

Guidance for prescribing First RRT (SLEDD & SCUFF) in ICCU

Definitions:

- Slow Low Efficiency Daily Dialysis (SLEDD) is a form of RRT that combines the advantages of CRRT and Intermittent Hemodialysis (IHD) by using conventional hemodialysis machines with low blood flow rates over longer duration than standard haemodialysis (so better haemodynamic stability) for ureamic toxin and solute clearance.
- Slow Continuous Ultrafiltration (SCUFF) is continuous renal replacement therapy used when only fluid removal is required i.e. no solute or toxin clearance is needed.

Indications:

1- Hemodynamically unstable patients with Severe Acute Kidney Injury and one of the following:

- Refractory Hyperkalaemia with potassium > 6.5 mmol/L Or rapidly rising potassium.
- Refractory fluid overload
- Severe metabolic acidosis with PH < 7.1-7.2 despite optimal medical management.
- Signs of uraemia, such as pericarditis, encephalopathy, or an otherwise unexplained decline in mental status.

*Severe AKI is defined according to Kidney Disease: Improving Global Outcomes (KDIGO) criteria (an increase in serum creatinine to three times baseline, **or** increase in serum creatinine to ≥ 353.6 micromol/L, **or** reduction in urine output to <0.3 mL/kg per hour for ≥ 24 hours, **or** anuria for ≥ 12 hours).

2- For removal of certain alcohol and drug intoxications, use the mnemonic **TABS MEL**; Theophylline, Alcohol, Barbiturates, Salicylates, Methanol, Ethylene glycol and Lithium. We recommend checking the renal drug data base for drug characteristics.

3- Chronic hemodialysis patients who present with an acute illness and are hemodynamically unstable. Patients with Arterio-Venous Fistula and graft who require RRT on ICCU should have this delivered by renal nursing staff (unless a vascath is in-situ) and after consultation with nephrology.

Duration:

The length of the dialysis session depends on the needs of the patient and is generally influenced by tolerance to ultrafiltration and the hemodynamic status of the patient. The time per session ranges from 6 to 18 hours but is typically approximately 6-8 hours.

Ultrafiltration goal & net weight loss:

- The ultrafiltration goal generally varies between 0 and 6 L per treatment, with an average of approximately 3 L.
 - In patients who require RRT solely for fluid removal, SCUFF should be used.
 - The goal is determined by the volume status, the patient's ongoing fluid requirement (eg, NG feeding, TPN and intravenous antibiotics) and the cumulative fluid accumulation since admission. This should be agreed in consultation with the ICCU consultant.
- For patients who are new to dialysis start with 500 ml in the first session and increment over the subsequent sessions.

- For chronic hemodialysis patients use their target (dry) weight if known.
- For patient with pulmonary oedema the ultrafiltration rate should be set as low as possible initially and gradually increased until the maximum tolerable ultrafiltration rate (UF).
- UF rate should normally be between **10-12 ml/kg/hr** (this may need to be titrated during the therapy depending on tolerance)

Machine settings:

- Blood flow rate (Qb): Start with low flow for the first session at 100-150 ml/min to avoid uraemic disequilibrium syndrome in new starters and to reduce risk of intra-dialytic hypotension (IDH). Increment the rate over subsequent sessions as tolerated if SLEDD sessions and clearance are inadequate.
- Dialysate flow rate (Qd): Start at 300 ml/min (typically 1.5 to 2 times blood flow rate).
- Temperature : Lower temperatures are associated with less occurrence intra-dialytic hypotension IDH and better UF goals, however less tolerated by patients and more anticoagulation is required. Use temperatures equal to or < 35.5 C if high volumes of UF are required otherwise general rule set temperatures 0.5 less than patient body temperature.
- Dialyzers : Start with low flux dialyzers for new starters on dialysis e.g. FX8 or FX10
- Dialysis line blood flows
 - 15cm Vascath 230-400ml/min
 - 20cm Vascath 195-365ml/min

Dialysate concentrations

All SLEDD patients will use Citrasate dialysate

Potassium: Depends on patient serum potassium, see guidance on dialysate concentration on V6 embedded in the prescription.

- Sodium: For patient with normal serum sodium use the standard concentration which is 135-136 mmol/L. For patient hyponatraemia dial down to the lowest available concentration which is 128 to 130 to avoid rapid correction which could lead to osmotic demyelination. Short sessions and more frequent are safer.
- Bicarbonate concentration: Use the standard concentration of 30 mmol/L. For patient with very severe acidosis (serum bicarbonate level of <10 mmol/L) use concentration of 35 mmol/L.

Anticoagulation :

- Patient with no increased risk of bleeding unfractionated heparin can be used for anticoagulation of the circuit. This is different from the trust heparin anticoagulation protocol which is used for patients not the circuit.
- For first sessions use no or minimal anticoagulation. Subsequently give bolus of 1000 Units followed by 500 Units/hour. This is prescribed on V6 as Heparin 5000U (RENAL) via dialysis circuit and must be prescribed by the medical team and countersigned by the nursing staff.

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 This is the bicarbonate shown on the machine

- All patients receiving heparin must have their APTT checked every 3 hours once they have received >2000 units of heparin to ensure coagulopathy is not developing.
- Note the most common cause of loss of circuit and premature termination of SLEDD is due to clotting. However reasons for clotting of the extracorporeal circuit are multifactorial:
 - Patient cardiac output & vascular tone
 - Blood viscosity –saline flushes
 - Flow rates via vascular access i.e line position and size
 - Prescription
 - Anticoagulation
 - Intermittent RRT
 - Modification of UF profile
 - Response time to device alarms
- Heparin administration must be discussed with the ICCU consultant on duty in those who have contraindications to anticoagulation.
- In patient with Heparin Induced Thrombocytopenia (HIT) please discuss with the nephrologist on call.

Intradialytic Hypotension:

If a patient develops IDH try the following measures which are related to the dialysis prescription:

- Reduce UF rate, short frequent sessions
- Cool dialysate down to lowest tolerated temperature
- Clinical reassessment of dry weight.
- IDH on ICCU may also be a manifestation of dialysis related cardiac dysfunction and requires assessment of cardiac output and vascular tone to provide the appropriate inotropic or vasopressor pharmacological therapy to facilitate RRT.
- Higher dialysate calcium concentration if this can be done without rendering the patient hypercalcemic.