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Standard Treatment Workflow

HEMODIALYSIS

ICD-11-N005.9

WHEN TO START HD — REMEMBER "AEIOU"

- A - Acidosis: severe metabolic acidosis not responding to treatment
- E - Electrolytes: refractory hyperkalaemia/ECG changes.
- I - Intoxication: a dialysable poison or drug.
- O - Overload: fluid overload / pulmonary oedema not responding to diuretics.
- U - Uraemia: uraemic pericarditis, encephalopathy, bleeding or intractable symptoms.
- Planned CKD start: for uraemic symptoms as function declines (≈ eGFR 5–10) — not by a number alone; decide with nephrology **P** **S**

RED FLAGS — STABILISE & REFER

URGENT - stabilise & arrange emergency dialysis / refer:

- Refractory hyperkalaemia/ECG changes - give IV calcium, insulin – dextrose, salbutamol, then dialyse
- Pulmonary oedema not responding to diuretics; severe acidosis/uraemic emergency
- Air embolism, haemolysis, anaphylaxis (intradialytic emergencies)
- Clotted/failing access (no thrill) or uncontrolled access bleeding; CRBSI/ sepsis

Also refer (non-urgent):

- Access creation / salvage & vein mapping
- Inadequate dialysis or repeated intradialytic hypotension; transplant work-up

INFRASTRUCTURE

- Trained staff (nephrology nurses/technicians)
- Water purification system for dialysate
- Waste management (biomedical waste protocol)

BASELINE WORKUP

- CBC, RFT, LFT; Ca, Phosphate, iPTH
- Hepatitis B & C and HIV status
- Blood group
- Others as clinically indicated

SHARED DECISION MAKING

- Elicit goals of care
- Choose KRT modality - including conservative kidney management (CKM)
- If choosing HD → consider HDF and dialyser type (low- or high-flux)

SELECTION & ACCESS

Kidney failure/AEIOU indication **P** **S**

- No → Plan access early- Fistula First-refer for AVF when dialysis is fore-seeable. Preserve veins **P** **S**
- Yes → Stabilise + urgent dialysis/refer (temporary catheter if no access) **T**

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Access order: AVF > AV graft > tunnelled catheter > temporary catheter (IJV; avoid subclavian) **T**

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Vein preservation: no IV/venipuncture/ BP cuff on the fistula arm-mark "Save This Arm" **P** **S**

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Start vaccination for HBV. Anemia, bone mineral disease, nutrition, BP, glycaemia reviewed **P** **S**

A SAFE SESSION

Before session: weight & weight gain, BP, breathlessness, oedema; examine access **P** **S**

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AVF/Graft- look, feel thrill, listen bruit, check redness. Catheter exit site- clean/dry, aseptic handling **S** **T**

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Machine & circuit checks; right patient/ dialyser/dialysate; hand hygiene; aseptic cannulation/connection **S** **T**

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Start — prescription set by nephrology: blood flow, dialysate, time (~4 h ×3/wk), UF to dry weight, anticoagulation **S** **T**

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New, severely uraemic patient → start short, gentle sessions to avoid disequilibrium **S** **T**

MONITOR & ADEQUACY

Monitor every 30–60 min: BP, pulse, symptoms, access/circuit; keep UF rate safe (avoid very high UF) **P** **S**

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Access pressure, circuit clotting watch -post dialysis needle site bleeding **T**

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Any intradialytic problem?

- No → Complete session; record UF, postweight, BP; review **P** **S**
- Yes → Manage per complications panel →escalate if severe **T**

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Adequacy: track Kt/V or URR periodically - if inadequate, refer for prescription review **S** **T**

TIP- counsel on cost if needed and transport

MANAGING COMPLICATIONS

A. Hypotension — the commonest event

◆ * Fall in BP ± dizziness, cramps, nausea?

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Stop/reduce UF · lay head-down · give saline 100–250 mL · reduce blood flow · oxygen if needed. Find cause: too-fast UF, dry weight too low, cardiac, sepsis, eating, BP meds **P** **S**

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Not improving / chest pain/arrhythmia → refer **T**

B. Intradialytic hypertension

Paradoxical BP rise during/after dialysis → check fluid status & dry weight, review drug adherence; consider a short-acting antihypertensive **P** **S**

C. Cramps/nausea/headache & disequilibrium

Cramps/nausea/headache — usually from hypotension/fast UF → reduce UF, give saline. Disequilibrium (new severe uraemia: confusion ± seizures) → prevent with short gentle starts; if it occurs → slow/stop, support, refer. **S** **T**

D. Air embolism — EMERGENCY

Clamp venous line, STOP pump. Lay on left side, head-down; give oxygen; resuscitate; refer now. **T**

E. Haemolysis — EMERGENCY

Port-wine blood, chest/back pain. Stop dialysis; DO NOT return blood. Support; check K^+; refer **T**

F. Fistula/graft problems

No thrill / no bruit, or new pain & swelling?

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Possible clotted/failing access → refer urgently (salvage is time-sensitive). Post-needle bleeding → firm pressure; if not stopping → refer. **T**

G. Catheter bloodstream infection (CRBSI)

Fever/rigors during or after dialysis in a catheter patient?

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Blood cultures (catheter + peripheral). Start empirical IV antibiotics covering gram-positive (incl. MRSA) + gram-negative per local protocol.
Refer - catheter may need removal. **S** **T**

H. Bloodborne infection control — every session

Hand hygiene & gloves; no shared multidose vials/supplies; clean station between patients.
Dedicated machine / area for HBsAg-positive; safe sharps; staff HBV vaccination. **P** **S**

VASCULAR ACCESS CARE

- Prepare the site properly before cannulation
- Use the rope-ladder cannulation technique (rotate sites)
- Ensure post-HD haemostasis (stop needle-site bleeding)
- Wear a mask for central venous catheter (CVC) use

INFECTION CONTROL

- Proper use of PPE (gloves, gown, mask, eye protection)
- Protocols for cleaning & disinfecting surfaces and equipment between patients

AUDITS

Track and review regularly:

- Infection rates & vaccination uptake
- Hospitalisations, drop-outs & deaths
- Complications (intradialytic & access)

PATIENT & CAREGIVER EDUCATION

Attend every session and control fluid - this matters most

- Don't skip sessions (risk: high K, overload)
- Limit fluid between sessions
- Diet: low potassium & phosphate, less salt
- Adequate protein; binders with food
- BP/anaemia/bone medicines as advised
- Protect the access arm; feel thrill daily
- Keep catheter dry & covered
- Warning signs: breathlessness, swelling, bleeding, no thrill, fever → seek care

INTERDIALYTIC CARE, INFECTION CONTROL & FOLLOW-UP

Access care

- Feel the thrill daily; report loss of thrill, pain, redness or bleeding at once **P** **S**
- Keep catheter dry & covered; aseptic handling only

Between sessions

- Keep to fluid & diet limits; take medicines; attend every session **P** **S**

Infection control & monitoring

- Clean station; no shared vials; HBsAg-positive on a dedicated machine.
- Periodic viral markers, Kt/V/URR, haemoglobin, Ca–PO_4–PTH, dry-weight review **S** **T**

HD IN ACUTE/LIMITED SETTINGS

Track and review regularly

- For unstable patients, SLED or gentler settings reduce hypotension **S** **T**
- If HD not available & patient can't be moved: stabilise hyperkalaemia & overload medically (calcium, insulin–dextrose, salbutamol, restrict fluid) & refer
- Consider acute peritoneal dialysis as a bridge **P** **S**

ABBREVIATIONS

AKI: Acute Kidney Injury
AVF: Arteriovenous Fistula
CKD: Chronic Kidney Disease
CRBSI: Catheter-Related Bloodstream Infection
ESA: Erythropoiesis-Stimulating Agent
HBsAg/HCV/HIV: Viral Markers
HD: Haemodialysis
IJV: Internal Jugular Vein
KRT: Kidney Replacement Therapy
Kt/V & URR: Adequacy Measures
P/S/T: Primary/Secondary/Tertiary
PD: Peritoneal Dialysis
SLED: Slow Low-Efficiency Dialysis
UF: Ultrafiltration

A ROADMAP FOR SAFE, EFFECTIVE AND STANDARDIZED HEMODIALYSIS