The Shrewsbury and Telford Hospital NHS
NHS Trust

Patient Management Framework

for

Acute Dialysis

A guide for Renal Nurses in the assessment, treatment planning and evaluation of acute renal failure patients

Acute Dialysis Assessment

For acute patients, plus chronic patients presenting unwell.

AT FIRST GLANCE

Assessment	*Rationale*
IMMEDIATE ATTENTION	
Hyperkalaemia Pulmonary oedema Gross acidosis (pH < 7.1)	If life threatening, proceed with dialysis immediately.

If the patient has presented in a life threatening condition, you will not have time to do a full assessment. You would perform an **Emergency Acute Assessment** just to get the patient onto AFB, then once the patient is on, carry on with the rest of the assessment…….

EMERGENCY ACUTE ASSESSMENT

Assessment	*Rationale*
Diagnosis	Make a note of diagnosis **AFB is default treatment**
Acid Base balance	May have severe acidosis, you will need high bicarbonate replacement rate
Potassium HIGH	If high, will reduce as soon as patient is on AFB If K+ low or normal and patient is acidotic, there is a **great danger of hypokalaemia** – use K+ trimmer.
Bleeding risk / platelets	If post or pending surgery or if patient is a bleeding risk, use either tight heparin, heparin free or epoprostenol (flolan) If platelet count < 50, use heparin free or epoprostenol.

Fluid balance	If MOF, likely to be dry. If in doubt and first session, use colloid prime and straight hook up. If obviously fluid overloaded (pulmonary oedema) use bleed off and gradually increase UF rate.
Blood Pressure contingency	Make sure you have a contingency plan if BP crashes. Use colloid (beware of pulmonary capillary leak if pt is in septic shock).

Now that AFB has started, acid base deficit will be correcting, potassium will be reducing or stabilising and if overloaded, fluid will start to be removed. You now have time to think about everything else. Make sure the patient is safe.

Now perform the **Full Acute Assessment**, please see next page…….

FULL ACUTE ASSESSMENT

Assessment	*Rationale*
Diagnosis	Choice of technique ie AFB, HDF,
General condition	Can we fit patient into timetable or is Dx urgent?
? Multi organ failure (MOF)	Determines level of renal nursing skill
Multiple injuries / rhabdomyelosis	Expect rapid rise in serum K+ (no trimmer)
Blood borne virus screen	Must be performed at earliest possible opportunity to determine if isolation procedures required.
Access	Right Internal Jugular (150mm Or 200mm) or Right or Left femoral (250mm) Ensure correct locking procedure is followed
Religious considerations	eg Jehovah's and blood products / re-circulation.
Impending or recent surgery?	Anticoagulation type and schedule Blood flow
Platelet count ?	Heparin free (with saline flushes) or epoprostenol (Flolan) if platelet count < 50
Resuscitation fluid – what do I use ?	Colloid or crystalloid ? ? danger of pulmonary capillary leak ? use plasma prime
Oncotic agent to help UF	Isoplex
First session	Watch for first use syndrome Blood flow 180mls/min Treatment time of 2 hours If Blood urea level high @ start consider rate of reduction (Disequilibrium syndrome)

OBSERVATIONS	
Look at patient, ask how he feels, and use your intuition.	Probably more important than anything else.
Weight	If possible weigh patient, important baseline and absolute determinant of fluid state over several days. Also determines size of dialyser and volume of blood circuit.
Temperature, core and peripheral	Infection, catabolism, dialysate temperature setting.
ECG tracing	Arrhythmias, subsequent effect of Dx on ECG. Look for possible interference of blood pump on trace [1]. Always monitor 1st session then assess need for monitoring requirements
BP	Most readily obvious vital sign.
CVP and /or JVP	Indicator of fluid balance.
Skin colour, tone, feel for oedema	Indicates perfusion, degree of shock, fluid balance, general well-being.
Resp rate, pattern, depth	Respiratory difficulty, degree of acidosis.
Saturation (oximeter / ABG)	Blood oxygenation, baseline and guide
Conscious state / confusion / lethargy	Baseline for gauging efficiency and degree of side effects, eg disequilibrium effects.

PATHOLOGY	
Serum sodium	Control of hypo / hypernatraemia Sodium modelling / conductivity setting Effects of high Na+ drugs Salt in diet
Serum potassium	High? Low? ??dangerously so? Relationship with degree of acidosis Use of trimmer Effect of insulin Obligatory K^+ in TPN Potassium abuse in food and drink
Acid base balance	Bicarbonate proportioning in HDF/HD Na HCO_3 infusion flow in AFB Beware acidosis AND hypokalaemia
Serum urea and creatinine	Blood exchange markers Indicators of catabolic states Indicators of residual function
Urinary Urea Nitrogen	Indicator of residual / returning function
Serum Ca++	Concentrate determinant, diet
Serum phosphate	Use of HPO_4 binders, diet If low and requires K_2HPO_4 infusion, then? ITU
Serum albumin	Nutritional status marker. If low, oncotic pressure effects with high UFR. Consider Isoplex or 20% albumin.
Blood sugar	? diabetic patient, Use of glucose bath Is patient on TPN and insulin - rebound hypoglycaemia.

Hb	If low,?? CRF Blood transfusion Effect on Hb with low heparinisation. Also look at Hct
Platelets	? less than 50 Consider heparin free or epoprostenol Effect of dialysis time Effect of membrane

INTAKE	
Oral and IV fluid	What type, how much? Set fluid restriction
Sources of protein and electrolytes	Anything pt should not have? Dietician referral
TPN & Insulin	Effect of lipid Effects of obligatory electrolytes Sources of K^{+}, Ca^{++}, etc Volume - any problems with UFR? ? daily Dx for volume
Blood transfusion	What type of access? ? Give on Dx - arrange to be ready. Effect on heparinisation of circuit
Peripheral line	Useful if colloids or blood are being given, or for intermittent bolus drug administration.

Assessment	*Rationale*
OUTPUT	
Urine volume	Extremely important as it eases dialysis considerably if UFR kept low. Is it increasing / decreasing? Is high UFR / high weight loss reducing volume? Aids setting of fluid restriction.
Urine quality	Specific gravity, pH, blood and protein presence. 24 hour collection is good determinant of function.
Urinary catheter	Do you need if patient is anuric?.
Bowel function	What function and when? Quantity - further determinant of weight loss
Other output	Further determinants of volume losses. Eg. naso-gastric, vomiting Fluid collection (ascites, PD fluid)– drainage will affect weight considerably.
Overall fluid balance	Has major implications for fluid overload at one extreme and dehydration, shock and access loss at the other.

MEDICATIONS	
Diuretics	? need if anuric
Nephrotoxic agents / combinations	Possible cause of ARF -
Dialyzable drugs	Modify dose (medical staff), discuss alternative times to administer. Seek advice of pharmacists.
Digoxin	Danger of arrhythmia's if K+ drops too quickly. Use of K+ trimmer makes concentration gradient less steep.
Inotrope infusions	Baseline to determine effects of RRT Try NOT to reduce on Dx if possible.
Intra-muscular injections	Possibility of haemorrhage due to anticoagulation
NURSING CARE	
Position in bed	If breathless, sitting position may bend femoral lines. ? effect of position on care by others eg physio's
Passive movements / physiotherapy	Beware of temporary loss of blood flows through movement of patients and / or chest physiotherapy.
Oral care	As required particularly if dehydrated & receiving oxygen via mask.
Equipment and ancillaries	Oxygen cylinder full and working? Suction and other emergency / ancillary equipment ready? Spare drug infusion ready?

PSYCHOLOGICAL CARE	
Reaction of patient to pre-dialysis counselling.	Baseline for effects of dialysis. Approach to explanation of dialysis.
Communication	What name does the patient like to be referred by? Are their any other methods of communication being used . eg Alphabet board or pencil and pad.
Paralysed / sedated patient.	Sensory systems intact. Patients can hear, feel and worry. May not always see. Disorientation of space and time. Remember that during assessment and intra-dialytic care to talk to patients, to explain what is happening, to orientate. Touch is also important.
Psychological effect on relatives and friends.	Effect of high tech environment. For every patient in physical crisis, there will be at least one relative / friend in psychological / emotional crisis. What degree of involvement can relatives / friends take in care?

Treatment Planning for Acute Dialysis

Topic	*Rationale*
General Considerations	
Type of RRT	AFB is default RRT AFB if patient unstable or if nurse has any concerns about patient, if cardiac problems, if in shock. HDF for stable / uncomplicated acutes
Machine type	Kimal Nikkiso for AFB Fresenius 4008/5008 for HDF
Treatment locality	Renal Unit. Consider ITU if patient is very unstable or likely to suffer serious complications.
Timetable	Daily short sessions or if recovering, go by pathology results. When can you dialyse? Is there a slot during operational hours? What is a safe interdialytic period ?
Pharmacy legalities	Pharmacy prescription charts signed by a doctor where necessary.
Extracorporeal Circuit	
Circuit configuration	Always double needle/Single pump Single needle HDF only if double needle impossible.
Dialyser	Elisio 13H default for Acute patients Ensure right size dialyser for right size patient K_{OA} or surface area.

Dialyser configuration	Synthetic hollow fibre is default
Dialyser membrane	High flux, synthetic membrane (Polynephron)

Topic	*Rationale*
Dialysis Efficiency and Adequacy	
Blood flow (Q_B)	Low (180ml/min) if first session or if cardiac problems. Determinant of efficiency. Go to 250mls/min with ward acutes if required.
Diffusive time	Determinant of efficiency (with Q_B). Allow for sequential UF time and deduct non-diffusive time for expected problems. For first intermittent session of ward patient with high urea, no more than 2 ½ hrs.
Concentrate	Requirement for glucose - ie diabetes, TPN. Biochemistry, particularly K^+ D294 is default for HDF Standard prescription for AFB is 2001
K^+ trimmer	Serum K+, acidosis, digoxin, rhabdomyelosis, obligatory K^+ in TPN are all factors to consider. Important if acidotic and K+ normal or low…….. Ward acutes Trim to 3 or 4 mmol/l (max)

Proportionating	Sodium modelling. Conductivity setting in AFB HCO_3 setting on HDFmachines
Hook up / Bleed off technique	? Fluid to lose? BP low? use of colloid prime. Straight hook up unless in pulmonary oedema
Dialysate temperature	Default 36.5°C. May be reduced to 36.0°C. Aim is to set to optimum comfort for patient.
AFB conductivity	Different to haemodialysis. Eg 136 mmol / l ≡ 14.2 mS/cm/sec Otherwise, same as sodium modelling
AFB bicarbonate flow	Dependent on acid base balance, blood flow, dialyser type, dialysate flow. Titrate HCO_3 against acid base balance. Use standard Shrewsbury Renal Unit calculation and see guidelines.

Topic	***Rationale***
Ultrafiltration	
Dry / target weight.	Ideal weight for patient and "target" to reach in UF calculations. Is the absolute determinant of fluid balance and nutritional state.
Pre-dialysis weight	Actual weight of patient presenting for dialysis. It is usually impossible / difficult to weigh bed bound pts. Use standard fluid assessment methods, ask medical opinion.

UF technique	Straight forward dialysis or sequential technique. Consider UF modelling. Consider effect of albumin or synthetic colloids.
UF rate	Observe UF policy, split into diffusive and sequential modes.
Transmembrane pressure	On some machines, may be a useful determinant of how hard the machine is working to take fluid off. Take a baseline reading once pt established on UF rate and check periodically. Change in TMP over time is important
Colloid or crystalloid to titrate against BP drop.	What to give (ask for medical opinion in septic shock), how and when. Peripherally or via circuit? Full benefits of albumin are only apparent after 20 mins.

Topic	***Rationale***
Anticoagulation	
Anticoagulant type	Is there active bleeding or a bleeding risk, what is the platelet count, Is there a sensitivity to unfractionated heparin. Consider heparin free with saline flushes. Obtain medical opinion if required. Remember that in AFB, if dialyser surface area is lost to clotting, bicarbonate loss will be lessened = subsequent danger of alkalosis.
Anticoagulant regime	?recent or impending surgery? danger of bleeding. Consider heparin free, tight/minimal, reduced or normal schedules.

Anticoagulant bolus and flow	According to above or else modify schedule depending on circumstances.
Anticoagulation assays (ACT test)	Obtain baseline CT before anticoagulation given. Determine frequency of testing depending on bleeding risk and schedule. Dose adjustment as per anticoagulation policy.
Anticoagulation discontinuation	If AVF or graft, discontinue $^{1}/_{2}$ to $^{3}/_{4}$ hour prior to take off procedure.
Catheter locking solution	Depends on catheter type. Temporary catheters use Heparin. Tunnelled catheters use Duralock. Amount of lock is dependant on the size of catheter. This is written on the catheter and patient prescription/dialysis orders. Do not lock if limb used for infusion. Use return limb for infusions.

Treatment / Topic	***Rationale***
Intra-dialytic assessment	
Frequency of observations.	To determine effects of RRT on body systems. The more unstable the patient, the greater the frequency and intensity of observation.
Intra-dialytic blood work (eg U/E's)	Perform if unsure about clearances, particularly the effect of RRT on K^{+}
Blood sugar estimations	Important if TPN or insulin are used or if patient is diabetic.

Intradialytic VBG's	Essential for AFB in order to titrate bicarbonate against acid base deficit. Take as frequently as required.
Intake	
Peripheral line	If crystalloid and if patient anuric and overloaded, reduce I/V rate to lessen UF rate.
Oral fluids.	Normally allow for 200mls. Is patient well enough to drink?
Diet.	?dumping syndrome especially with high UF rate. Redirect meals to renal unit.
TPN.	For Ward patients, stop infusion and recalculate infusion rate for recommencing post dialysis. Also see insulin below (under drugs)
Output	
Frequency of measurement of all output.	Continue as per ward plans. Be prepared for lessening of urine output with high UF rates.
Naso gastric tubes.	Be aware of danger of vomiting caused by RRT combined with ileus and supine position of patient in cases of hypotensive crash. If N/G tube available - use it.

Treatment / Topic	*Rationale*
Drugs.	
Intradialytic drugs.	Plan infusion, bolus injections. Eg Vancomycin 1 hour 40 mins before end of session via infusion pump.
Post dialysis drugs.	Give post dialysis or on washback.
Specific nursing care.	
State preferred position	May be important if flows are poor.
Oral toilet, frequency and type.	Continue as per ward plans. Modify if oxygen therapy is used.
Wounds and drains.	Note on plan if danger of bleeding.

Evaluation of Acute Dialysis

Whereas chronic dialysis evaluation looks at a defined period of treatment (usually 1 to 2 months), acute dialysis focuses on one session.

Evaluation of Effectiveness

Effectiveness of acute dialysis may be determined in many ways, including……

1. Reduction in urea (urea reduction ratio (URR) in stable patients of > 65% for patients dialysed thrice weekly) or UKM (for established stable patients - KT/V of > 1.4 for patients dialysed thrice weekly.

2. Asymptomatic session.

3. Correction of acidosis, ideally to a pH of 7.4 and standard bicarbonate of 25 mmols/litre.

4. Stabilisation of other pathology parameters such as Ca^{++}, $HPO4^{--}$, Hb.

5. Effect on other body systems - eg respiratory, cardiovascular stability.

6. Minimal blood loss and satisfactory washback (ie effective anticoagulation).

7. Eventually: patient outcome and return of renal function.

Clinical Review

This is conducted by a senior member of the clinical team, usually the Senior Nurse, Registrar or Consultant and either by retrospective chart review, audit, case study or ward round. It represents a second tier of clinical management and supervision on top of first line management and clinical supervision by renal nurses and is especially useful for teaching purposes.

Documentation of session.

This applies to ward patients. A session report must be written in the patient medical notes using a Dialysis sticker, in order to confirm attendance, and long term reference for legal purposes. For new patients or those considered complicated, documentation must show a distinction between assessment, intent and evaluation of effectiveness. For established stable patients, a brief summary will suffice as for chronic dialysis patients. Please refer to the policy "*The Written Record*" and see samples quoted at end.

Daily dialysis charts should remain on the unit where a summary can be written to use for verbal report purposes. Renal Plus Database must be updated after each session.

Sample documentation for new / complicated ward acute session…..

Evaluation / Progress Report		
Date		**signature**
01/01/12	*RENAL NURSE. 52 year old lady transferred from PRH Telford with*	
19-00 hrs	*History of ARF following repair of # neck of left femur (6 weeks ago).*	
	Seen by registrar, BBV screen taken, considered dry, possible pre-renal cause,	
	Very acidotic, pH 7.2, SBC 15.0, K+ 6.8, Urea 39, Creat 448, Na 138	
	NIDDM, good control. Digoxin ^{O}	
	Some mention of previous renal impairment.	
	Right sided internal jugular inserted.	
	BP 110/70, HR 110 Resp rate 26 min, Kusmaul.	
	Plan: (1) 2 hours AFB (2) HCO_3 *@ 16% of* Q_B *(3) Use K trimmer*	
	(as patient acidotic) 3mmol/l (4) No fluid removal (5) Straight hookup.	
	(6) Tight heparin (7) QB 180 mls / min (8) ½ - 1 hrly gases	
	(9) Search pre-ESRF list. (10) Watch for K+ drop	
	Good flows, BP stable, perfusion better after 1 hour, Breathing less	
	laboured, good correction of acid base to pH 7.35, SBC 23. K+ 3.9	
	ACT range 123 - 135 secs on 1000 iu/hr. Glucose 7.6 mmol/l.	
	2 hours completed, no fluid off, good washback.	
	We will plan to dialyse again in the morning.	*A. Other*
		renal on call

Sample documentation for routine session……

Date	kardex2.xls	**signature**
01/02/12	*RENAL UNIT. Routine 3 x weekly HDF continues, no fluid loss as*	
19-00hrs	*urine output improving. Elisio 13H, D294, normal heparin*	
	Total $3^{1}/_{2}$ *hrs, good washback, catheter heparin locked.*	
	Review tomorrow re further dialysis.	*B. Smith*

Original Gemapps\fr\ac\ass1 draft 2/90
1/12/94 working document. BSK.
To Word 6/95
Reformat 6/99 + some changes.
Reformat 07/10/02 + changes
This booklet has assessment, Rx planning and evaluation combined.
1. MRHA One Liner Issue 38, 2005. Superimposed trace on ECG may be blood pump.
28/8/06 Active C protein (pt MN)

Reviewed and amended 17/04/12/12 Sonia Howell to reflect current practice.