

## Haemodialysis scheduling, adequacy and laboratory monitoring (Monthly, quarterly, annual bloods and MRSA & MSSA screening)

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

### INTRODUCTION

For haemodialysis to be effective there are is general evidence of recommended scheduling of dialysis and measures of adequacy and efficiency to ensure the patient is receiving optimal treatment, regular monitoring and evaluation of results is required, to provide the patient with a quality of life they expect. Dialysis adequacy is generally monitored monthly, whilst some slower developing and changing factors such as parathyroid hormone (PTH) levels, B<sup>12</sup>, Folate and aluminium levels are monitored quarterly or annually. A the risk of contracting blood borne viruses and healthcare acquired infections (HCAI) is high, regular screening is necessary to ensure all patients are cared for in a safe environment and free from infection.

### THIS GUIDELINE IS FOR USE BY THE FOLLOWING STAFF GROUPS :

Nurses and doctors working within renal medicine

#### Lead Clinician(s)

Alison Shelton

Dialysis Unit Manager

Reviewed with no amendments on:

25<sup>th</sup> July 2013

Extension approved by Trust Management Committee on:

22<sup>nd</sup> July 2015

Review Date:

8<sup>th</sup> April 2020

This is the most current document and is to be used until a revised version is available

**Key amendments to this guideline**

<b>Date</b>	<b>Amendment</b>	<b>By:</b>
May 2010	Guideline approved by	Clinical Effectiveness Committee
25/07/2013	Guideline reviewed and approved by	Dr Martin Ferring
07/08/2015	Document extended for 12 months as per TMC paper approved on 22 <sup>nd</sup> July 2015	TMC
02/12/16	Documents extended for 12 months as per TMC paper approved on 22 <sup>nd</sup> July 2015	TMC
October 2017	Document extended for further two years without changes	Dr Martin Ferring
December 2017	Sentence added in at the request of the Coroner	
January 2020	Document extended for 3 months whilst undergoing approval process	Dr Martin Ferring

**DETAILS OF GUIDELINE**

This guideline is relevant to all staff and individuals performing or caring for patients with end stage renal disease and undergoing haemodialysis. A copy of the guideline will be giving to all relevant individuals and a signature list obtained to confirm understanding and agreement to the guideline.

**INTRODUCTION**

A number of factors are responsible for the efficiency of dialysis, for example patients access and blood flow, dialyser size and membrane type, method of dialysis and blood litres processed. Patient general wellbeing and nutritional state are also important parts of the overall goal, when monitoring and assessing dialysis adequacy. It is well documented that the more dialysis a patient receives the better their outcome and life longevity. However as the optimum dialysis would be at least daily in an attempt to match normal kidney function, this also has to be balanced along with trying to live a normal a life as possible. Recommendations and what is considered to patients as an acceptable balance, is to receive haemodialysis thrice weekly for around 4 hours each session. However this is also dependant on patient size, condition, their wellbeing and may in fact need to be increased or in some cases reduced if the treatment is to relieve symptoms only. Regardless, all treatments require some monitoring, assessment and evaluation.

Dialysis adequacy is a global concept where molecular clearance is measured by the dialysis process. The molecular weights of the solvent and solutes to be cleared by dialysis range over three orders of magnitude, from small (water and urea) to large ( $\beta$ -2- microglobulin). Adequate clearance of the whole range of molecules by dialysis is important. For practicality reasons, haemodialysis adequacy is calculated using a small molecule such as urea.

Haematology and anaemia status of the patient is also extremely important as the patient is at great risk of haemorrhage, intestinal bleeding, anaemia caused from uraemia etc. Regular monitoring and correction ensures the patient suffers no symptoms of anaemia.

Being aware of the patients blood borne virus status and MRSA and MSSA status is vital for the safety of all patients and staff. Positive status of any kind requires segregation, treatment and more regular monitoring. An uncontrolled outbreak within a unit would have serious consequences.

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All adequacy and monitoring has set standards to achieve and all these results are collated on a central database – UK Renal Registry. Measuring of adequacy is performed using one or both global measurements – urea reduction ratio (URR) or and clearance, time and volume (Kt/V).

### Haemodialysis

Haemodialysis is the removal of toxic wastes and fluid using a dialysis machine, treated water, dialysate concentrates, blood lines and a dialyser.

### Frequency

It is recommended that a patient should receive haemodialysis three times weekly and for approximately four hours at each session. The time however is not a set determined figure, as other factors have to be taken into considerations. These being the patients other medical conditions and health, their size and body weight, the efficiency of their dialysis access and their physical tolerance to treatment. More effectively is to ensure that the patients receive the best tolerated dialysis they can manage, using the best dialysers, with the highest blood flow and dialysate flow they can tolerate, for the longest time they can tolerate, on a dialysis machine that can monitor and recognise problem issues as they appear. The recommended measurement of dialysis is for a URR of > 65% or an eKt/V of > 1.2. However this still only provides the patient with an average overall eGFR of 10 – 15 mls/min, which is probably at the point that they started dialysis. Unfortunately they will not return to the level of well-being and biochemical status as they were when their kidneys were functioning normally. However the more dialysis the patient can tolerate and the more frequently they can receive it, the closer to normal and the greater improvement to their actual GFR they will manage. To ensure the patient receive the best dialysis they can, measuring and monitoring dialysis adequacy is vital.

### MONITORING TOOL

Every patient with end-stage chronic renal failure receiving thrice weekly HD should have consistently:

- either urea reduction ratio (URR) > 65%
- or equilibrated Kt/V of >1.2 (or single pool Kt/V of > 1.3) calculated from pre- and post-dialysis urea values, duration of dialysis and weight loss during dialysis.

To achieve a URR above 65% or eKt/V above 1.2 consistently in the vast majority of the haemodialysis population clinicians should aim for a minimum target URR of 70% or minimum eKt/V of 1.4 in individual patients. Aiming for these target doses also addresses the concerns raised by recent data which suggest that women and patients of low body weight may have improved survival rates if the URR is maintained above 70% or eKt/V is at least 1.4. The aim for this guideline will be for all patients to achieve a URR of 70% or eKt/V 1.4

**URR** – is the simplest monitoring tool.

The percentage of fall in blood urea affected by a dialysis session is measured as follows:

$$\frac{\text{pre dialysis urea} - \text{post dialysis urea}}{\text{pre dialysis urea}} \times 100\%$$

**Kt/V** urea is also predicated from one of several simple formulae but requires the data of the pre and post dialysis urea, dialysis duration and fluid loss during the dialysis session to be computer calculated.

Haematology and other values are set from national standards by the Renal Association

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All results and care issues of all patients will be evaluated and discussed at a multidisciplinary quality meeting with a consultant nephrologist at least monthly. The outcome of these meetings will be recorded and feedback to the patient and patients GP. Outcomes will be endorsed and treatment changes made by the named nurse. A paper trail will confirm results have being actioned, re-evaluated and all parties informed.

Whilst the named nurse is responsible for ensuring their patients monitoring is performed, evaluated and care altered, the unit manager is responsible for ensuring that all monitoring and treatment changes are performed safely and within the guidelines and that results meet the standards and are fed to all the collating database bodies. Quality outcomes will be fed back to the lead nurse in a quality monthly report from the unit manager.

Approved sampling must also be ensured, for example post urea blood sampling must be taken according to a recommended method, which all staff and patients follow and which is confirmed to the renal registry as the chosen method of post urea sampling. The post-dialysis sampling method used within WAHT and as most widely used by UK renal units is the **Stop-dialysate-flow method**, (Mactier et al 2000)

### Stop-dialysate flow post urea sampling method

Once the dialysis time is completed:

- Stop the dialysate flow
- Maintain the patients normal blood flow
- Wait 5 minutes
- Sample from either the venous or arterial sampling port
- Wash back as normal

STANDARDS	%	CLINICAL EXCEPTIONS
For all patients to receive the minimum documented monitoring of adequacy of treatment	100% of all patients	For all patients adequacy to be within the expected national quality standard limits

### Pre dialysis monthly bloods and sampling

Test	Bottle	Lab	How	When
U/E Bone Bicarb,	gold	Chem.	Before flushing with saline (for RDC following removal of lumen locking agent and before flushing with saline)	1st
FBC	purple	Haematology	Before flushing with saline	2 <sup>nd</sup> (after filling gold top)
MSSA + MRSA	swab	Microbiology	Renal dialysis catheter (RDC) exit site, nares and any other wounds (patients only)	Before cleaning of exit site or wound

### Post dialysis monthly bloods

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Test	Bottle	Lab	How	When
Urea	gold	Chemistry	<b>Stop-dialysate-flow method</b> 1. Stop dialysate flow, but keep blood pump running for five minutes. 2. Take a blood sample from anywhere in the blood circuit	1st

### Pre dialysis three monthly bloods and sampling (all monthly samples +below)

Test	Bottle	Lab	How	When
Liver function, cholest, CRP,	gold	Chemistry	Before flushing with saline (for RDC following removal of lumen locking agent and before flushing with saline)	1st
PTH	gold	Chemistry	Before flushing with saline	After U/E
Ferritin	gold	Chemistry	Before flushing with saline. No less than two weeks after the last dose of IV iron	After U/E
HBsAg, HCV	Red	Serology	Frequency will increase if the patient has recently returned from a high risk overseas area. Patients consent required	After U/E
MSSA + MRSA	swab	Microbiology	All patients. Nares, access, wounds	Before cleaning of access or wounds & 2 days after taking any antibiotics or Mupiricin nasal ointment

### Pre dialysis annual bloods

Test	Bottle	Lab	How	When
HIV	Red	Serology	Following other sampling. Patients consent required	After U/E
B <sub>12</sub> + Folate	purple	Haematology	Following other sampling	After U/E
Aluminium	gold	Chemistry	Following other sampling	After U/E

## REFERENCES

- Renal Association (2007): Treatment of adults and child with renal failure
- Mactier, Geddes and Troynor at Stobhill Hospital, Glasgow: Slow-dialysate-flow method
- Geddes CC, Traynor J, Walbaum D et al. (2000) A new method of post-dialysis blood urea sampling: the 'stop dialysate flow' method. *Nephro Dial Transplant* 2000;15(4):517-23

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- WAHT Pathology Handbook

### CONTRIBUTION LIST

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