamicin regime cannot be given.

**Intermittent Gentamicin regime:**

Gentamicin added to one bag per day preferably midday or evening exchange

<table>
<thead>
<tr>
<th>Weight</th>
<th>Dosage</th>
<th>Dosage if urine output &gt;100 mls per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-80 kg</td>
<td>40 mg (50 mg</td>
<td>60 mg (70 mg if urine output &gt;100 mls per day)</td>
</tr>
<tr>
<td>80-100 kg</td>
<td>50 mg (60 mg</td>
<td></td>
</tr>
<tr>
<td>100-120 kg</td>
<td>60 mg (70 mg</td>
<td></td>
</tr>
</tbody>
</table>

If weight less than 60 kg or > 120 kg, discuss dose with on call renal team – refer to 0.6 mg/kg dosage.

**Monitoring**

Check serum Gentamicin level Day 3, Day 6 and Day 10.

If level <2 continue current regime.

If level 2-3 decrease dosage by 10 mg and re check in 3 days.

If level >3 – Stop Gentamicin dose for 24 hours and re start reducing dosage regime by 15 mg per dose.

If Gentamicin level >4 then Stop Gentamicin and discuss with Consultant Nephrologist.

**Continuous Gentamicin regime:**

First bag 8mg/L (10 mg/L if urine output >100 ml per day) Subsequent bags 4 mg/L (5mg/L if urine output >100ml per day)

Gentamicin levels should be taken on days 3, 6 and 10 and if the level is >4mg/L the Gentamicin should be discontinued and further dosing discussed with Consultant Nephrologist.
**Continued Treatment of peritoneal dialysis peritonitis:**

This depends upon culture results. The culture should be available in 48 hrs.

**Gram positive organisms:**

- Stop ciprofloxacin

- *Staph epidermidis (coagulase –ve staph)* Continue Vancomycin for 2 doses (3 doses on 5 day regime)

- *Staph Aureus*
  - Continue Vancomycin for 3 doses (4 doses on ‘5 day’ regime)
  - Consider adding a second antibiotic if patient not improving i.e
    - IV flucloxacillin or
    - IP Gentamicin

- *MRSA*
  - Continue with Vancomycin for 3 doses (4 doses on ‘5 day’ regime)
  - Discuss with microbiology
  - Treat as per MRSA eradication protocol for presumed nasal infection

- *Enterococcus*
  - Continue Vancomycin for 2 doses (3 doses on ‘5 day’ regime)

**Gram negative organisms:**

- Inform consultant immediately.

- Stop Vancomycin

- Continue ciprofloxacin if the organism is sensitive

- Add gentamicin if patient not improving

- Continue for 10 days
• Pseudomonas
  o Stop vancomycin
  o Increase ciprofloxacin dose to 750 mg b.d and add gentamicin as per above regime
**Culture negative infections:**

- Continue Vancomycin and ciprofloxacin.
- Continue for 14 days

**Treatment of peritoneal dialysis peritonitis in patients carrying out APD (patients on the 'cycler':)**

Ideally the patient should convert to a CAPD regime with the help of the nursing staff. When the fluid has cleared, the patient may return to a more typical APD regimen (i.e. short nightly cycles and a prolonged daytime dwell). If the daytime dwell contains antibiotics, this must be a full exchange (at least 6 hours). Alternatively, a continuous gentamicin regime can be adopted as per above protocol.

**When to remove a Tenckhoff catheter:**

A Tenckhoff catheter should not be removed without discussing the case with a consultant nephrologist. According to the ISPD guidelines, the following are indications for urgent removal of a Tenckhoff catheter:

- Refractory peritonitis - failure to respond to antibiotics within 5 days
- Relapsing peritonitis - an episode that occurs within 4 weeks of completion of therapy of a prior episode with the same organism, or one sterile episode
- Refractory exit-site and tunnel infection
- Fungal peritonitis

A catheter may need to be removed earlier than this under certain circumstances.

**Vancomycin allergy**

If the patient is Vancomycin allergic they should receive Teicoplanin as follows:

- A single loading dose of **intravenous** Teicoplanin 400mg should be given.
- For the first week they should receive Teicoplanin 20mg/L in every bag
- For the second week they should receive Teicoplanin 20mg/L in every alternate bag
- For the third week they should receive Teicoplanin 20mg/L in the overnight dwell bag only
### 3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Rates of peritoneal dialysis peritonitis (and organisms responsible for peritonitis) are audited in the renal department by the PD nurse team.</th>
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</thead>
<tbody>
<tr>
<td>Lead</td>
<td>The PD nurse team</td>
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<tr>
<td>Tool</td>
<td>Numbers of patients with PD peritonitis are audited and presented annually.</td>
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<td>Frequency</td>
<td>Annually</td>
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<td>Reporting arrangements</td>
<td>The results of this audit will be shared at the Renal Audit meeting.</td>
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<tr>
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<td>The Renal Audit meeting, and the renal lead and renal audit lead will act on recommendations that arise from the audit.</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Any required changes in practice that are identified will lead to an amendment of the guideline. Any lessons to be shared will be shared in the appropriate arena eg presenting at the Grand Round.</td>
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### 4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Diversity & Human Rights Policy' or the Equality and Diversity website.

4.2. **Equality Impact Assessment**

   The Initial Equality Impact Assessment Screening Form is at Appendix 2.
# Appendix 1. Governance Information

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Clinical Guidelines, Emergency Guidelines, Acute Medicine, Renal Medicine, General Medicine

### Links to key external standards
n/a

### Related Documents:
n/a

### Training Need Identified?
No

### Version Control Table

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<th>Changes Made by (Name and Job Title)</th>
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<tr>
<td>2009</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Renal Consultants</td>
</tr>
<tr>
<td>1 Feb ‘11</td>
<td>V2.0</td>
<td>Updated in light of ISPD guidelines</td>
<td>Dr Steve Dickinson, Renal Consultant, and Dr Paul Johnston, Renal Consultant</td>
</tr>
<tr>
<td>15 Jan ‘14</td>
<td>V3.0</td>
<td>Minor changes only i.e. ward name changes updated. Correction of ‘oral gentamicin’ to ‘oral ciprofloxacin’ in one sentence.</td>
<td>Dr Steve Dickinson, Renal Consultant, and Dr Paul Johnston, Renal Consultant</td>
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<tr>
<td>9 Dec ‘16</td>
<td>V4.0</td>
<td>No changes.</td>
<td>Dr Steve Dickinson, Renal Consultant</td>
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**All or part of this document can be released under the Freedom of Information Act 2000**

**This document is to be retained for 10 years from the date of expiry.**

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Appendix 2. Initial Equality Impact Assessment Form

| Name of Name of the strategy / policy / proposal / service function to be assessed (hereafter referred to as **policy**) (Provide brief description): |
| Directorate and service area: | Existing |
| Name of individual completing assessment: | Dr Steve Dickinson 01872 253241 |

1. **Policy Aim***
Who is the strategy / policy / proposal / service function aimed at?
This guideline has been written to guide the management of adults with peritoneal dialysis peritonitis. Patients carrying out peritoneal dialysis (PD) are either performing Continuous Ambulatory Peritoneal Dialysis (CAPD) or Automated Peritoneal Dialysis (APD).

2. **Policy Objectives***
This guideline has been written to guide the management of adults with peritoneal dialysis peritonitis. Patients carrying out peritoneal dialysis (PD) are either performing Continuous Ambulatory Peritoneal Dialysis (CAPD) or Automated Peritoneal Dialysis (APD).

3. **Policy – intended Outcomes***
To guide the safe management of adults with peritoneal dialysis peritonitis.

4. **How will you measure the outcome?***
Rates and organisms responsible for peritoneal dialysis peritonitis are audited in the renal department by the PD nurse team.

5. **Who is intended to benefit from the policy?***
Patients carrying out peritoneal dialysis (PD).

6a) Is consultation required with the workforce, equality groups, local interest groups etc. around this policy?
Yes

b) If yes, have these *groups been consulted?*
Yes

C). Please list any groups who have been consulted about this procedure.
The four substantial renal consultants and locum renal consultant at RCHT.

7. **The Impact***
Please complete the following table.

Are there concerns that the policy **could** have differential impact on:

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Rationale for Assessment / Existing Evidence</th>
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<tr>
<td><strong>Age</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong> (male, female, transgender / gender reassignment)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td>✓</td>
<td>If patient has a learning disability or autism the Learning Disability/Autism Acute Liaison Team can be connected for advice/support. Similarly, the Mental Health and Wellbeing Nurse can be accessed for advice/support if the patient has a mental health condition, if necessary. If a patient has hearing loss they will be told to contact their GP if they feel unwell.</td>
<td></td>
</tr>
<tr>
<td>---</td>
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<tr>
<td>Disability - Learning disability, physical disability, sensory impairment and mental health problems</td>
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<tr>
<td>Religion / other beliefs</td>
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<td>No obvious affects relating to Religion or Belief.</td>
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</tr>
<tr>
<td>Marriage and civil partnership</td>
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<td></td>
</tr>
<tr>
<td>Pregnancy and maternity</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this excludes any policies which have been identified as not requiring consultation. or
- Major service redesign or development

8. Please indicate if a full equality analysis is recommended. Yes No ✓

9. If you are not recommending a Full Impact assessment please explain why. A Full Impact assessment is not required.

Signature of policy developer / lead manager / director

Dr Steve Dickinson, Renal Consultant

Date of completion and submission 9 December 2016

Names and signatures of members carrying out the Screening Assessment

1. 

2. HREI Lead

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead, c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

A summary of the results will be published on the Trust’s web site.

Signed ______________

Date ______________