PERITONEAL EQUILIBRATION TEST

University Hospitals of Leicester NHS
NHS Trust
RRCV CMG
Renal & Transplant Service

1. Introduction and Who Guideline applies to

Peritoneal dialysis (PD) relies on a patient's peritoneal membrane to act as a natural semi-permeable dialysis membrane. Assessment of membrane function, specifically solute transport rate and ultrafiltration capacity) is fundamental to PD prescription. This is for the following reasons:

- There is considerable between-patient variability in both solute transport and ultrafiltration capacity.

- Membrane function is an independent predictor of patient survival; specifically high solute transport and low ultrafiltration capacity are associated with worse outcomes.

- Membrane function changes with time on therapy. Early changes – usually during the first few weeks of treatment - can be avoided by performing tests 6 weeks after commencing PD. Later changes vary between patients but tend to be increasing solute transport and reduced ultrafiltration capacity; the rate of membrane change is accelerated in patients with earlier loss of residual renal function and greater requirement for hypertonic glucose solutions.

The PET test allows for a measurement of membrane function by measuring equilibration of dialysate glucose, and creatinine across the peritoneal membrane during a 4 hour dwell of 2.27% dialysate.

This allows:

- Determination of the membrane transport classification (High, High Average, Low Average, Low).

- Prediction of dialysis dose.

- Choice of regime (e.g. long dwells for slow transporters).

- Monitoring of membrane function.

- Diagnosing membrane injury.

- Diagnosing causes of inadequate solute clearance and ultrafiltration.

This guidelines sets out the procedure for performing a Peritoneal Equilibration Test (PET), in order to assess membrane function in patients on peritoneal dialysis (PD).It applies to all individuals employed by the University Hospital of Leicester NHS Trust including nursing, medical and allied healthcare professionals involved with the care of patients undergoing peritoneal dialysis in the hospital or community setting.

2. Guideline Standards and Procedures

2.1 Indications

Peritoneal membrane function should be monitored regularly - 6-8 weeks after commencing treatment and at least annually or when clinically indicated.

2.2 Contraindications

This test should not be performed with 6 weeks of an episode of peritonitis.

2.3 Limitations of practice

This protocol should not be undertaken by an inexperienced nurse without direct supervision from a competent renal nurse.

2.4 Criteria for competence

This protocol is for the use of all medical staff and suitably qualified registered nurses, who have
achieved competency in peritoneal dialysis or are under direct supervision of a peritoneal dialysis
competent nurse.

Evidence of competence in peritoneal dialysis should be evidenced by completed and signed peritoneal dialysis competencies within the practitioner's portfolio.

The Nursing and Midwifery Council (2008), The Code: Standards of conduct, performance and ethics for nurses and midwives states that;

- You must have the knowledge and skills for safe and effective practice when working without direct supervision.
- You must recognise and work within the limits of your competence.
- You must keep your knowledge and skills up to date throughout your working life.
- You must take part in appropriate learning and practice activities that maintain and develop your competence and performance.

2.5 Procedure

A Urea Kinetic Modelling (UKM) test will need to be performed with or prior to the test to allow results to be processed in the Adequest or Patient online computer programme.

2.5.1 The test should always be performed after a 1.5 or 2 litre overnight dwell using 2.27% glucose. This must be in situ for between 8 and 12 hours. The patient must not drain out the overnight exchange prior to the test.

2.5.2 For patients on APD, their treatment should finish at least 8 hours before the start of the test. The therapy must end with a 2 litre fill of 2.27%.

2.5.3 The overnight exchange should be drained out over 20 minutes and the bag weighed and a

10ml sample of effluent taken, labelled appropriately and sent for estimation of urea and creatinine. This sample and all dialysate samples should be clearly labelled as PD fluid.

2.5.4 A 1.5 or 2 litre bag of 2.27% dextrose should be infused into the patient, whilst supine, over a period of 20 minutes. The patient should be rolled from side to side after each 400ml of infusion.

2.5.5 At the completion of infusion (Time 0), a 10ml sample of dialysate is taken. This is achieved
by draining 200ml into the dialysis bag, mixing, then withdrawing a 10ml sample of this effluent. The remaining 190ml is returned into the patient. The sample is appropriately labelled and sent for glucose, urea and creatinine estimation.

2.5.6 This step is repeated after 120 minutes and a dialysate sample obtained: a blood sample is also taken at this point and sent for glucose, urea and creatinine estimation.

2.5.7 After a further 120 minutes (Time 240), the fluid is drained out completely over a 20 minute period and the volume measured. The fluid is well mixed and a 10 ml sample collected and sent for glucose, urea and creatinine estimation.

2.5.8 The patient may be freely ambulant during the 4 hour test.

2.5.9 At completion of the test, additional fluid may be administered according to their normal regime.

2.5.10 The results of the test should be recorded on the patient data input form (attached).

2.5.11 The dialysate/plasma (D/P) ratios for urea and creatinine concentration, and the dialysate in/out ratios (D/DO) for glucose are determined for the three time points. The results are calculated using PD Adequest version 2.0, into which the results from the data input form should be entered.

2.5.12 The D/P creatinine at 4 hours is used for membrane classification: this and the other results from Adequest should be entered into the appropriate screens on the Proton system.

3. Education and Training

Medical staff from nephrology and transplant service and nursing staff (ward nurses, haemodialysis nurses and renal community team) should be familiar with guideline and access it for specific advice on dosing.

This table is used to track the development and approval and dissemination of the document and any changes made on revised / reviewed versions.

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