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Queensland Government	URN:	,	
Paediatric	Family name:		
Peritoneal Dialysis	Given name(s):		
Peritonitis Clinical Pathway	Address:		
Facility:	Date of birth:	Sex: M	FI
Clinical pathways never replace clinical judgement. Care outlined in	this pathway must be varied if it is n	ot clinically appropriate for t	the individual clier
This form is to be used to assess nationts on porit	oneal dialysis	ty offlyont Abdom	ninal nain

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

Assessment	Completed	Initial	Time	Date
Clinically assess the patient				
If temperature above 38°C collect blood cultures				
 Inspect exit site Swab site if signs of infection and send for M/C/S and fungal culture 				
 Collect sterile samples of PD effluent fluid (60 mL) to ensure timely culture for analysis Send specimen to Pathology QLD Pathology request: Sterile fluid culture + fluid in blood culture medium for M/C/S, fungal culture, WCC & differential. Body site: Peritoneal dialysis fluid 				
Commence immediate Empiric Treatment using table below				
 Admit/transfer patient if any of the following (tick as appropriate below): Fever or Significant Pain or 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

- MRSA negative patients use cefepime as monotherapy or cefazolin + Gentamicin*, if cefepime not available.
- Known/suspected MRSA positive patients or immediate Penicillin/ Cephalosporin hypersensitivity (e.g. anaphylaxis) use Vancomycin + Gentamicin for empiric treatment*.

Antibiotic		SINGLE DWELL ONLY	Subsequent Dosing				
				APD			
			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		
Gentamicin*	doses intraperitoneal	0.6 mg/kg (max. 50mg)	-	Usual last fill volume without antibiotic; 0.6 mg/kg daily in 6 hour manual exchange before starting APD	0.6 mg/kg daily in a single 6 hour dwell		
Vancomycin*	¥	30 mg/kg (max. 1.5g)	-	-	-		
*If anguing Vancomyoin or Contamicin treatment required: Vancomyoin, check blood level on day 3 and re dose							

For duration of antibiotic treatment, use antifungal prophylaxis:

Nystatin <u>OR</u>	Less than 5 years of age: 200,000 units (2 mL) four times a day (orally or via NGT). If able to swallow tablets: 500,000 units (1 tablet) four times daily.			
Miconazole 2% oral gel	2.5 mL to 5 mL four times a day, applied to oral mucosa (gums and tongue). If NGT in-situ: Use Miconazole gel topically on oral mucosa and give Nystatin liquid via NGT.			

Fever or Significant Pain or Unable to perform own dialysis • Contact the Paediatric Nephrologist / Peritoneal Dialysis Unit										
Contact the Paediatric Nephrologist / Peritoneal Dialysis Unit as soon as practical										
Dosing regim	Dosing regimen for empiric treatment of suspected peritonitis in children on PD NB. All antibiotics given intraperitoneally (IP). Empiric therapy cover first 48 to 72 hours of therapy only.									
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Antibiotic		Initial Dosing SINGLE DWELL ONL	Y	Subs	sequent Dosing	1				
				APD			CA	APD T		
			All cycler exchanges	s C	aytime dwell			}		
Cephalosporins - cefepime - cefazolin 500 mg/L		125 mg/L	volum	g/L; increase la le to 50% of us time dwell volu	ual		mg/L ch dwell			
Cephalosporins - cefepime - cefazolin Gentamicin* 500 mg/L 500 mg/kg (max. 50mg)		-	Usual la: antibio in 6 hou befo		daily ange	in a	APD mg/L ch dwell l/kg daily single ur dwell			
Vancomycin*	¥	30 mg/kg (max. 1.5g)	-		-			- 2		
Vancomycin if serur	n leve	or Gentamicin treatment of the state of the	- check level daily and				nd re-dos	- C		
	1	ic treatment, use antifu								
Nystatin <u>OR</u>	Nystatin Less than 5 years of age: 200,000 units (2 mL) four times a day (orally or via NGT). If able to swallow tablets: 500,000 units (1 tablet) four times daily.									
Miconazole 2% oral gel 2.5 mL to 5 mL four times a day, applied to oral mucosa (gums and tongue). If NGT in-situ: Use Miconazole gel topically on oral mucosa and give Nystatin liquid via NGT.										
Signature Log) To	o be completed by all sta	aff who initial this pathwa	ау						
Name (print)			•	Signature			Date	7		



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Paediatric Peritoneal Dialysis Peritonitis Clinical Pathway Empiric Treatment Plan of Care Immediate Treatment following Culture Results If PD Fluid WCC above 0-6 hours $100 \times 10^6/L$ of which 50% Start intraperitoneal are polymorphonuclear antibiotics as soon as neutrophils possible · Allow to dwell for at least 6 hours • Ensure **Diagnosis of** Gram-positive and Peritonitis is made Gram-negative coverage Continue usual PD regimen **Antibiotic Regimen depends** on the results of the culture. Follow the links below to 6-8 hours locate the correct regimen. · Determine and Staphylococcus aureus = ☐ Plan 1 Go to Page 3 prescribe ongoing antibiotic treatment Plan 2 Go to Page 4 Enterococcus/Streptococcus = Ensure follow-up Other Gram-positive organisms= Plan 3 Go to Page 5 arrangements are Pseudomonas species = Plan 4 Go to Page 6 clear or patient admitted Single Gram-negative = ☐ Plan 5 Go to Page 7 · Await sensitivity Polymicrobial peritonitis day 1-3 = Plan 6 Go to Page 8 results Culture negative on day 1 & 2 = ⇔ ☐ Plan 7 Go to Page 9 If Gram stain shows fungal = Plan 8 Go to Page 10 elements, surgically remove PD catheter **Transfer** If patient remains Consider re-training after unwell may need to successful peritonitis be transferring to treatment other facility

Signature: Medical Officer / Nurse Practitioner (print name): Date:

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Peritonitis Clinical Pathway	Dat	ate of birth: Sex: M F				
Plan of Care 1 This plan of care is onl	y va	alid if signed by a medical officer/nurse practitioner:				
Medical Officer / Nurse Practitioner (print name):		Signature: Date:				
Staphyloco	сси	us aureus on culture				
Flucloxacillin and/or Cefazolin		Methicillin resistant S.aureus				
sensitive S.aureus		(MRSA)				
	_					
Cease Gram-negative coverage		Cease Gram-negative				
(Gentamicin or Cefepime)		coverage (Gentamicin or				
No allergies: Continue Gram-		Cefepime)				
positive coverage (Cefazolin IP)		Continue Gram-positive coverage (Vancomycin IP) Check Vancomycin level on				
 Cephalosporin immediate type hypersensitivity: Seek Infectious 						
Diseases (ID) opinion.		Check Vancomycin level on day 3 and re-dose if serum				
Assess exit site again		level <15 mg/L.				
• Access clinical in	mnr	rovement, repeat dialysis				
		and culture at days 3–5				
		and send for cell count				
and culture at da						
		No olivical improvement by E days				
Clinical improvement		No clinical improvement by 5 days on appropriate antibiotics				
▼	\neg	V				
- Continue antibiotics		Surgically remove PD catheter				
- Duration of therapy 21 days		Continue antibiotics minimum 14 days				



Paediatric Peritoneal Dialysis Peritonitis Clinical Pathway

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Medical Officer / Nurse Practitioner (print name):

Signature: Date:

Enterococcus or Streptococcus sp. on culture

- · Discontinue empiric treatment
- Start continuous ampicillin IP in each PD dialysate bag
- If ampicillin resistant or immediate type penicillin hypersensitivity, change to Vancomycin IP alone.
- Check blood level on day 3 and re-dose Vancomycin if serum level <15 mg/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
- PD effluent bags are clear

Clinical improvement

- · Continue antibiotics
- · Duration of therapy:
 - 14 days (streptococcus)
 - 21 days (enterococcus)

No clinical improvement by 5 days on appropriate antibiotics

- Surgically remove PD catheter
- Patient to remain on treatment for 14 days, after PD catheter removal



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Peritoneal Dialysis	Address	S:		
Peritonitis Clinical Pathway		birth:	Sex: M	FI
Plan of Care 3 This plan of care is only	ly valid	if signed by a medical offic	er/nurse pract	itioner:
Medical Officer / Nurse Practitioner (print name):	Sig	gnature:	Date:	
· ·		organisms including Staphylococcus on		
	cultu	ure		
 Stop Cefepin Gram-positiv sensitivities Stop Gram-n (Gentamicin) 	e cove	erage based on		
Assess clinical repeat dialysis culture at days • Symptoms • PD effluent	effluer 3–5: resolv	nt cell count and		
Clinical improvement	_	No clinical improve on appropriate	-	ays
Continue antibioticsDuration of therapy: 14 days		 Surgically remove Patient to remain of 14 days after PD c 	n treatment	for



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Peritonitis Clinical Pathway	Date of birth:	Sex: M F I
Plan of Care 4 This plan of care is onl	y valid if signed by a medical off	icer/nurse practitioner:
Medical Officer / Nurse Practitioner (print name):	Signature:	Date:
Pseudomonas sp Without PD catheter infection (exit-site/tunnel)	(e.g. <i>aeruginosa</i>) on culture With PD catheter in tunnel) current or p	•
Treat with Cefepime IP or Ceftazidime IP if sensitive - otherwise seek ID advice	Surgically remove Patient to remain for 21 days after removal	on treatment
Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5: • Symptoms resolved • PD effluent bags are clear		
Clinical improvement	No clinical improvement by	/

- · Continue antibiotics
- · Duration of therapy: 21 days*
 - *Adult ISPD 2016 guidelines recommend up to 28 days treatment

5 days on appropriate antibiotics

- · Surgically remove PD catheter
- Patient to remain on treatment for 21 days after PD catheter removal

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Paediatric Peritoneal Dialysis Peritonitis Clinical Pathway Plan of Care 5 This plan of care is only	Family name: Given name(s): Address: Date of birth:	Sex: M F II		
Medical Officer / Nurse Practitioner (print name):	Signature:	Date:		
Other single Gram-	-negative organism	on culture tenotrophomonas		
 Adjust antibiotics to sensitivity pattern If Cefepime IP is used empirically consider rationalizing therapy to Cefazolin IP if sensitive 	Oral Trimethoprim / Sulphamethoxazole 4 mg/kg of trimethoprim component twice daily orally (max. 160 mg/dose)			
Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5: • Symptoms resolved • PD effluent bags are clear	repeat of count a	clinical improvement, dialysis effluent cell nd culture at days 3–5: otoms resolved ffluent bags are clear		
 Continue antibiotics Duration of therapy 21 days 5 days on a Surgic PD car Patien treatm 	t to remain on ent for 14 days D catheter			



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Paediatric Peritoneal Dialysis Peritonitis Clinical Pathway Plan of Care 6 This plan of care is on Medical Officer / Nurse Practitioner (print name):	Family name: Given name(s): Address: Date of birth: Iy valid if signed by a medical Signature:	Sex: M F I officer/nurse practitioner:
Polymicrobial Multiple Gram-negative organisms or mixed Gram-negative/Gram-positive	MILLITINIA (=ram_n/	ositive organisms
Consider GI problem	Touch contami Consider PD c	
 Add oral metronidazole 7.5 mg/kg (max. 400 mg) twice daily Discuss ongoing antibiotic management with Infectious Disease Consultant 	Continue thera sensitivities – du	
Obtain urgent surgical assessment	Without exit site or tunnel infection	With exit site or tunnel infection
In case of laparotomy indicating intra-abdominal pathology/ abscess, surgically remove PD catheter	Continue antibiotics for a minimum duration of 21 days.	Surgically remove PD catheter
Continue antibiotics for minimum duration of 21 days		



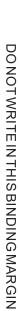
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Paediatric Peritoneal Dialysis Peritonitis Clinical Pathway			Family name: Given name(s): Address: Date of birth: Sex: M F I				
Plan of Care 7 This p		va	lid if signed by a m		urse practitio	oner:	
			ve on day 1 and initial therapy	2			
	Day 3: Culture still negative Clinical assessment Repeat PD Fluid white cell count and differential			and			
Infection respection patient improvir	-		Infe	ction not res	olving		
 Cease Gentamicin Continue with or change to Cefazolin IP for 14 days 			for unus	culture technicual causes (e.cteria, legione r fungi	g.		
	Now cul positiv		re		l culture egative		
 Adjust therapy to sensitivity p Duration of the 		patterns afte nerapy based re		after 5 da	al improvem ays, surgica PD catheto	ally	
	on organism id		iuilea	Continue	antibiotics	for	

improvement

- Continue antibiotic
- Duration of therapy: Minimum 14 days dependent on organism identified

at least 14 days after PD catheter removal





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Peritonitis Clinical Pathway	Date of birth: Sex: M F I
Plan of Care 8 This plan of care is on	nly valid if signed by a medical officer/nurse practitioner:
Medical Officer / Nurse Practitioner (print name):	: Signature: Date:
Fungi identifie	ed on culture or Gram stain
Surgically remo	ove PD catheter immediately
Commo	
	ence oral fluconazole g dose: 12 mg/kg daily
(max. 800	0 mg) on days 1 and 2,
	nance dose of 6 mg/kg daily
,	mg) and consider TDM. Seek ID advice.
Direct antifu	fungal agent according to
	ease physician advice (see x for antifungal options)
	should be continued for 14 days after removal of
	catheter

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

Appendix

Intraperitoneal antimicrobial dosing recommendations for patients with PD-associated peritonitis				
Antimicrobial	Intermittent (per exchange, once daily)	Continuous (LD = loading dose, exchange dwell of 3 to 6 hours) (MD = maintenance dose)	PD dialysis solution stability at room temperature and 37 degrees C (1, 2)	Drug-Heparin compatibility# (at 37 degrees C)
Aminoglycosides				
Gentamicin	0.6 mg/kg (max. 50 mg)	-	Stable for up to 4hrs in P2 and El	Incompatible
Tobramycin	0.6 mg/kg (max. 50 mg)	-	Stable for up to 4hrs in P2 and El	Incompatible

Aminoglycosides and penicillins/cephalosporins should not be mixed in the same PD bag due to the potential inactivation of the aminoglycoside. Check level daily and re-dose if serum level is <1 mg/L.

Cephalosporins				
Cefazolin	-	LD 500 mg/L MD 125 mg/L	Stable for up to 24hrs in P1, P2 and El	Compatible with MD concentrations of Cefazolin
Cefepime	-	LD 500 mg/L MD 125 mg/L	Stable for up to 12hrs in EI, only 5 hrs in P2 and 10 hrs in P1	Compatible
Ceftazidime	-	LD 500 mg/L MD 125 mg/L	Stable for up to 24hrs in EI, only 6 hrs in P2 and 12 hrs in P1	Compatible with MD concentrations of Ceftazidime
Cefotaxime	-	LD 500 mg/L MD 125 mg/L	Limited data. Stable for up to 6 hrs in F	
Glycopeptides				
Vancomycin	Load: 30 mg/kg (max. 1.5 g) Repeat dosing 15 mg/kg based on levels*	LD 1000 mg/L MD 25 mg/L	Stable for up to 24hrs in P1, P2 and El	Conflicting reports. Unknown.
Teicoplanin (seek ID advice)	15 mg/kg every 5 days	LD 400 mg/L MD 20 mg/L	Stable for up to 24hrs in P1 and EI	Incompatible

In patients with residual renal function, glycopeptide elimination may be accelerated. If intermittent therapy is used in such setting, the second dose should be time-based on a blood level obtained 2-4 days after the initial dose.

For vancomycin, re-dosing should occur when the blood level is <15 mg/L.

For teicoplanin, re-dosing should occur when the blood level is <20 mg/L. Seek ID advice.

Intermittent glycopeptide therapy is not recommended for patients with residual renal function unless serum levels of the drug can be monitored in a timely manner.

Penicillins and others				
Ampicillin	-	MD 125 mg/L		Incompatible
Aztreonam	-	LD 1000 mg/L MD 250 mg/L	Stable for up to 24hrs in El	Compatible
Imipenem- cilastatin	-	LD 250 mg/L MD 50 mg/L	Stable for up to 6hrs in EI, 2 hrs in P1 and P2	Compatible

In patients on APD, increase the last fill volume to 50% of usual dwell volume to maintain ongoing antibiotic exposure.

Antifungals				
Fluconazole (seek ID advice)	6 mg/kg (max. 200mg) In one exchange per day 24-48 hrly	-		Compatible
Voriconazole (seek ID advice)	2.5 mg/kg (max. 200mg) in once exchange per day 24 hrly	-		Unknown

Intraperitoneal dosing recommendations from Sanford Antimicrobial guidelines 2021.

Peritoneal dialysis (PD) fluids: Physioneal 1.36% = P1; Physioneal 3.86% = P2; Extraneal (Icodextrin) = EI, Fresenius = F PD dialysis solution stability references: (1) Deslandes G et al. Peritoneal dialysis International. 2016; 36(6): 676-679

(2) Yousaf F et al. Peritoneal dialysis International. 2016; 36(4): 457-459

(3) De Vin F et al. Peritoneal dialysis International. 2009; 29:5–15

#Heparin compatibility should be assessed on a case by case basis - consider type of PD fluid and antimicrobials used IP.