



Crumlin | Temple Street | Tallaght | Connolly

**CHI NURSING PRACTICE GUIDELINE ON COMMENCING PERITONEAL DIALYSIS –  
CHRONIC KIDNEY DISEASE / ACUTE KIDNEY INJURY**

<b>Area of use:</b>	All of organisation <input type="checkbox"/>	CHI at Connolly <input type="checkbox"/>	CHI at Crumlin <input checked="" type="checkbox"/>
	CHI at Herberton <input type="checkbox"/>	CHI at Tallaght <input type="checkbox"/>	CHI at Temple Street <input checked="" type="checkbox"/>
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## 1.0 Guideline Statement

The purpose of this document is to guide health care professionals to care for a child commencing peritoneal dialysis. This guideline will provide staff members with the knowledge base required to care for patients commencing peritoneal dialysis and ensure the delivery of high quality safe practice to our patients.

## 2.0 Scope

Nephrology CHI staff who have undergone training and who are deemed competent in peritoneal dialysis will use this guideline.

## 3.0 General Responsibilities

- All Staff: Adhere to all guidelines and procedures relevant to their area of work.
- Line Manager / Head of Department: to ensure their staff are aware of and compliant with all policies and procedures relevant to their area of work.

## 4.0 Specific Responsibilities

It is the responsibility of Nephrology staff with support from CNEF's and Renal CNS's to implement guidelines into practice. Each staff member has a role to play in adhering to these guidelines when caring for a patient commencing peritoneal dialysis.

## 5.0 Procedure

### 5.1 Introduction to Peritoneal Dialysis

Peritoneal dialysis is used to manage acute and chronic renal failure. The peritoneum is a membrane, which lines the abdominal cavity. It has a rich blood supply making it an ideal area in which to carry out dialysis. Dialysis fluid is instilled into the peritoneal cavity through a Tenckhoff catheter. This fluid circulates through the abdomen in which toxins, solutes move across the membrane by diffusion, and fluid removal occurs by osmosis. The fluid is then drained from the body after a prescribed period of time (ISPD 2012).

### 5.2 Clinical Indications for Peritoneal Dialysis

- Acute Renal Failure
- End stage renal Failure

### 5.3 Contraindications for Peritoneal Dialysis

#### A) Absolute contraindications

The only absolute contraindications for PD are those that affect the integrity of the abdominal cavity and peritoneum. These include:

- Omphalocele
- Gastroschisis
- Diaphragmatic hernia
- Obliterated peritoneal cavity and peritoneum membrane failure

**B) Relative contraindications include:**

- Pending abdominal surgery
- Previous major abdominal surgery
- Impending (<3months) living donor kidney transplantation.
- Lack of appropriate care giver at home to provide therapy
- Patient/caregiver choice for haemodialysis

The presence of a gastrostomy, colostomy, ureterostomy and/or pyelostomy does not preclude PD.

**5.4 Pre-operative Investigations/Considerations prior to Tenckhoff Catheter Insertion (see appendix 2)**

Not all investigations/considerations are necessary in children with HUS (Haemolytic Uraemic Syndrome) / ARF (acute renal failure).

**A) Organisation**

- Prepare the child and family on peritoneal dialysis pre operatively.
- ESRF Children are seen in clinic routinely as an outpatient and will meet the multidisciplinary team as appropriate.

**Note:** A home visit/virtual home visit are required to ensure suitability of peritoneal dialysis at home. Not required for acute patients.

- The need for a gastrostomy tube should be discussed at clinic. It is recommended that gastrostomy placement should preferentially take place before or at the time of PD insertion as abdominal surgery increases the risk of peritonitis. If required, refer patient to surgical team.
- Children with gastrostomy buttons already in situ, there must be no evidence of a gastrostomy exit site infection prior to catheter insertion especially any possible candida species.

**5.4 Pre- Operative Investigations / Considerations prior to Tenckhoff Insertion**

**Growth & Nutritional data**

- Obtain a weight and height to calculate Body surface area head.

**Radiology**

- Wrist x ray (bone age)
- Echocardiogram

**Blood Tests/Swabs**

- Take relevant bloods – FBC, U&E, Ferritin, and Vitamin D, TFT's as per CKD and transplantation workup.
- Discuss with nephrology team to check which bloods are also required.
- Ensure MRSA, VRE, CRE and MRGNB, screen is completed.
- If child is positive for any of the above screens, contact the Infection Control Team as screening may be necessary for parents. if patient is a carrier for staphylococcus infection they may need treatment.

### Prophylactic Antibiotics

Refer to local policy in terms of administration of prophylactic antibiotics

### Pre-operative Guidelines

The PD exit site should ideally avoid the belt line, be above the nappy line in infants where possible be on the opposite side to the gastrostomy.

- A photograph displaying equipment lay out should be brought to theatre to avoid incorrect placement of equipment.
- Bring a Tenckhoff, minicap, clamp, mefix, a non-occlusive dressing and extension set to OT with patient (discuss with Nephrology team what size Tenckhoff is required).
- A preoperative peritoneal dialysis checklist must be completed (see appendix 2).

### 5.5 Peritoneal Catheter Choice

The Tenckhoff catheter remains the gold standard for PD access and is the most widely used in chronic dialysis. The use of a double cuff swan neck Tenckhoff catheter with a downward or lateral subcutaneous tunnel configuration that is placed by a surgeon or nephrologist experienced in PD catheter placement is recommended. Double-cuffed catheters are associated with a lower peritonitis rate than single-cuffed ones.

The following table is a guide only and should be used in consultation with the surgeon / nephrologist inserting the Tenckhoff:

Size	Catheter	Weight Guide
31cm	Neonatal PD catheter double cuff straight.	Under 4 kgs
38.9cm	Infant PD catheter swan neck curl catheter double cuff	4-10 kgs
42cm	Paediatric PD catheter swan neck curl catheter double cuff	10-45 kgs
59cm	Paediatric swan neck curl catheter double cuff	45 kgs and above

## 5.6 Post-operative care of Tenckhoff catheter insertion

- Oral fluids can commence with agreement from Surgeons / Nephrologists
- Assess fluid restriction.
- Discuss using gastrostomy with surgical team.

### A) Flushing the catheter

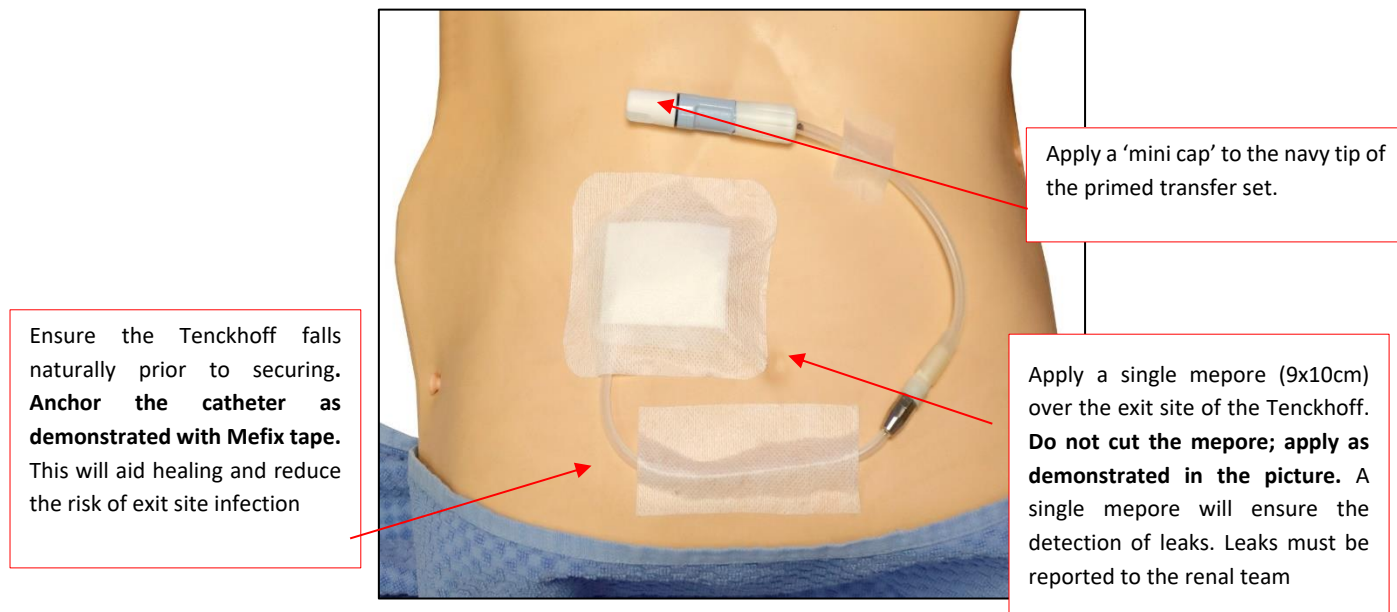
Quick flushes are required on return from theatre to ensure patency. The Tenckhoff should be flushed using the Claria machine with heparinised Physioneal 40 1.36%, 10ml/kg. Preservative free heparin 500 iu/L is added to the dialysate to prevent fibrin /clots in the Tenckhoff. Heparin also has antiangiogenic and anti-inflammatory properties.

- Do not exceed 10mls/kg of Physioneal 40 1.36%, as this may alter healing of the PD exit site.
- Keep the patient supine to avoid high intra-peritoneal pressures and possible leaks. Do not exceed 25mls/kg fills for ventilated patients.
- Give adequate analgesia -clonidine, paracetamol and use morphine with caution and avoid non-steroidal anti-inflammatory medications.
- Continue flushing the Tenckhoff until the PD fluid has turned rose or clear then discontinue
- Once the catheter is working well it can be locked with preservative free heparin (see appendix 5) . If the patient is in acute renal failure or if immediate dialysis is indicated they may commence peritoneal dialysis therapy.
- The Tenckhoff catheter should be flushed weekly when not in use. This is important to ensure the Tenckhoff catheter is working well.

### B) Wound Site Care

- Ideally, the tenckhoff should be left undisturbed after flushing, to allow the site to heal for 4- 6 weeks. This cannot always be facilitated in patients with acute renal failure who need dialysis urgently. In this case, dialysis can start immediately post flushes unless otherwise contra-indicated.
- A non-occlusive dressing should be applied in theatre (See Figure 1) and the catheter should be securely anchored close to the exit site to minimize movement and the potential risk for traction injury, which represents a risk factor for exit site infections. Anchoring also prevents trauma to the wound site by avoiding mobilisation of the tube promoting early healing.
- Observe the exit site dressing. The aim is to keep the exit site clean, dry, painless and non-inflamed.
- After one week, the exit site dressing should be changed using sterile technique using chlorhexidine 0.5% to cleanse. Once weekly dressings should continue until the exit site is healed, healing can take up to 6 weeks (ISPD 2012). The exit site is described as healed when the skin around the exit site looks normal without gaping.
- Dressing changes should be performed more frequently only if excessive drainage is noted at the exit site or if there is persistent oozing at exit site.
- If it is felt that healing of the site is not progressing normally, a culture should be taken and daily cleaning will be required. Antibiotic treatment may be required.
- The patient should not shower or wet the dressing during the healing phase. Once healed can take showers and shallow baths (not submerging exit site).
- Complete care bundles and Tenckhoff dressing chart to document dressing changes.

Figure 1.



### 5.7 Peritoneal Dialysis Training

- Renal Nurse Specialists coordinate training following a structured programme of competencies.
- Training should ideally occur on a 1:1 basis using a standardized teaching plan.
- It is advised that two family members are trained.
- Caregivers should be taught to thoroughly wash their hands before any care procedures. It is paramount that the hands are dried completely with a clean towel as hand dampness after washing can cause bacterial translocation through touch contamination.
- Parents should be educated about the importance of excluding animals from the room which dialysis is conducted (ISPD 2018).

### 5.8 Training Content

Theory	Practical	Complications	Other
Functions of the kidney	Handwashing	Signs, symptoms & treatment of peritonitis	Record keeping
Overview of PD	Aseptic Non-Touch Technique	Signs, symptoms & treatment of exit site & tunnel infections	Administration of medications
Fluid balance ( <i>weight and BP</i> )	Dialysis therapy ( <i>step by step guide</i> )	Drain problems (constipation, fibrin)	Dietary management
Different strengths of PD fluid	Emergency measures for contamination	Fluid balance (hypertension, hypotension)	Ordering and management of supplies
Prevention of infection	Troubleshooting	Other (leaks, pain)	Managing life with PD ( <i>school, sport, holidays</i> )
	Blood pressure and weight monitoring		Contacting the hospital, making clinic visits
	Exit site care		
	Manual drain		

## 6.0 Continuous Review

This policy and procedure shall be reviewed and updated at least every two years by the Author/and or Owner in order to determine its effectiveness and appropriateness. It shall be assessed and amended as necessary during this period to reflect any changes in best practice, law, substantial organisational change and professional or academic change.

Peritoneal Dialysis care bundles

## 7.0 Audit and Evaluation

In order to ensure the effectiveness of this policy and procedure the Author/and or Owner shall complete an audit annually to review and monitor compliance with this policy and procedure. The Author/and or Owner must further provide a systematic process for the reporting and investigation of compliance breaches, or potential breaches, to enable proactive prevention in the future.

## 8.0 Key Stakeholders

The following Key Stakeholders were consulted/involved in the development of this document:

NAME	TITLE
Dr Atif Awan	Consultant Nephrologist
Dr Michael Riordan	Consultant Nephrologist
Dr Clodagh Sweeney	Consultant Nephrologist
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Suzanne Kernan	CNM2 Temple Street
Fy Lape	CNM 2 Crumlin
Sandra Geraghty	CNEF Crumlin
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## 9.0 References

Warady B., Bakkaloglu S., Newland J., Cantwell M., Verrina E., Neu A., Chadha V., Yap, H. and Schaefer, F. (2012) Consensus Guideline for the prevention and treatment of catheter-related infections and peritonitis in pediatric patients receiving peritoneal dialysis: 2012 update. International Society for Peritoneal Dialysis. Vol. 32, pp32-86.

Kam-Tao, P., Szeto, C., Piraino, B., de Arteago, J., Fan, S., Figueiredo, A., Fish, D., Goffin, E., Kim, Y., Salxer, W., Struijk, D., teitelbaum, I. and Johnson, D. (2016) ISPD peritonitis recommendations: 2016 Update on prevention and treatment. Journal of the international society for peritoneal dialysis. Vol.36 (5), 481-508.



## 10.0 Appendix 1.

### Peritoneal Dialysis prescription

#### Choice of Dialysis fluid:

Physioneal 40 is a bicarbonate / lactate based fluid and is used for patients.

Physioneal 35 contains higher level of calcium - 1.75mmols Calcium.

Physioneal is available in 3 strengths:

- 1.36% physioneal
- 2.27% physioneal
- 3.86% physioneal

The higher the percentage the more glucose present in the Physioneal Fluid.

Physioneal 1.36% is the weakest bag- 3.86% is the strongest Physioneal fluid.

Extra Neal 7.5% Icodextrin is used as a long daytime dwell in patients requiring extra fluid removal and or phosphate clearance.

#### Fill Volumes

- Children under 2 years of age should be optimise up to fill volume of 800ml/m<sup>2</sup>
- Children over 2 years should be optimised up to fill volume of 1100ml/m<sup>2</sup>.
- Fill volumes of 1400ml/m<sup>2</sup> can be used in older patients. Tolerance should be taken into consideration due to the risk of high intra –peritoneal pressures.

#### Therapy Time

- Initially when low fill volumes are being used therapy time should be extended to compensate and increase dialysis efficiency.
- Depending on blood results and fluid removal requirements, therapy times of between 10-12 hours should be adequate for most children.
- Reduce time overnight when using optic choice PD.

#### Dwell Times

Dwell Times and their effectiveness depends on the characteristics of the patient's peritoneum.

- Shorter dwells will remove more fluid and specific electrolytes- urea/potassium.
- Longer dwells will remove less fluid (patient may potentially absorb fluid) but will remove more phosphate.
- If adequate blood results /UF are not achieved. Consider adjusting dwell times and number of cycles.
- Peritoneal Dialysis therapy should use lower glucose fluid (physioneal 1.36%)

## Appendix 2 – Pre-Operative Peritoneal Dialysis Checklist

Full Name: .....	.....
Address: ...	.....
.....	.....
HCR.....	.....

Addressograph

Pre-Operative Peritoneal Dialysis Checklist			
<i>Please tick</i>	Yes	No	N/A
Height in cms			
Weight in kgs                  Date weighed _____			
MRSA screen completed			
Octenisan body wash completed			
If required, have laxatives been given? If so, has it been given with good effect?			
IV antibiotics given 60 minutes pre-operatively (Consult with local policy at CHI Temple Street or CHI Crumlin)			
Parental nasal MRSA screen completed?			
Peritoneal dialysis equipment, Tenckhoff, minicap, clamp, titanium connection and transfer set to accompany patient to Occupational Therapy.			
Photograph demonstrating set up of equipment to accompany patient			
<b>Date:</b>			
<b>Signature:</b>	<b>Grade:</b>	<b>NMBI:</b>	
<b>Counter Signature:</b>	<b>Grade:</b>	<b>NMBI:</b>	

## Appendix 3 – Claria Set up


### Equipment

- Azowipes
- Prescription
- Trolley
- Physioneal fluid / Extraneal fluid
- Drainage bag
- Cassette
- Sample bag / empty heater bag / drain manifold if required
- Disposable hand towel
- Alcohol gel
- Connection shield if required

### Step 1 – Prepare

**Close all windows and doors. Wash hands for 60 seconds with antimicrobial handwash**

Prepare / tidy your area. Turn machine on.

- Machine will read 'Connecting to network...'
- Gather equipment.
- **Wash hands with antimicrobial handwash and dry thoroughly.**
- Clean machine (excluding cassette) and work surface with azowipes
- Clean hands with alcohol gel for 15 seconds and ensure hands are dry.
- Follow machine prompt to enter weight and BP. Press red button.
- Machine will read 'PRESS GO TO START'. **Do not** press go.
- Press  and select 'CHANGE PROGRAM' to review programme.
- Press **red** button when satisfied program is correct.

### Step 2 – Open Equipment

- Decontaminate hands with alcohol and ensure hands are dry
- Check dialysis bag/s, extraneal bag, cassette and drainage bag and any other equipment needed (e.g. sample bag, drain manifold, and empty heater bag) while in packaging for:
  - a) Volume
  - b) Expiry date
  - c) Concentration/ type
- Open up packaging of dialysis bags, cassette, drainage bag and any other equipment you may need and **leave in packaging.**
- Check for:

- a) Solution is clear
- b) Leaks
- c) Seals are intact
- Machine will read "PRESS GO TO START".
- Press **green** button – machine will confirm standard or low fill mode (press **green** button) and prompt to mix two-chamber bag (press **green** button).
- The machine will read "LOAD THE SET".

### Step 3 – Loading the Set

- Decontaminate hands with alcohol gel.
- Place dialysis bags on clean surface and break seals of dialysis bags.
- Place dialysis bag with blue seal upwards / empty heater bag on heater plate. Do not stack bags.
- Decontaminate hands with alcohol gel.
- Close clamps of cassette, open door of machine, pick up and load the cassette.
- Pick up drainage bag, close short clamps, put long waste line inside folded bag and place below machine.
- Press **green** button-machine will read "SELF TESTING" - then reads - "CONNECT BAGS".

### Step 4 – Connecting Bags





- Decontaminate hands with alcohol gel and ensure hands are dry.
- Pick up heater line (red line) and attach to heater bag, using ANTT.
- Continue process for remainder of bags.
- If patient is for a last bag fill of different solution, ensure you attach the blue line to this bag.
- Ensure you **break seal** of Extraneal if in use.
- Using same process, attach waste line to drainage bag.
- If sample bag or drain manifold is needed attach it at this point to the waste line sample line.
- After connecting all lines, open clamps on lines in use only.
- Clamp line on outlet tube of drainage bag.
- Press **green** button-machine will read "PRIMING" – then reads "CONNECT YOURSELF".

## Appendix 4 – Connection and Disconnection from Home Choice Machine

### Connection

- Wash hands using antimicrobial hand wash and dry thoroughly.
- Record BP and weight.
- Gather equipment (alcohol gel, azowipes, connection shield).
- Wash hands using antimicrobial hand wash and dry thoroughly.
- Re-prime if any air in patient line.
- Open connection shield
- Decontaminate hands using alcohol gel
- Remove patient line from organiser, remove blue ring pull, apply connection shield at this point if in use, and connect to patient line using ANTT.
- **Note** - Remove Tenckhoff minicap last to minimise navy tip exposure.
- Press **green** button, when initial drain appears on machine, open Tenckhoff clamp.
- Observe colour of drainage solution.

### Disconnection.

- Wash hands using antimicrobial handwash and dry thoroughly.
- Ensure you are bare below elbow and tie back hair.
- Clean area with azowipes.
- Place unopened minicap on clean trolley.
- Record information. Machine will read “END OF THERAPY”.
- Press  - record “INITIAL DRAIN”.
- Press  - record “LAST UF”.
- Press  - record “AVERAGE DWELL TIME”.
- Press  - record “LOST DWELL TIME” or rarely “ADDED DWELL TIME”
- Press **green** button- Machine reads “CLOSE ALL CLAMPS”(but don't yet)
- Decontaminate hands using alcohol gel and ensure they are dry.
- (Perform 30-second hand wash with hibiscrub and dry hands thoroughly with disposable towel.)delete
- Clamp patient line first, then all other lines.
- Press **green** button – Machine reads “DISCONNECT YOURSELF”.
- Decontaminate hands with alcohol gel and ensure they dry.
- Open minicap, leave in packaging.
- Decontaminate hands with alcohol gel and ensure they dry.
- Disconnect patient line and apply minicap.
- Press **green** button, machine reads “REMOVE CASSETTE”, do so and press **green** button; reads “CONNECTING TO NETWORK” and then “TURN ME OFF”.
- Turn machine off and dispose of dialysate appropriately.
- Check fluid, colour, observe for fibrin.

- Assess patient's weight. And record blood pressure.
- Clean equipment – machine, table and trolley.

## Appendix 5: Locking a Tenckhoff Catheter with 0.9% Sodium Chloride & Heparin 1:1000 units.

### Equipment

- 0.9% Sodium Chloride
- 1: 1000 Preservative free Heparin
- 10mls Syringe
- Clinell® wipes
- Green Needle
- Filter Needle
- Sterile Gloves
- Mini Cap

### Procedure

- Wash hands using an antiseptic hand wash agent and dry thoroughly.
- Gather equipment required.
- Clean trolley.
- Decontaminate hands using alcohol hand gel provided
- Open out sterile field on trolley and open sterile gloves, needles, syringes, minicap, on sterile field.
- Wash hands using an antiseptic hand wash agent and dry thoroughly.
- Apply sterile gloves.
- Draw up 1 mls of heparin 1:1000 units with the filter needle and dilute with 0.9% sodium chlorideto make final volume of 10 mls, as prescribed.
- Pick up the catheter and place sterile drape under the child's catheter and extension line.
- Remove mini cap and place the syringe on to catheter using non touch technique.
- Open twist clamp and instil Heparinised saline into catheter, close twist clamp then disconnect syringe.
- Place new mini cap.

**Please note NEVER withdraw / pull back on the syringe once connected to the catheter.**