

Renal Self Learning Package

ADVANCED PERITONEAL DIALYSIS MANAGEMENT



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RENAL SELF LEARNING PACKAGE ADVANCED PERITONEAL DIALYSIS MANAGEMENT

GOAL

This learning package has been designed to assist the participant to independently increase his/her knowledge related to the care of the patient requiring peritoneal dialysis.

PACKAGE OBJECTIVES

To provide the opportunity for the participant to:

- Demonstrate a clear and practical understanding of the peritoneal dialysis process;
- Set prescription and program for automated PD therapies;
- Identify the potential complications of peritoneal dialysis and discuss the appropriate management of each;
- Provide patient education related to peritoneal dialysis;
- Provide appropriate pre op and post op nursing management of the patient admitted for PD catheter insertion;
- Troubleshoot peritoneal dialysis problems for both inpatients and outpatients;
- Participate in the collection of samples for PET and Kt/V;
- Demonstrate competency in the nursing management of patients requiring peritoneal dialysis treatments by completing the *management of the peritoneal dialysis competency assessment*

ASSUMED KNOWLEDGE

It is assumed that you already have an understanding of the physiological principles of peritoneal dialysis, an understanding of dialysis fluids and PD catheters and the peritoneal dialysis techniques. These topics have been covered in the – *Introduction to peritoneal dialysis self learning package*. It is assumed that the participant has successfully completed the *Introduction to peritoneal dialysis self learning package* and has completed the PD dressing skills assessment.

OVERVIEW

This learning package has been designed to assist nurses to advance their skills in the management of patients requiring peritoneal dialysis. The package uses case studies to highlight important skills and knowledge pertaining to managing the PD patient.

RESOURCES

There are a number of **resource people** on the ward who can help you if you need assistance. It may be necessary to contact the PD CNC, peritoneal dialysis nurses or clinical nurse educator if you encounter any difficulties with the resource.

Listed below are the **education** or training sessions you can attend, to assist you in the completion of this package. It is your responsibility to keep record of the PD education and training sessions you have attended.

- Ad hoc PDC extension set change in PD unit
- Simulated PDC extension set change in 4S procedure room
- Bi-monthly simulated PD machine troubleshooting
- Bi-monthly PD programming inservice
- Monthly PD policy update inservice

In addition, where possible take the opportunity to observe the insertion of a PDC.

ASSESSMENT

Assessment of this package is by way of successful completion of the:

1. Package questions and evidence of reflection.
2. Skills attainments:
 - PDC extension set and titanium connector change;
 - Freeline solo exchange;
 - HomeChoice set up and connection;
 - HomeChoice disconnection;
 - Loading antibiotics to PD fluid.
3. *Management of the PD patient Competency Assessment* which you will find at the end of this package.



A number of journal articles have been compiled into a reference compendium, which is available to borrow from the clinical nurse educator. Throughout the package you will be directed to the compendium to read further information related to a particular topic.



This icon will be used when you are required to access the hospital policies and procedures for *nephrology protocols and procedures/peritoneal dialysis*.

ADVANCED PD PACKAGE EVALUATION FORM

Please come back to this page when you have finished working on this package and complete this form.

Name -
Date -

Did you understand what was required to complete this package? Yes No
Comments:

Was the content of this package useful/clear/relevant? Yes No
Comments:

What other resources did you find helpful in completing this package?

Please comment on any ways this package could be improved for future learners.

Thank you for taking the time to give us your valuable feedback. Please return this form with your package to the CNE and it will be removed from the package before returning to you.

Case 1 – Admission for the insertion of a peritoneal dialysis catheter

Stan is a 70 year old man who is admitted to the ward for the insertion of a peritoneal dialysis catheter the next day.

Stan will have the catheter inserted using a local anaesthetic percutaneous Seldinger (non-surgical) approach. In our hospital this procedure is performed by Associate Professor Ivor Katz in the Cardiac Catheter Lab or alternatively in the PD Room on 4 south. The alternative is to have the catheter inserted surgically under general anaesthetic. Patients requiring surgical placement of a PD catheter are usually admitted to a surgical ward in the hospital or St George Private Hospital under a vascular surgeon.

As stated, Stan will have the procedure performed percutaneously and the Cardiac Catheter Lab has been booked for 1100 the next day. Advantages of inserting peritoneal dialysis catheters (PDC) under the percutaneous approach include:

- Small incision site allowing early use of catheter if required;
- Less risk of bleeding/leaks;
- Performed under local anaesthetic;
- Early mobilisation;
- Reduced hospital stay;
- Operating theatre not required;
- Can be performed by a skilled physician rather than a surgeon.

Disadvantages are that is a 'blind technique' of insertion into the peritoneal cavity and is not suitable if intra-abdominal adhesions are suspected.

Q1 You are responsible for the admission and preparation of Stan on the afternoon shift. What are your priorities of care including specific pre insertion preparation?

Q2 Stan expresses concern regarding whether he will be able to exercise or drive after the catheter is inserted. What is your response and who would you refer Stan to for further information?

Stan is transferred to the Cardiac Catheter Lab at 1100 the next day and returns to his room following afternoon handover.

Q3 What particular post op management will be required for Stan and the PDC?

The important post op complications you will be monitoring Stan for are:

- Excessive bleeding from insertion or exit site;
- Heavily blood stained PD effluent;
- Bowel or solid organ perforation.

Q4 In the box below give an overview of your nursing actions should these complications occur:

Complication	Clinical signs	Nursing actions
Excessive bleeding from insertion or exit site.		
Heavily blood stained PD effluent.		
Bowel or solid organ perforation.		

After one flush the dialysis effluent remains blood stained.

Q5 What is the course of action you take to manage this situation?

Q6 The next morning Stan asks you if he can shower before discharge. What is your response to Stan?

Stan is discharged home with an appointment for review by the PD Unit nurses in one week.



Insertion of a PDC protocol and procedures



Consider your own practice in relation to this case. What could you improve on and how could you go about it? Make a few reflection notes in the box below.

<p>Reflection Box</p>

Case 2 – Admission for intermittent PD

Stan was discharged following the insertion of his PDC and presented to the PD Unit for review the following week. On presentation he was found to be shaky and complained of feeling generally unwell. Blood tests revealed that his serum K was 6.8mmol. As the PDC was only inserted a week previously, he was transferred to a bed on the ward for the commencement of low-fill IPD urgently. You will be caring for Stan this pm.

Q7 What parameters would you program into the machine for his first dialysis session?

Parameter	Program	Rationale
Total volume		
Fill Volume		
Therapy time		
Last fill		
Tidal or non-tidal		
Choice of dialysate strength		

Q8 The new peritoneal dialysis catheter is usually rested for two weeks before training commences. Why would you be observing for the following signs/symptoms? And what would your actions be?

Signs/Symptoms	Why?	Actions
Leaks		
Pain		
Blood on exit site		
Blood on PD fluid		
UF		
Serum potassium		
Alarms situations		

Q9 The morning nurse assesses Stan's PDC exit dressing and finds that it is lifting and the catheter exit is exposed. What is the correct course of action?

Stan responds to therapy well overnight. His serum K is now 4.8. He has been cleared for discharge and will present twice a week for IPD until training commences.

Q10 What organisation is required before Stan leaves the ward?

Stan presents for routine IPD in two day's time. By this time, Stan's PD catheter has been in situ for over a week and therefore, he may tolerate higher fill volumes.

Q11 What parameters would you program into the machine for his 2nd dialysis session?

Parameter	Program	Rationale
Total volume		
Fill Volume		
Therapy time		
Last fill		
Tidal or non-tidal		
Choice of dialysate strength		

Q12 Who would you consult regarding the new PD prescription?

Q13 Why are the following PD machine alarms common in patients with a new PD catheter?

Complete the table:

Alarms	Why does this alarm occur?
Low drain volume	
Low UF	
Low fill volume	



Intermittent peritoneal dialysis protocol and procedures



Consider your own practice in regard to this case. What could you improve on and how could you go about it? Make a few reflection notes in the box below.

Reflection Box

Case 3 – Patient experiencing Peritonitis

Vivien is a 68 year old lady who has been on peritoneal dialysis for 2 years. She contacted the PD unit at 0800 complaining of abdominal pain. She was told to present to the Emergency Department.

Infection of the peritoneum is the most frequent complication of peritoneal dialysis. New delivery systems and techniques have resulted in a decrease in the incidence of peritonitis. Peritonitis remains the most common reason for hospitalisation and is still a major cause of failure for peritoneal dialysis.

Q14 Apart from abdominal pain what signs and symptoms might indicate that Vivien has peritonitis?

When Vivien arrives in ED she is triaged and his vital signs are recorded:

- Temperature is 38.2°,
- BP is 115/82,
- pulse 90,
- RR 18/min
- Complaining of abdominal pain with rebound tenderness.

A specimen of peritoneal dialysis fluid is collected and it looks cloudy. It is sent to pathology for culture and sensitivity. In the meantime the Renal Registrar orders a loading dose of antibiotics.

Q15 According to Renal Department protocol what are the standard antibiotics administered when peritonitis is suspected and how long must the medications be left indwelling?

Vivian will need to be admitted because she continues to complain of abdominal tenderness despite analgesia and her temperature remains above 37.8°. She is admitted to the renal ward. She will have antibiotics loaded in her PD fluid and regular pain relief and monitoring.

Vivien's PD fluid culture result is:

- 1980ml
- appearance is turbid
- White cells $1620 \times 10^6/L$, Red cells $20 \times 10^6/L$.

The antibiotics chosen are Cefazolin 250mg per 2lt bag and Gentamicin 40mg daily IP. Vivien is commenced on CAPD to enable the use of antibiotics.

Q16 According to the Renal Department guide, what additives are compatible with Gentamicin?

After 48hours the dialysate organism was confirmed as a heavy growth of staphylococcus aureus. Vivien is treated with antibiotics for 14 days which she is able to perform at home after training. Her follow up fluid specimen reveals White cells $10 \times 10^6/L$ and no growth.

At Vivien's post peritonitis follow up appointment in the PD Clinic she attended a training session related to the causes and outcomes of peritonitis. The PD nurse specialist reviewed the possible reasons why the peritonitis might have occurred and watched Vivien undertake the set up of the APD machine to ensure her technique was correct.

Q17 Outline the possible causes for Vivien's peritonitis.

Q18 What short term complications can occur when someone has peritonitis?

Q19 There are a number of long term complications, which can occur as a result of continual episodes of peritonitis. Briefly describe 3 complications?

Complication	Overview
1	
2	
3	



Peritonitis protocol and procedures



Consider your own practice in regard to this case. What could you improve on and how could you go about it? Make a few reflection notes in the box below.

Reflection Box

Case 4 - Poor flow from PDC

Jan is a 62 year old patient who has been on peritoneal dialysis for 4 years. Jan was admitted from home on Friday afternoon as she had been experiencing poor flows on APD. The PD nurses conducted a home visit on Friday morning and could not identify a reason so she was admitted to the ward to investigate the problem.

Q20 What are some of the causes for poor flow/blockage of a PD catheter?

Before going off duty the PD nurse instilled Actilyse into the catheter and requested that it remain indwelling for 2 hours.

Q21 What is Actilyse? When is it used?

At 1700 the Actilyse was drained and a manual flush performed. As there did not seem to be a problem i.e. fluid in = fluid out, Jan was commenced on her usual APD using 1x 2.5% and 1x 4.245 strength bags. There were no alarms overnight. Her weight was 73kg prior to APD and 73.2 following PD.

On Saturday night Jan again had APD which did not end until 0800 due to a number of poor drain alarms. Her weight remained the same at 73.2Kg despite the high strength bags. There is evidence edema in her sacral area after being in bed for an extended period. Her BP is now 174/100 and her JVP is raised.

Q22 What are the signs and symptoms of fluid overload? How would you manage Vivien's dialysis on Saturday night?

Q23 What are the signs and symptoms of dehydration? How would you manage the dialysis if someone was dehydrated?

After review by the renal team on Sunday morning Jan started on IPD using 2 x 2.5 and 2 x 4.25 strength bags. The nephrologist suggested follow up with PD staff on Monday. Jan will require adequacy tests performed and a consult regarding fluid management.

Jan was assessed by the PD CNC who undertook a comprehensive history and physical assessment. The findings revealed that she had no obvious uraemic symptoms, her appetite was good and she was well nourished. Her BP was 168/90 and she had signs of pedal oedema. Her JVP was slightly raised with crackles audible on the right side of her posterior lung fields. Jan had recently noticed a decrease in the volume of urine which was thought to be about 500 mls/day. Her weight increased 2kg over the past month.

Jan has been using high strength bags for a couple of months and experiences drain alarms frequently.

The PD CNC commenced Kt/V to assess the adequacy of her PD. The test was performed before discharge.

Kt/V is a way of measuring dialysis adequacy by knowing how much urea is removed (K) over a certain dialysis period (t) divided by the volume of water a patient's body contains (V).

- K** = Clearance of urea
- t** = time (= duration of the PD cycle)
- V** = volume

When analysing Kt/V results it is important to keep the following in mind

K is affected by:	
	fill volume
	surface area of the peritoneum
	blood supply to the peritoneum
	patient position
t is affected by:	
	dwel time
	fill / drain times
	new catheters
	tubing set
V is affected by:	
	patient size

Factors influencing dialysis adequacy

- Capillary proximity to the mesothelium;
- Vascularity of the membrane;
- Effective peritoneal surface area;
- History of peritonitis episodes;
- Length of time on peritoneal dialysis;
- Membrane transport characteristics.

Access the CARI Guidelines -



<http://www.cari.org.au/guidelines.php>

Q24 What are the CARI Guidelines?

Q25 According to CARI Guidelines what is an appropriate Kt/V target for patients on peritoneal dialysis:

The outcome was that Jan has UF failure and was put on Icodextrin.

Q26 What is Icodextrin?

Q27 How is Icodextrin prescribed for people on APD?

Jan was discharged home following Kt/V with follow up from nurses regarding the response to Icodextrin. Jan remained on APD for a further year with good fluid control using Icodextrin. Unfortunately her Kt/V continued to decline and her blood levels suggested her dialysis was suboptimal. She had an AV fistula created and converted to satellite haemodialysis.

PD has a limited lifespan and adequacy is an indicator that patients should transition to haemo.

Q28 What are the reasons why PD fails?



Poor flow and adequacy protocol and procedures



Consider your own practice in regard to this case. What could you improve on and how could you go about it? Make a few reflection notes in the box below.

Reflection Box

Case 5 – Patient with contaminated catheter

Betty was connecting herself to APD at 2100 and realised that there was no minicap on the end of her catheter. She was sure that she had put one on that morning. She later found it on the floor near the bed and probably did not secure it correctly. As instructed at training she rang the afterhours hospital contact number for advice.

You are the nurse on 4 south who takes the call from Betty and you direct it to the In Charge of shift nurse who you realise is attending to a patient following a PACE call.



Refer to the protocol on catheter contamination on the website

Q 29 What would you instruct Betty to do?

Q 30 Your initial course of action would be?

- a) Tell Betty the PD unit will contact her in the morning
- b) Instruct Betty to come to the hospital and present to the ED
- c) Contact the MOIC and ask his opinion
- d) Wait for the *In charge* to phone Betty back

The answer is b). Betty will need to present to the Emergency Department so that decontamination can be commenced.

This situation is one of the more common reasons why patients on PD will contact the ward after hours. There is a comprehensive flow sheet which should be followed in these situations and it is available on the renal website.

Q 31 Who would need to be informed regarding the contaminated catheter?

Q32 Betty presented to the ED and was assessed and transferred to the ward. The *In Charge* has asked you to manage the patient. Outline your course of action:

While attending to Betty you receive a phone call from ED passing on the results for the PD fluid sample which was taken in ED.

Q33 If Betty's PDF WCC >100, what are the next steps?

Q34 If Betty's PDF WCC <100, outline your next steps?

Q35 When and why would a PD fluid culture be repeated?



Decontamination and peritonitis protocol and procedures



Consider your own practice in regard to this case. What could you improve on and how could you go about it? Make a few reflection notes in the box below

Reflection Box

The St George Hospital, Renal Department

Management of the peritoneal dialysis patient competency assessment

Outcome statement

The nurse uses knowledge, skill and judgement in the management of the patient requiring peritoneal dialysis treatments.

ELEMENT	PERFORMANCE CRITERIA	YES	NO	N/A
Demonstrates an understanding of the fundamental principles of peritoneal dialysis.	1.1 Discusses the processes involved in the removal of fluids and solutes across the peritoneal membrane. 1.2 Outlines the types of PD systems available and their indications. 1.3 Discusses common complications of PD & management. 1.4 Outlines the care of the peritoneal dialysis catheter. 1.5 Outlines the principles of dialysability of medications. 1.6 Accesses the renal protocols including management of PD patients.			
Demonstrates an understanding of the commonly used intra peritoneal medications.	2.1 Identifies commonly used drugs, dosage and indications. 2.2 Discusses common side effects of intra-peritoneal (IP) Medications. 2.3 Identifies medications that can be administered by the EN.			
Demonstrates knowledge of the operating principles of the HomeChoice machine.	3.1 Can identify machine faults and mechanism for rectification. 3.2 Discusses common alarm situations and the appropriate steps for trouble shooting those situations. 3.3 Adjusts the program according to assessment findings and dialysis requirements.			
Performs peritoneal dialysis procedures as per skill assessment form.	4.1 PDC extension set and titanium connector change; 4.2 Freeline solo exchange; 4.3 HomeChoice set up and connection; 4.4 HomeChoice disconnection; 4.5 Loading antibiotics to PD fluid.			
Assesses patient and treatment aims.	5.1 Chooses & justifies the correct dialysate according to fluid loss required. 5.2 Assesses biochemistry and adds the correct dose of K ⁺ to dialysate as per protocol 5.3 Assesses patient for the following both pre and post treatment including weight, vital signs and well being 5.4 Assesses PD exit site.			

ELEMENTS	PERFORMANCE CRITERIA	YES	NO	N/A
6. Demonstrates clinical decision making based on changes in patient condition and assessment findings.	6.1 Outlines course of action in the management of: <ul style="list-style-type: none"> clinical signs of peritonitis changes in volume status poor flow or obstructed catheter leakage from PD catheter. 			
7. Maintains patient and self safety.	7.1. Uses Personal Protective Equipment (PPE). 7.2 Maintains sterility of the set up throughout the treatment. 7.3 Monitors the patient's condition throughout the procedure. 7.4 Discards used equipment appropriately. 7.5 Cleans and stores machine correctly.			
8. Demonstrates knowledge of the management of PD outlyers and outpatient trouble shooting	8.1 Cognisant of Baxter backup support <i>out of hours</i> and how to access. 8.2 Instructs outpatients on correct course of action over the phone. 8.3 Overviews the flowchart for managing PD outpatients requiring admission to the ward for minor troubleshooting. 8.4 Able to describe procedure for antibiotic loading and pick up of loaded bags on week end. 8.5 Delegates PD patient care as appropriate.			
9. Maintains effective communication with patient, staff and others	9.1 Informs and educates the patient of procedure. 9.2 Shares information related to the treatment with colleagues. 9.3 Documents the treatment on the APD/CAPD treatment sheet. 9.4 Documents changes/outcomes in continuation notes. 9.5 Reports all adverse reactions to medical officer.			

Name of participant _____ Date _____

Print Name

Competence Achieved Yes No Date for reassessment

Name and Signature of Assessor _____

Print Name & Sign