



SW379



Queensland Government

Paediatric Peritoneal Dialysis Peritonitis Clinical Pathway

Facility:

(Affix identification label here)

URN:

Family name:

Given name(s):

Address:

Date of birth:

Sex: M F I

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	Completed	Initial	Time	Date
• Clinically assess the patient	<input type="checkbox"/>			
• If temperature above 38°C collect blood cultures	<input type="checkbox"/>			
• Inspect exit site - Swab site if signs of infection	<input type="checkbox"/>			
• 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)	<input type="checkbox"/>			
• Commence immediate Empiric Treatment using table below	<input type="checkbox"/>			
• Admit/transfer patient if any of the following (tick as appropriate below): <input type="checkbox"/> Fever or <input type="checkbox"/> Significant Pain or <input type="checkbox"/> Unable to perform own dialysis	<input type="checkbox"/>			
• Contact the Paediatric Nephrologist / Peritoneal Dialysis Unit as soon as practical	<input type="checkbox"/>			

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*.

Antibiotic	Initial Dosing SINGLE DWELL ONLY	Subsequent Dosing		
		APD		CAPD
		All cycler exchanges	Daytime dwell	
Cephalosporins - cefepime - cefazolin	500 mg/L	125 mg/L	125 mg/L; increase last fill volume to 50% of usual night time dwell volume	125 mg/L in each dwell
			Usual last fill volume without antibiotic; 0.6 mg/kg daily in 6 hr manual exchange before starting APD	0.6 mg/kg daily in a single 6 hr dwell
Gentamicin*	0.6 mg/kg (max 50mg)	-		
Vancomycin*	30 mg/kg (max 1.5g)	-	-	-

* 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

Name (print)	Designation	Signature	Date



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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 → Plan 1 Go to Page 3
- Enterococcus/Streptococcus → Plan 2 Go to Page 4
- Other gram positive organisms → Plan 3 Go to Page 5
- Pseudomonas species → Plan 4 Go to Page 6
- Single gram-negative → Plan 5 Go to Page 7
- Polymicrobial peritonitis day 1–3 → Plan 6 Go to Page 8
- Culture negative on day 1 & 2 → Plan 7 Go to Page 9
- If Gram stain shows fungal elements, remove catheter** → Plan 8 Go to Page 10

Consider re-training after successful peritonitis treatment

Plan of Care

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Medical Officer / Nurse Practitioner
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Signature:

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Plan of Care 1 This plan of care is only valid if signed by a medical officer/nurse practitioner:

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Staphylococcus aureus on culture

Flucloxacillin-sensitive or nMRSA *S. aureus*

Methicillin resistant *S. aureus* (MRSA)

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

- 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

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Plan of Care 2 This plan of care is only valid if signed by a medical officer/nurse practitioner:

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Date:

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

No clinical improvement by 5 days on appropriate antibiotics

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

- Remove catheter
- Patient to remain on treatment for 14 days after catheter removal

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Plan of Care 3 This plan of care is only valid if signed by a medical officer/nurse practitioner:

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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

No clinical improvement by 5 days on appropriate antibiotics

- Continue antibiotics
- Duration of therapy: 14 days

- Remove catheter
- Patient to remain on treatment for 14 days after catheter removal

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Plan of Care 4 This plan of care is only valid if signed by a medical officer/nurse practitioner:

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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

With catheter infection (exit-site/tunnel) current or prior to peritonitis

- Remove catheter
- Patient to remain on treatment for 21 days after catheter removal

No clinical improvement by 5 days on appropriate antibiotics

- Remove catheter
- Patient to remain on treatment for 21 days after catheter removal

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Plan of Care 5 This plan of care is only valid if signed by a medical officer/nurse practitioner:

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Other single gram-negative organism on culture

***E. coli*, Proteus, Klebsiella**

Stenotrophomonas

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

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

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

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

Clinical improvement

No clinical improvement by 5 days on appropriate antibiotics

Clinical improvement

- Continue antibiotics
- Duration of therapy 21 days

- Remove catheter
- Patient to remain on treatment for 14 days after catheter removal

- Continue antibiotics for 28 days
- No need to change

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Plan of Care 6 This plan of care is only valid if signed by a medical officer/nurse practitioner:

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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 21days

Without exit site or tunnel infection

- Continue antibiotics
- Duration of treatment for a minimum 21 days

With exit site or tunnel infection

- Remove catheter

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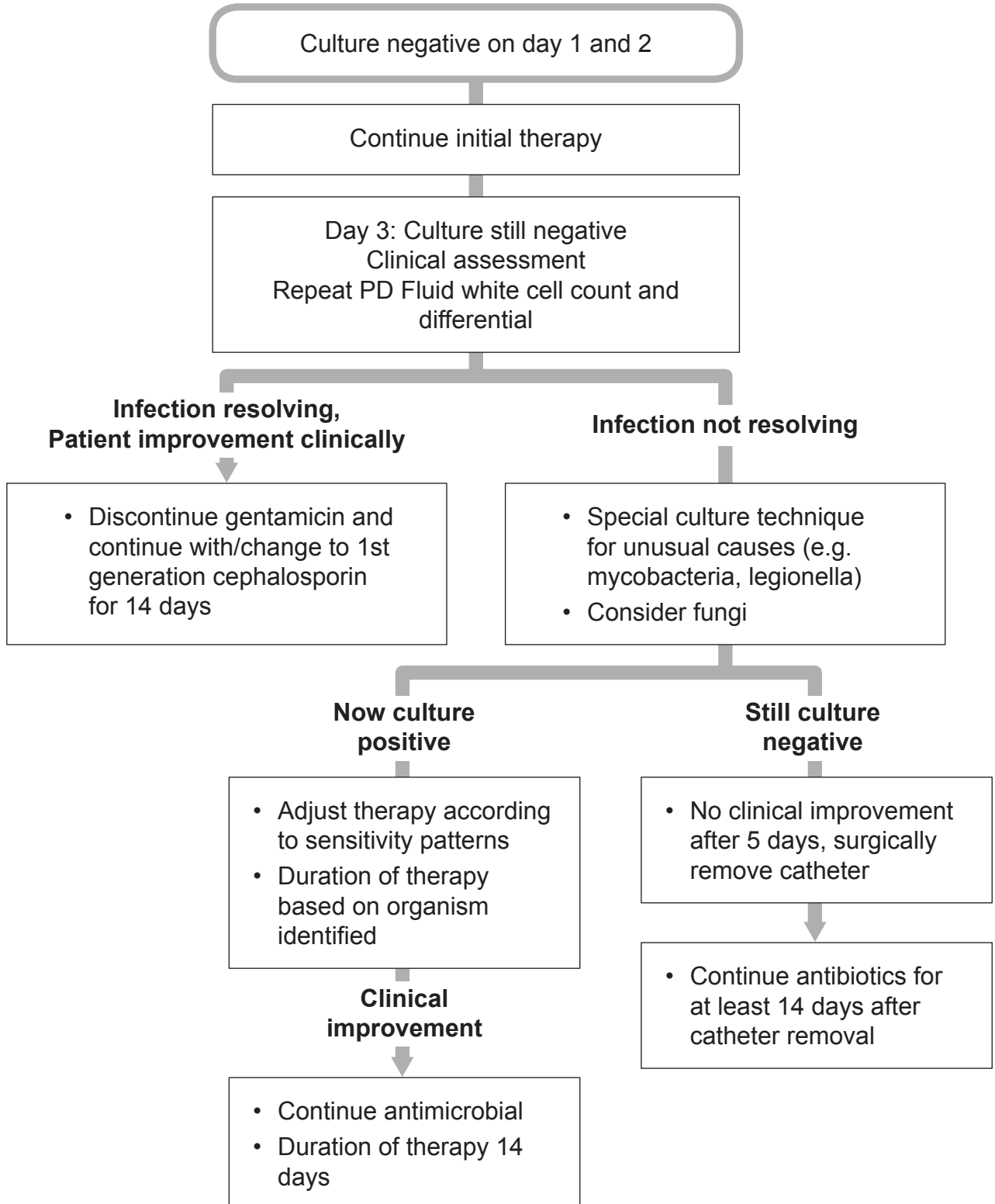
Plan of Care 7 This plan of care is only valid if signed by a medical officer/nurse practitioner:

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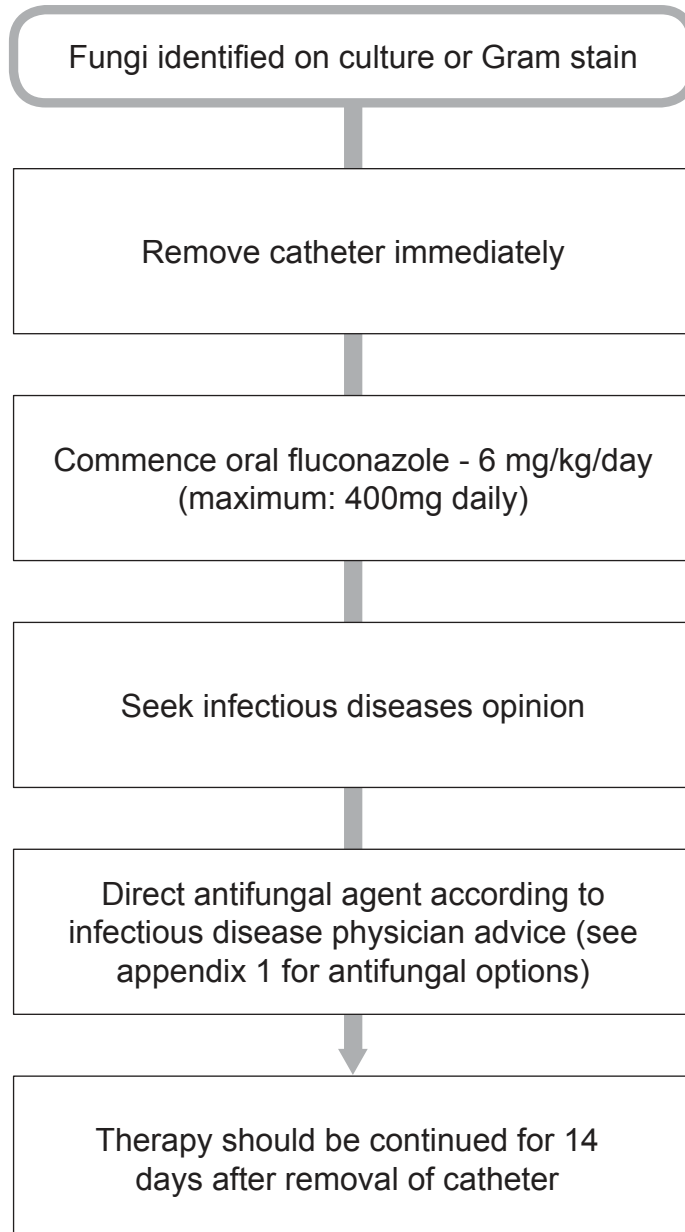
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Appendix 1

Antibiotic Dosing Recommendations for the Treatment of Peritonitis			
All doses intraperitoneal unless otherwise stated			
	Continuous ^a		Intermittent ^a
	Loading dose	Maintenance dose	
Aminoglycosides (IP)^b			
Gentamicin	-	-	0.6 mg / kg (max 50mg) ^c
Cephalosporins (IP)			
Cefazolin	500 mg / L	125 mg / L	-
Cefepime	500 mg / L	125 mg / L	-
Cefotaxime	500 mg / L	250 mg / L	-
Ceftazidime	500 mg / L	125 mg / L	-
Glycopeptides (IP)^b			
Vancomycin	1000 mg / L	25 mg / L	Loading dose 30 mg / kg (max 1.5g) Repeat dosing 15 mg / kg based on levels ^d
Teicoplanin	400 mg / L	20 mg / L	15 mg / kg every 5-7 days
Penicillins (IP)^b			
Ampicillin	-	125mg / L	-
Others			
Aztreonam (IP)	1000 mg / L	250 mg / L	-
Imipenem-cilastin (IP)	250 mg / L	50 mg / L	-
Linezolid (PO)	<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		
Metronidazole (PO)	10 mg / kg / dose given three times daily (maximum: 1.2 g daily)		
Rifampicin (PO)	5 - 10 mg / kg / dose given twice daily (maximum: 600 mg daily)		
Antifungals			
Fluconazole (IP, IV or PO)	6 mg /kg every 24h (maximum: 400mg daily)		
Caspofungin (IV only)	70 mg / m ² on day 1 (maximum: 70 mg daily)	50 mg / m ² daily (maximum; 50 mg daily)	

IP = intraperitoneal; IV = intravenously; PO = orally

- ^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.

Adapted from the International Society for Peritoneal Dialysis. Dialysis- ISPD Guidelines / Recommendations. Consensus Guidelines for the Prevention and treatment of catheter-related infections and peritonitis in pediatric patients receiving peritoneal dialysis: 2012 update