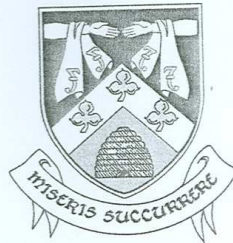


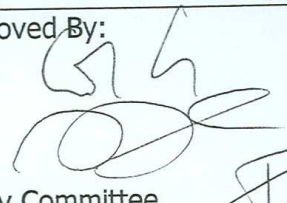
<Nephrology, Dialysis and Transplantation>



<Protocols and Procedures for Peritoneal Procedures >

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Jan 2009	1	Policy updated Additional appendix	5.2,appendix1. Appendix 2 (new)



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### **1.0 Aim/Purpose of policy**

The aim of this document is to provide up to date guidelines for care of patients on peritoneal dialysis therapy. The objective is to ensure that the multidisciplinary team is providing a uniformed approach to practice which is underpinned by evidence based practice.

### **2.0 Scope of Policy**

This policy refers to all medical and nursing staff in the renal area in Beaumont Hospital. All members of the multidisciplinary team are accountable for the care they deliver. They are required to base their practice on the best available evidence identified by research in order to provide effective, safe patient care.

### **3.0 Definitions**

Peritoneal Dialysis (PD) is a treatment that uses a natural membrane in the body for fluid and solute exchange. The goals of the therapy include removal of waste products, management of fluid, and regulation of acid base and electrolyte imbalances. To achieve these goals a dialysing solution (dialysate) is instilled into the peritoneal cavity for a period of time known as a dwell period. Following the dwell period the fluid (effluent) containing substances such as urea, creatinine, electrolytes and amino acids is drained and replaced with fresh dialysate.

In order for this treatment to work the patient requires a tenckhoff catheter to be inserted into the peritoneum cavity. Within these guidelines, nurses will find information required on the overall management of tenckhoff catheters and peritoneal dialysis.

### **4.0 Responsibilities**

Each nurse is professionally guided by An Bord Altranais particularly by "The Code of Professional Conduct" (An Bord Altranais, 2000). Members of the multidisciplinary team must acknowledge any limitations of competence and refuse in such cases to accept delegated functions.

## **5.0 Procedures**

### **5.1**

#### **PRE-OP CARE FOR TENCKHOFF INSERTION**

##### ***Procedure***

- PD Staff to be contacted by medical staff when patients scheduled for theatre for tenckhoff insertion
- Swab the nose and umbilicus for culture and sensitivity, results required pre-op
- Administer bowel prep as prescribed unless otherwise stated by surgeons the day prior to surgery, and record result (**Lancaster 2001 p. 343**)
- Patient must fast from 12 midnight pre op (**Lancaster 2001 p.344**)
- Ensure patient has a hibiscrub shower the morning of the procedure
- Prophylactic IV Antibiotics to be administered on morning of theatre as prescribed (Beaumont policy as of June 2009) Teicoplanin 400mgs (if no allergies noted) on morning of theatre (**Kredit et Al 2002 3.5, Lancaster 2001 p.343**)
- Ensure bladder is empty on the morning pre theatre (**Lancaster 2001 p.344**)
- Prepare Patient for theatre as per Beaumont Hospital checklist

**5.2****Procedure for Flushing a Tenckhoff Catheter on Insertion.**  
**(Lancaster 2001 p.344)**

**Indications:** To assess the patency of the Tenckhoff Catheter on insertion to ensure fluid inflow and outflow is adequate.

**Equipment:** (For the PD nurse outside sterile field)

- 2 Litre bag of Extraneal © (Warmed)
- Blue Clamps x2
- PD bag weighing scales

For the theatre nurse (On sterile field)

- \* Tenckhoff peritoneal dialysis double cuffed catheter
- Titanium accessory catheter adaptor
- 125cm long wide bore extension set
- PD Transfer set
- Minicap

<b>Procedure</b>
➤ PD nurse attends theatre as the patient is prepared by the surgeon
➤ The PD nurse prepares the Warmed extraneal™.
➤ Once the tenckhoff is inserted the surgeon attaches the titanium adaptor to the tube
➤ The end (with the wings – blue cap) of the extension set is passed to the PD nurse
➤ Once primed the surgeon attaches the extension tube to the Tenckhoff.
➤ Approximately 400mls is flushed in and out as per surgeon's
➤ Instructions.
➤ The extension tube is then disconnected by the surgeon and the transfer set and minicap is applied
➤ The PD Nurse clamps the dialysis bag.
➤ The PD nurse weighs the fluid as it goes into the peritoneum and the drain bag is weighed post procedure.
➤ Equipment is disposed of in the theatre sluice room as per disposal policy.
➤ The tenckhoff insertion is documented on clinical vision and in the PD diary and the patient kardex by the PD nurse.

- The nurse then replaces all items in the theatre bag.

### **5.3**

#### **EXIT SITE CARE FOR TENCKHOFF CATHETER (Lancaster 2001 p348)**

##### Equipment required

Gauze Squares (Sterile)  
Chlorhexidine Sachet  
Mepore dressing 9x15 (2)  
Sterile Gloves

<b><i>Procedure</i></b>
➤ The dressing should be performed by a competent Nurse in this area.
➤ Initially post op leave dressing undisturbed unless medically indicated.
➤ Advise patients not to shower or bath for two weeks post-op ( <b><i>ISPD 2005 P.109</i></b> )
➤ Dressing renewed on day <b>5</b> and day <b>10</b> . ( <b><i>Kredit et AL 2002 3.7</i></b> )
➤ Thereafter dressing renewed every second day and after every shower
➤ <b>Wash hands</b> as per protocol.
➤ Wash down worktop area with teepol solution (patients use soap and water at home) and clean with a hard surface wipe.
➤ Open gauze pieces and mepore dressing onto their packs on the worktop.
➤ Keep one gauze piece dry and apply chlorhexidine (unisept) to the other four pieces.
➤ Remove old dressing (if not already removed at the end of your shower).
➤ <b>Apply hand gel (ISPD 2005 p110)</b>
➤ Take up the gauze using the parachute method, clean around exit site in one direction with chlorhexidine gauze. Repeat this action with the other three pieces. With the last piece of gauze clean the tube from the exit site and discard piece.
➤ Take dry piece of gauze and pat dry around the site. Remember bacteria grow on heat, moisture and light.



<b>Procedure</b>
➤ Apply new dressing flat to surface. <b>Do not key hole cut.</b>
➤ Catheter must be anchored to skin. <b>(ISPD 2005 p.109)</b>

#### **5.4 Performing a Manual Exchange**

##### Equipment

Hard surface wipes  
 2 connection shields.  
 2 Minicaps/disconnect caps  
 2 Blue clamps.  
 Hand gel  
 Warm Bag of dialysate fluid.

<b>Procedure</b>
➤ <b>Wash hands</b> as per protocol
➤ Wash down worktop with Teepol solution, Patients can use soap and water and home
➤ Clean with a hard surface wipe, cleaning in one direction only, covering the entire surface.
➤ Open bag – lay on table Check for
➤ Clarity.
➤ Volume.
➤ Concentration
➤ Expiry date
➤ (e) Leakage.
➤ Pull bag lines free.
➤ Lay table with all of the above requirements (7 in total)
➤ Open connection shield
➤ <b>Apply hand gel</b>
➤ Apply connection shield to the end of tubing on the bag
➤ Remove cap from your tube and connect yourself to the bag
➤ Open roller clamp and drain.
➤ When drained out, close roller clamp.
➤ Break green seal on full bag line count to 15 to allow flush from full bag to drainage bag.
➤ Clamp drainage bag line.
➤ Open roller clamp to fill.
➤ When filled, clamp bag line.

➤ Close roller clamp and apply a clamp to the fill line.
➤ Open disconnect cap
➤ <b>Apply hand gel</b>
➤ Disconnect yourself and put new cap on

## 5.5

### DISPOSAL OF PERITONEAL DIALYSIS EFFLUENT. (DOHC 2004 p.7)

#### Hospital policy

#### Procedure

➤ Staff must wear gloves and apron when handling effluent at all times
➤ Ensure clamps are on bags before leaving the patients bedside.
➤ <b>CAPD bags</b> to be hung on the designated hooks in the sluice room and allowed to drain.
➤ Remove clamps and place in designated bowl for cleaning.
➤ CAPD bags to be disposed of in the domestic waste only bins.
➤ Flush sluice after each disposal and wash hands.
➤ <b>CCPD</b> Drainage bags to be used with all CCPD machines in hospital.
➤ CCPD trolley to be wheeled to the designated bathroom (main bathroom on corridor).
➤ CCPD drain bags to be unclamped over the toilet and allowed to drain into same.
➤ Flush toilet after each disposal and wash hands.
➤ CCPD dialysis bags and drain bag to be disposed of in the domestic waste only bin in the bathroom.
➤ <b>If the patient has a Blood Borne Virus where possible to be nursed in a side room</b>
➤ The entire CAPD and APD closed circuit to be disposed of in the zulu bin. <b>Do not empty effluent.</b>
➤ Zulu bin to be provided for disposal of all peritoneal dialysis bags. Same changed after each APD circuit.
➤ If side rooms not available or patient needs to be nursed in the high dependency area, Zulu bin to kept beside patients bed.

### **Disposal of waste when patient is at home.**

**Patients at home:** Empty cardboard boxes to be flattened and disposed of in your refuse/recycle bin/centre.

**Patients using CAPD** Ensure bags tightly clamped after use.

Use a dedicated scissors and cut the bags, emptying the effluent down the toilet.

Flush the toilet after use.

Dispose of the bag and lines in a bag then into the refuse sack (Double bagging) then into the wheelie bin.

Ensure hands are washed post disposal.

**Patients using CCPD** – Use drain bags and wheel to and drain into the toilet the next morning.

Where drain bags not appropriate drain lines may be used and effluent drained directly from the machine into the shower plug hole.

When shower plug is used it must be cleaned daily and disinfected using standard bleach based disinfectant. (As the concentration of bleach in these products varies patients should be advised to follow instructions for surface disinfection on the label)

CCPD bags and lines to be disposed of into a bag then into the refuse (Double bagging) then into the wheelie bin.

#### **Patients positive for blood borne viruses on CAPD/CCPD**

Waste should be disposed of as healthcare risk waste – Special arrangements need to be put in place with the patients local health clinics to allow this process.

**CAPD Patients** should dispose of their dialysis bags without emptying the effluent i.e directly into the health care waste bin

**CCPD Patients** Should use drain lines which should be secured

#### **Safe Management of PD fluid spillage**

- (1) Wear Gloves
- (2) Soak up fluid using disposable paper towels
- (3) Wash area using bleach based cleaner
- (4) Dry the area
- (5) Dispose of gloves and paper appropriately
- (6) Wash hands

**5.6****CARE OF A PATIENT WITH PERITONITIS (ISPD 2005)****Equipment**

Drain Bag  
 Clamps x 4  
 2 Peritoneal dialysate manual bags 1.36% (Dianeal / Physioneal)  
 Dressing pack x 2  
 Sharps bin.  
 Aqueous povidine iodine (antiseptic).  
 Rocket tube, CBC tube, Aerobic blood bottle

**Procedure**

Monitor vital signs 4 hourly or as required and treat appropriately

Assess patients level of pain and administer analgesia as prescribed

Using a 3 litre manual drain bag, drain out the peritoneal effluent observing for cloudiness.

Effluent sample to be obtained using 1x rocket tube, 1 CBC Bottle & 1 blood culture bottle

Aerobic if patient not on antibiotics

Anaerobic bottle if patient is on antibiotic treatment.

Sample port , Rocket Tube, CBC Bottle and Blood Culture Bottle to be soaked in aqueous povidine iodine (antiseptic) solution for 5 minutes

Sample to be taken at the bedside using aseptic technique with sterile field and equipment.

Order patient sample labels for; fluid microscopy cult & sens. and three stickers print

Flush peritoneal cavity with 500 mls of dialysate 1.36% , to be repeated 4 times.

A 2 litre bag of dialysate 1.36% with the antibiotic added is used for final exchange

Commence patient on 4 hourly exchanges x 1.36% unless otherwise specified.

**Procedure**

Observe exit site and obtain swab if red/inflamed/oozing and send for C&S.

Try to identify underlying cause of infection and re-educate patient and family on aseptic technique.

Record peritonitis episode on clinical vision and on the manual record.

**5.7****CHANGE OF TRANSFER SET (Kredit el AL 2006 p.631)**

- Patients transfer set to be changed routinely every six months
- When transfer set is damaged / contaminated it must be changed immediately as per procedure outlined below.

**N.B** An exchange must be performed if the transfer set is changed due to contamination. Prophylactic Antibiotic treatment is required vancomycin 1g IP (check allergies)

**EQUIPMENT:**

- Sterile trolley
- Sterile dressing drape
- Minor surgery drape
- Aqueous povidine iodine (antiseptic) solution (**Molzahn 2006 p.631**)
- Blue clamp (bottom of trolley)
- Sterile gauze
- Transfer set (minicap/UV flash)
- Sterile gloves

***Procedure***

Set up sterile trolley with the above equipment on the bottom shelf  
clamp tenckhoff above the titanium

**Wash hands**

Open dressing drape onto trolley

Open above equipment onto the dressing drape

**Wash hands and apply sterile gloves**

Apply minor surgical drape over patient and expose tenckhoff

Prepare new transfer set, close the roller clamp and apply mini cap

Divide gauze 3/2

Apply Aqueous povidine iodine (antiseptic) to 3 pieces of gauze

Hold tube with one dry piece of gauze

Apply Aqueous povidine iodine (antiseptic) soak to titanium adaptor for 5 minutes

<b>Procedure</b>
Dry excess aqueous povidine iodine (antiseptic) from around the titanium
use two fresh pieces of gauze to disconnect line from the titanium
Apply new transfer set securely
Ensure tube securely anchored
Document procedure in Clinical Vision and patients nursing notes

**5.8****CHANGE OF TITANIUM ADAPTOR**

NB. If Patient notices tenckhoff is damaged at home inform them to clamp above damaged area and attend hospital straight away.

**N.B** An exchange must be performed if the titanium adaptor is changed due to contamination or damage. Prophylactic Antibiotic treatment is required vancomycin 1g IP (check allergies)

**EQUIPMENT:**

- Sterile trolley
- Sterile dressing drape
- Minor surgery drape
- Aqueous povidine iodine (antiseptic) solution
- Blue clamp (bottom of trolley)
- Sterile gauze
- Transfer set (minicap/UV flash)
- Titanium adaptor
- Sterile gloves
- Sterile scissors

<b>Procedure</b>
Set up sterile trolley with the above equipment on the bottom shelf
clamp tenckhoff above the damaged area if not already performed
wash hands
Open dressing drape onto trolley
Open above equipment onto the dressing drape
Wash hands and apply sterile gloves
Apply minor surgical drape over patient and expose tenckhoff
Prepare new transfer set, close the roller clamp and apply mini cap
Divide gauze 3/2
Apply Aqueous povidine iodine (antiseptic) to 3 pieces of gauze
Hold tube with one dry piece of gauze

<b>Procedure</b>
Apply Aqueous povidine iodine (antiseptic) soak to titanium adaptor and around the damaged area for 5 minutes
Dry excess aqueous povidine iodine (antiseptic) from around the titanium
Using sterile scissors cut above the damaged area
Apply protective sheath from the titanium pack
Apply the titanium ensuring it meets with the tube
Sheath to be twisted onto titanium
Apply new transfer set securely to the titanium adaptor
Ensure tube securely anchored
Document procedure in Clinical Vision and patient's nursing notes

**5.9****Removal of Transfer Set****EQUIPMENT:**

- Sterile trolley
- Sterile dressing drape
- Minor surgery drape
- Aqueous povidine iodine (antiseptic) solution
- blue clamp (bottom of trolley)
- sterile gauze
- Yellow Bung
- Sterile gloves

<b>Procedure</b>
Set up sterile trolley with the above equipment on the bottom shelf
Clamp tenckhoff above titanium adaptor.
Wash hands
Open dressing drape onto trolley
Open above equipment onto the dressing drape
Wash hands and apply sterile gloves
Apply minor surgical drape over patient and expose tenckhoff with transfer set.
Prepare yellow bung
Divide gauze 3/2
Apply Aqueous povidine iodine (antiseptic) to 2 pieces of gauze
Hold tube with one dry piece of gauze
Apply Aqueous povidine iodine (antiseptic) soak to titanium adaptor for 5 minutes
Dry excess aqueous povidine iodine (antiseptic) from around the titanium and discard gauze.
Using a new dry gauze hold and remove transfer set.
Apply Yellow bung
Ensure tube securely anchored

<b>Procedure</b>
------------------

Document procedure in Clinical Vision and patient's nursing notes
---

**6.0**

**PROCEDURE FOR INTRA-PERITONEAL  
ADMINISTRATION OF MEDICATIONS**

**INDICATIONS:** This procedure is carried out when IP medication are required.

IP medications are normally given into a manual bag

**EQUIPMENT:**

Sterile trolley  
Dressing pack  
IP medication (See medication dose recommendation below)  
Relevant dilution agents  
Relevant sterile needles and syringes  
Sterile gloves  
Dialysate bag  
Aqueous povidine iodine (antiseptic) solution

**PROCEDURE**

Set up trolley with the above equipment
---

Wash hands and apply sterile gloves
-------------------------------------

Draw up medication as charted
-------------------------------

Soak dialysate bag port for 5 minutes with aqueous povidine iodine solution
---

Soak medication port for 5 minutes with aqueous povidine iodine solution
--

Draw up medication as prescribed.
-----------------------------------

Change needles
----------------

Inject medication into port on dialysate bag and shake bag
--

Continue as per manual exchange.
----------------------------------

Document on drug kardex and dialysis flow sheet.
--



**PROCEDURE****Unblocking a tenckhoff catheter with medication(Heparin, Urokinase, TPA).**

Clamp tenckhoff catheter above titanium

Remove the transfer set as per hospital policy 5.7

Apply medication syringe to end of titanium, remove clamp using sterile gauze and gently attempt to flush medication into tube.

Re-clamp catheter prior to removing syringe using sterile gauze.

Apply the new transfer set to the tenckhoff tube as per hospital policy 5.7.

Perform flush with 300mls dialysate solution and monitor inflow/outflow and effluent.

If flushing unsuccessful inform medical team for further instructions

**7.0 Distribution**

A copy of the policy will be circulated to the relevant areas by the Divisional Nurse Manager or Medical Consultant. The Clinical Nurse Manager and Consultant in each area is responsible to ensure all staff access and read the policy. The policy will also be available on the renal intranet webpage.

**8.0 Filing**

The master copy will be filed in the Divisional Nurse Managers office.

**9.0 Review**

This policy will be reviewed in two years or amended sooner if required.

**10.0 Superseded/ Obsolete Documents**

This document supersedes previous Peritoneal Dialysis guidelines developed in August 2002 which were updated in April 2007-February 2008.

## Appendix 1 Guidelines for Commencing a Peritoneal Dialysis Prescription

### **Commencing Fluid**

All new patients to commence using Dianeal PD4

Physioneal is commenced when infusion or drainage pain does not resolve.

### **Commencing a Last Bag Option**

All new patients to complete a 24 hour urine collection when training commences.

Urine output > 1000 mls No last bag necessary.

Urine output < 1000 mls a last bag option is necessary and Extraneal™ is used.

All patients using CAPD please use Extraneal™ as the overnight dwell.

#### Guideline for using Extraneal™ (Baxter 2007)

All patients using Extraneal™ to be given a Baxter safety pack™

Diabetic patients must have their capillary blood glucose machines checked by the diabetic nurse service to assess compatibility of test strips with the use of Extraneal™.

### **Commencing Fill volume**

Fill volume commences at 500mls and increases in increments as per patients medical

condition allows.

Max fill volume as per body surface area and Baxter weight guideline when on APD

2L < 1.7m<sup>2</sup> 2 – 2.5 L 1.7-2 m<sup>2</sup> 2.5 – 3 L > 2 m<sup>2</sup>

### Commencing Time

- Time 8 hrs x 4 cycles = 1.31 mins dwell (therefore assuming High Average Transporter).
- Aim to change programme as necessary after first PET test.
- PET test after 6 – 8 weeks of stable therapy and annually thereafter
- KT/V are recorded 4 monthly and change prescription of dialysis as necessary or  $KT/V \leq 1.7$ .

## Appendix 2 Recommended Intra-peritoneal Medication dosages

### Antibiotics IP (also see appendix 3 for specific culture results)

*Vancomycin* 2grams IP stat and 1gram IP as per levels re-dosing with level 20 or below (ISPD 2005)

*Gentamycin* 40mgs IP stat and repeat as per levels (level <2) . (ISPD 2005)

*Teicoplanin* 15mg per kg IP stat with levels and repeat day 5 or 400mg BD IP. (ISPD 2005)

### POTASSIUM IP

KCL vials 2-4 mEq per litre of dialysate fluid IP (Lancaster 2001, Kredit et Al 2006, p.647 Handbook of dialysis p338)

### INSULIN IP

Total daily insulin divided between exchanges, with additional insulin dose as per glucose concentration of the dialysate bag. (Molzahn 2006 p. 647 , Levy et Al 2001 p.412,)

Extra 2 iu per 1.36% glucose bag  
4 iu per 2.27% glucose bag  
6 iu per 3.86% glucose bag

Check blood sugar level one hour after each exchange.

**Heparin IP** (Lancaster 2001, ISPD 2005, Molzahn 2006 p647, )  
500 iu of heparin per litre of dialysate fluid  
or

1000 iu of heparin per litre of dialysate fluid during peritonitis episode. (*Levy et Al 2001 p287*)

**Urokinase IP** 10,000 iu in 5 mls of sterile water. (*Levy et Al 2001 p287*)

**TPA IP** Tissue Plasminogen Activator no guideline approved to date (*Advances in peritoneal dialysis 2001, 17:249-252,*)

**CT contrast dose to detect PD leak**

PD nurse must inject the contrast as per policy 6.0 (procedure for IP administration of medications).

Dose 100 mls of contrast to 2litres of PD fluid.

The patient should be ambulatory for approx. 30 mins combining walking and sitting pre CT scan.

(Molzahn and Butera 2006, Lancaster et al 2006)

### **APPENDIX 3** Specific Advice on antibiotic prescribing

#### **CONTENTS**

A) EXIT-SITE CARE AND *S. AUREUS* COLONISATION

B) EXIT-SITE AND TUNNEL INFECTIONS

C) ANTIBIOTIC PROPHYLAXIS PRIOR TO LOWER GI ENDOSCOPY

D) PERITONITIS

Fig 1. Empiric therapy

Fig 2 Culture negative peritonitis

Table 2 Guided antibiotic therapy

E) Antibiotic advice

**A) EXIT-SITE CARE AND *S. AUREUS* COLONISATION**

*Staphylococcus aureus* nasal carriage is associated with an increased risk of *S. aureus* exit-site infections, tunnel infections, peritonitis, and catheter loss. A single culture may yield a false negative result since many patients have intermittent nasal carriage.

Positive exit-site culture for *S. aureus* with no evidence of infection (i.e., denoting carriage)

1. Intranasal mupirocin three times per day for 5–7 days
2. Screen subsequently (nasal swab) every 2 months

**B) EXIT-SITE AND TUNNEL INFECTIONS****General points**

- **Exit site swabs must be taken prior to commencement of antibiotic therapy**
- Antibiotic therapy (Table 1) for exit-site / tunnel infections (Definitions - Appendix 1) should always be complimented by intensified exit-site cleaning with povidone iodine or chlorhexidine 2.0%
- *S. aureus* and *P. aeruginosa* exit-site infections are often associated with concomitant tunnel infections and are the organisms that most often result in catheter-infection-related peritonitis; aggressive management is always indicated for these organisms

**Table 1: ANTIBIOTIC THERAPY OF EXIT-SITE AND TUNNEL INFECTIONS**

<b>Empiric therapy</b>	<b>Treatment</b>	<b>Duration of therapy</b>
<b>No previous MSSA/ MRSA/ <i>P. Aeruginosa</i></b>	Flucloxacillin 500mg QDS po	10-14 days
<b>History of <i>P. aeruginosa</i> exit-site</b>	Flucloxacillin 500mg QDS po <i>plus</i> IP gentamicin*	Continue treatment until the

<b>colonisation</b>		exit site appears entirely normal.
		May be >2wks
<b>No improvement by day 3</b>	Admit for IV antibiotics	
<b>No improvement by day 5</b>	Consider catheter removal	

### **C) ANTIBIOTIC PROPHYLAXIS PRIOR TO LOWER GI ENDOSCOPY**

- Endoscopic imaging of the large bowel can result in peritonitis.
- Single dose co-amoxiclav 1.2g should be given at induction prior to procedure (if penicillin allergic contact microbiology).
- *It is important that phosphate-containing enemas and phosphate-containing bowel preparations are avoided in these patients. Klean Prep is the preferred agent for lower GI endoscopy study.*

### **D) PERITONITIS**

#### **Antibiotic management**

- Empiric therapy (Fig 1)
- Culture negative peritonitis (Fig 2)
- Guided antibiotic treatment (Tables 2a-c)

\*Specific advice on use of vancomycin, gentamicin and alternative agents in case of allergy contained in Appendix 2

#### **General points**

- Effluent should be visually inspected daily, to determine if clearing is occurring. If there is no improvement after 48 hours, cell counts and repeat cultures should be done
- Dwell time must be a minimum of 6 hours in patients intermittently dosed with intra-peritoneal antibiotics
- Once culture results and sensitivities are known, antibiotic therapy should be adjusted as appropriate (Tables 2a-c)

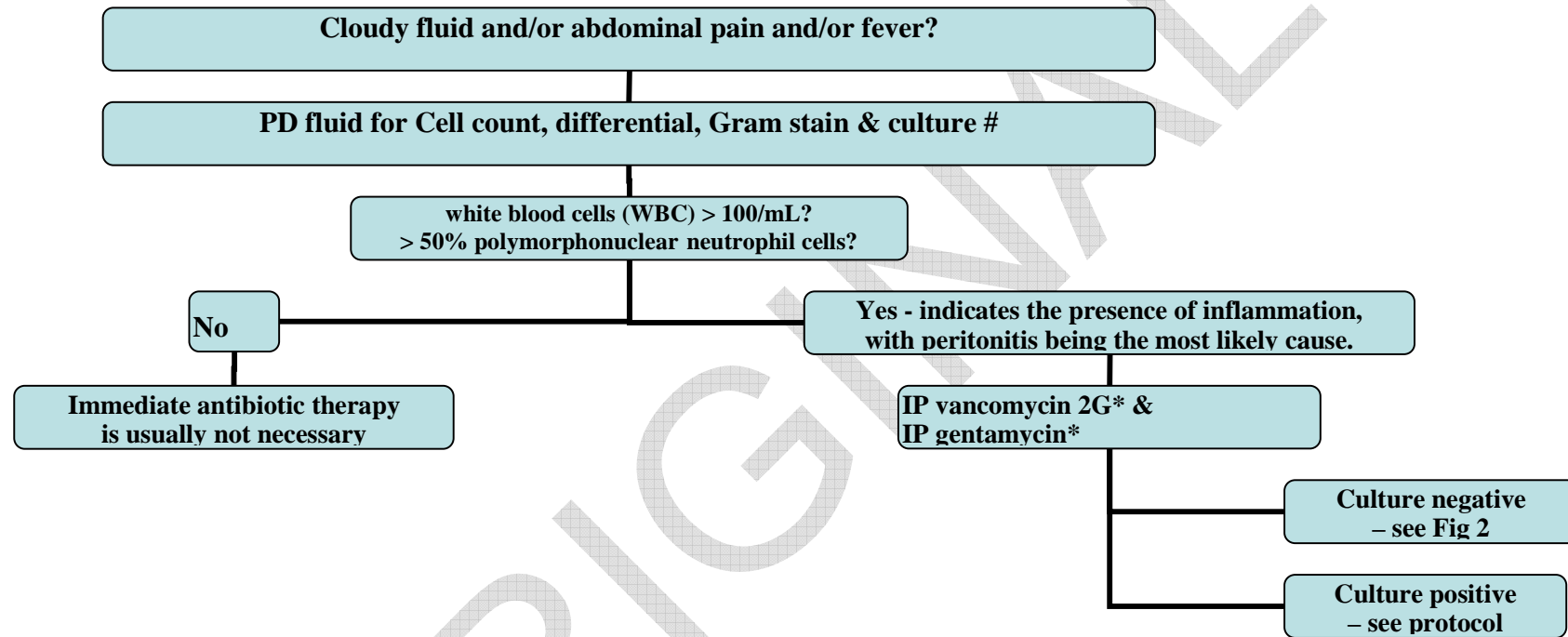
**Indications for catheter removal** (Definitions Appendix 1)

- Relapsing peritonitis
- Refractory peritonitis
- Fungal peritonitis
- Catheter-related peritonitis†

† Patients with an exit-site infection that progresses to peritonitis, or who present with an exit-site infection in conjunction with peritonitis with the same organism, will usually require catheter removal. The general exception is peritonitis due to coagulase- negative staphylococcus, which is generally readily treated.

ORIGINAL

**Fig 1. EMPIRIC THERAPY OF PERITONITIS**

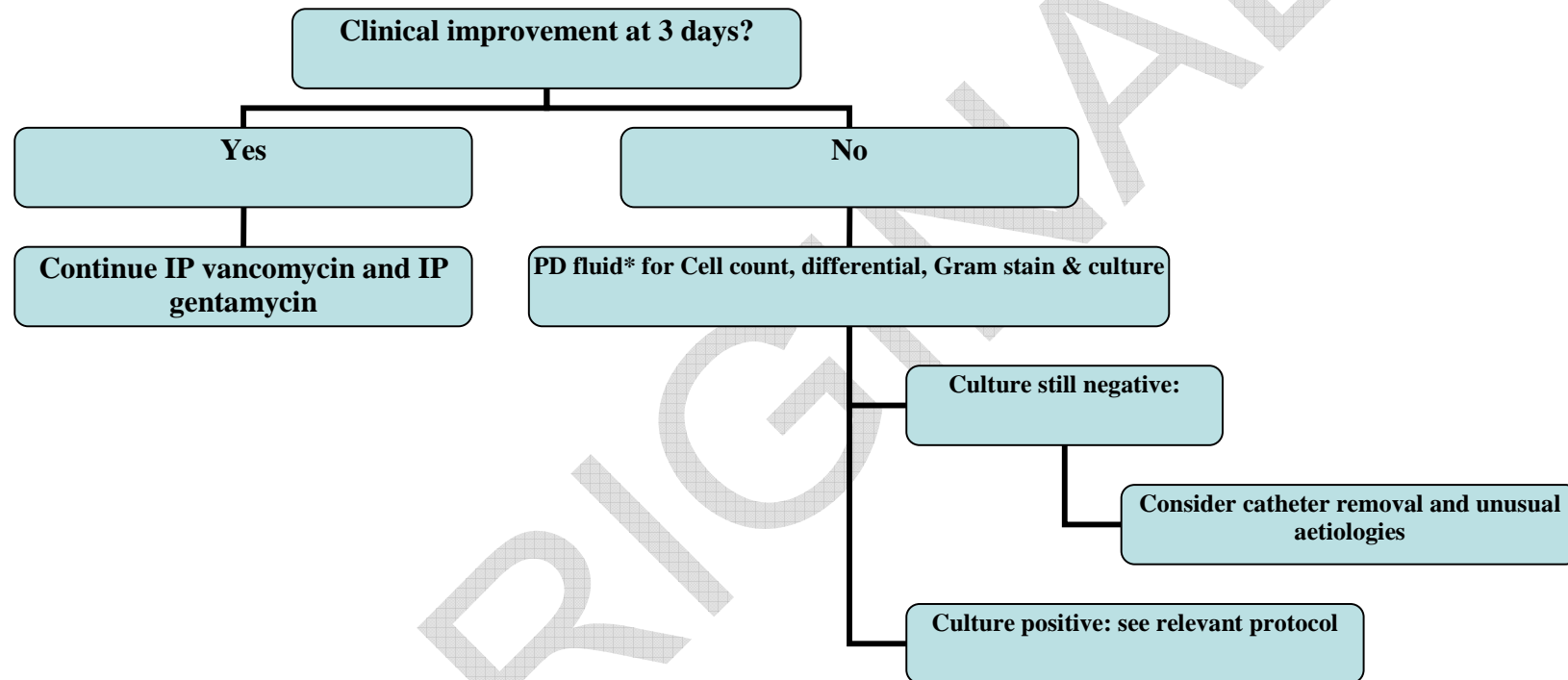


# Dialysate sample should be from a dwell minimum of 1 hour (

\*Appendix 2 for dosing instructions



**Fig 2. CULTURE-NEGATIVE PERITONITIS**



**GUIDED ANTIBIOTIC THERAPY****Table 2a. Gram positive organisms**

<b>Culture</b>	<b>Treatment</b>	<b>Comments</b>	<b>Duration</b>
<i>Streptococci</i>	<b>Sensitive to amoxicillin:</b> Loading dose amoxicillin 250-500 mg/L, maintenance dose 50mg/L in each exchange <b>Resistant to amoxicillin:</b> IP vancomycin*	Evaluate for exit site or tunnel infection	2 weeks
<i>Enterococci</i> <b>vancomycin resistant (VRE)</b>	<b>Sensitive to amoxicillin:</b> Loading dose amoxicillin 250-500 mg/L, maintenance dose 50mg/L in each exchange <i>plus</i> gentamicin* in a separate bag <u>if</u> clinically unstable or not settling by day 3. See Appendix 2 <b>Resistant to amoxicillin:</b> Discuss with microbiology	Outrule intra-abdominal pathology Evaluate for exit site or tunnel infection	3 weeks
<i>S. aureus</i>	IP Vancomycin  If no improvement by day 3 - add second agent (check with microbiology) If no improvement by day 5 - remove catheter	Causes severe peritonitis Very careful attention must be paid to the exit site and tunnel of the catheter. If the episode occurs in conjunction with an exit site infection - the infection will frequently prove refractory in which case the catheter must be removed.	3 weeks – IV therapy for 48-72hrs post resolution of pyrexia
<b>MRSA</b>	IP vancomycin*  If no improvement by day 3 - add second agent (check with microbiology) If no improvement by day 5 remove catheter		
<b>Coagulase-negative staphylococcus</b>	IP vancomycin*	Evaluate for exit site or tunnel infection	2 weeks
<b>Corynebacterium</b>	IP Vancomycin	Evaluate for exit site or tunnel infection	3 weeks

**Table 2b. Gram negative organisms**

<b>Culture</b>	<b>Treatment</b>	<b>Comments</b>	<b>Duration</b>
<i>P. aeruginosa</i>	Check with microbiology re sensitivities before commencing therapy  Two antibiotics should always be used	Consider surgical opinion if unstable  If no clinical improvement after 3 days: 1. Often related to catheter infection ... in such cases a. Catheter removal will be required b. Continue antibiotic therapy for 14 days post removal  2. Consider abdominal CT (?abscess)	3 weeks
<b>Other gram negatives</b> eg: <i>E. coli</i> , <i>Proteus spp</i>	Check with microbiology re sensitivities before commencing therapy	Consider surgical opinion if unstable  If no clinical improvement after 3 days: 1. Repeat cell count, gram stain & culture 2. Consider catheter removal	2- 3 weeks

**Table 2c. Other organisms**

<b>Culture</b>	<b>Treatment</b>	<b>Comments</b>	<b>Duration</b>
<b>Polymicrobial (multiple gram negative organisms and/or anaerobes)</b>	Check with microbiology re sensitivities before commencing therapy	Surgical opinion for all polymicrobial infections  If no clinical improvement after 3 days: 1. Often related to catheter infection ... in such cases a. Catheter removal will be required b. Continue antibiotic therapy for 14 days post removal 2. Consider abdominal CT (?abscess)	3 weeks
<b>Fungal</b>	Stop antibiotics Remove catheter Discuss with microbiology		2-4 weeks
<b>TB</b>	Discuss with microbiology and respiratory medicine	Consider when patient not responding to antibiotic therapy Remove catheter if no clinical improvement	12 months

# Antibiotic advice

## A) Antibiotic dosing

### Vancomycin

First dose 2g, subsequent doses should be 1g unless high clearance predicates 2g intermittent dosing.  
Target range for vancomycin: 15-20mg/l, repeat dosing when serum level <20mg/l

### Gentamicin (Martin)

APD - 0.6mg/kg daily if UO <400mls, 1.0mg/kg daily if UO >400mls (in one >6hr dwell/dy)  
CAPD - 8mg/L loading dose, 4mg/L maintenance dose each dwell

\*IP antibiotics - dwell time of the exchange must be a minimum of 6 hours.

## B) Antibiotic incompatibility

### Amoxicillin / Gentamicin incompatibility

These agents are incompatible in PD fluid necessitating sequential dosing. Gentamicin should be added to dialysate as indicated by serum levels. The interruption to amoxicillin dosing should be compensated for by increasing the amoxicillin maintenance dose to 100mg/L in the dwell immediately preceding gentamicin dwell.

### Quinolones

When given concomitantly with sevelamer or calcium may chelate, resulting in reduced quinolone absorption. Administration of the quinolone should, therefore, be separated from these drugs by at least 2 hours (with the quinolone administered first). If resolution of infection is slow consideration should be given to IV quinolone therapy

### Alternative antibiotics in event of allergy

- Flucloxacillin/amoxicillin → vancomycin
- Vancomycin → contact microbiology



## **APPENDIX 4 – Definitions of Infections**

**Exit site colonisation:** A positive culture in the absence of an abnormal appearance is indicative of colonization rather than infection. Intensifying exit-site cleaning with antiseptics is advised

**Exit site infection:** Purulent drainage with or without erythema of the skin at the catheter-epidermal interface

**Tunnel infection:** Usually occurs in the presence of an exit site infection and may present as erythema, oedema or tenderness over the subcutaneous pathway

**Recurrent peritonitis:** An episode that occurs within 4 weeks of completion of therapy of a prior episode but with a different organism

**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

**Repeat peritonitis:** An episode that occurs more than 4 weeks after completion of therapy of a prior episode with the same organism

**Refractory peritonitis:** Failure of the effluent to clear after 5 days of appropriate antibiotics

**Catheter-related peritonitis:** Peritonitis in conjunction with an exit-site or tunnel infection with the same organism or one site sterile



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