

Haemodialysis via Arteriovenous Fistula or Arteriovenous Graft using the 'One Nurse Techniques for Fresenius 5008 Dialysis Machine

Key Points

- Connection and disconnection of haemodialysis patient
- Maintaining AVF/AVG patency
- Managing clinical and technical complications pre, intra and post dialysis

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Abbreviations

MRSA	Methicillin Resistant Staphylococcus Aureus
SPO2	Saturation of Peripheral Oxygen
AVF/AVG	Arteriovenous fistula/Arteriovenous Graft
ISO-UF	Isolated Ultrafiltration
PPE	Personal Protective Equipment
BBV	Blood Borne Virus
VIP	Visual Infusion Phlebitis
FHFT	Frimley Park Hospital
WHO	World Health Organization
NEWS	National Early Warning Score

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Introduction

This protocol describes a **one trained competent nurse technique** and includes:

- a) The correct technique for aseptically preparing an arteriovenous fistula (AVF) or graft (AVG) for **commencement** of Haemodialysis/Haemodiafiltration.
- b) The correct technique for aseptically preparing an arteriovenous fistula or graft for **discontinuation** of Haemodialysis/Haemodiafiltration.

Staff undergoing training around haemodialysis must be supervised by a Registered Nurse who is competent in haemodialysis/ hemodiafiltration, until competencies have been signed and deemed competent.

The implementation of this guideline will be monitored using clinical audit and annual reassessment of competent staff.

Connection Via AVF / AVG

<i>Action</i>	<i>Rationale</i>
Patient Consent to treatment ▪ Check patient ID. ▪ Explain the procedure to the patient. ▪ Obtain verbal consent for procedure. ▪ Check for any known allergies.	▪ To ensure that the correct patient is dialysed. ▪ To ensure patient is informed of procedure. ▪ To minimise the risk of allergic reaction ▪ Ensure ID + allergy bracelet is insitu if any allergies known
Patient Assessment ▪ Ensure patient comfort. ▪ Perform BP, Pulse, Temperature, Respiratory Rate, SPO2 and Fluid assessment. ▪ Check patient's haematology, biochemistry, virology and microbiology results.	▪ To ensure health and safety of patient and the rationale for dialysis ▪ To ensure haemodynamic stability prior to dialysis ▪ To determine correct dose of anticoagulant, dialysate, need for blood transfusion. To ensure that patient is using

▪ Determine whether the patient needs Haemodialysis, Haemodiafiltration or ISO-UF as per discussion with the consultant. ▪ Check dry weight, assess fluid status of the patient and fluid balance chart. ▪ Determine UF goal for the patient. ▪ Set the dialysate correctly as per patient's prescription. ▪ Fully assess AVF/AVG function (See AVF/AVG assessment tool) ▪ If the patient is allergic to chlorhexidine, prepare a single bottle of betadine specific for the patient and write date of opening, and name of patient.	allocated dialysis machine to prevent blood borne virus. (Refer to Blood Borne Virus Policy) ▪ To ensure optimal treatment, prevent intradialytic hypotension. ▪ To ensure thrill and bruit are present. Do not cannulate if absent and inform Nurse in charge and Renal Consultant of the week. May require urgent USS of Fistula. Inform Renal Vascular Nurse. ▪ To prevent anaphylactic reaction & cross infection through single use solution
Preparation of 5008 Fresenius Haemodialysis machine ▪ Perform hand hygiene. ▪ Prepare Fresenius 5008 machine ready for use as per manufacturer's guidelines. ▪ Must be alarm free, priming of the extracorporeal circuit has been completed and free of air. ▪ Ensure the Earth wire is attached to the dialysis machine before use	▪ Prevent infection in line with WHO's 5 moments of hand hygiene. ▪ To ensure patient safety ▪ To prevent risk of air embolism ▪ To prevent electrocution to both staff and patients

Preparation of equipment for Haemodialysis via AVF/AVG

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| <ul style="list-style-type: none"> ▪ Clean trolley ▪ Renal AVF ON/OFF pack or a Dressing Pack ▪ Fistula needles (check for gauge, length and need for single needle) ▪ 2x 10ml BD luer lock syringes ▪ 2x Pairs of clean gloves, sterile gloves for AVG (face mask for graft) <ul style="list-style-type: none"> ▪ 2x10ml 0.9% Sodium Chloride solution ▪ 2x BD blunt filter needles ▪ Apron ▪ Full face visor ▪ Big sharps bin ▪ 1x 2.5ml syringe if diabetic to check GM ▪ Appropriate anticoagulant ▪ 1x 3mls Chloraprep (AVG) or 2x 1.5 chloraprep (AVF) or patient specific betadine bottle ▪ 2x chlorhexidine gluconate wipes ▪ Blood taking equipment if blood test required | <ul style="list-style-type: none"> ▪ To optimise time and avoid unnecessary delay. ▪ To ensure that the correct needles are used as per patient's prescription. ▪ To ensure health and safety of the patient and staff and prevent blood borne virus infection. ▪ Establish the need for blood tests and prevent unnecessary blood sampling. ▪ Ensure blood bottles are sufficiently filled. Prevents delays in virology and other results |
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Process/ Method For AVF/AVG Cannulation

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| <ul style="list-style-type: none"> ▪ Wash hands ▪ Don apron and visor ▪ Sanitise hand with alcogel at bedside. ▪ Ensure trolley is cleaned with Clinell wipes. ▪ Open plastic cover on renal ON pack and drop content onto the table tray, sanitise hands and open the pack. | <ul style="list-style-type: none"> ▪ To ensure consistent approach to cleaning of equipment and wearing of PPE ▪ To prevent and reduce the risk of infection and contamination. |
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▪ Open all other materials needed by dropping onto sterile field using a non-touch technique. ▪ Place 0.9% sodium chloride 10ml ampoules on the edge of the sterile field ▪ Sanitise hands and put on a pair of clean gloves (sterile gloves for AVG) ▪ Draw up 8 ml only of 0.9% sodium chloride into syringe. ▪ Prime fistula needles with 0.9% sodium chloride, if taking blood samples prime only the venous fistula needle. ▪ Place large sterile drape under patient's arm ▪ Clean the fistula/graft site with the appropriate solution. ▪ Apply tourniquet for AVF only. ▪ Insert arterial needle, take blood sample if necessary, assess flow, clamp and tape using the chevron technique ▪ Insert venous needle, assess flow, clamp and tape using the chevron technique. ▪ Remove gloves. ▪ Sanitise hand with alcogel. You are now ready to connect your patient to the machine.	▪ Minimise risk of embolus and aid needle placement ▪ 8ml solution will allow for good patency and flow assessment of AVF. Prevention of infiltration if needle displaced. ▪ Prevent AVF/AVG infection. ▪ To stabilise and engorge fistula and aid in needle placement Tourniquet should not be applied for AVG. ▪ To prevent needle dislodgement ▪ Prevent blood borne virus infection
Connecting patient to 5008 Fresenius Machine Follow the dialysis machine system/operating instructions on screen. ▪ Sanitise hands and put on clean gloves. ▪ Using a non-touch aseptic technique, connect the clamped arterial and venous bloodlines to the corresponding needles and discard syringes. ▪ Ensure all connections are correctly secured and positioned. ▪ Open all clamps.	▪ Reduces the risk of contamination. ▪ To ensure a standardised practice that conforms with Infection Control and Health & Safety practices. ▪ To prevent accidental disconnection and blood loss

▪ Start the blood pump and increase to 100mls/min, observing both the arterial and venous pressures. ▪ When blood has been detected by the machine, increase blood flow rate by 50ml/min until the prescribed value is achieved as per patient's prescription. ▪ Clean arterial sample port of the arterial blood line with 2% chlorhexidine gluconate wipe and administer anticoagulant as prescribed. ▪ Secure blood lines to the patient with adhesive tape and blue disposable clamp ▪ Ensure that the AVF/AVG arm is visible. Never cover with a blanket. ▪ Re-check HD machine parameters as per patient's prescription ▪ Ensure high and low alarm guards are set to a 100mmHg apart. ▪ Remove all PPE and perform hand washing as per protocol. ▪ Ensure that the patient is stable, safe and comfortable and patient has call bell. ▪ Clear trolley and clean with clinell wipes. ▪ Clean the monitor and door of the machine with clear surf. ▪ Ensure that all equipment for disconnection is in the bed space ▪ Sanitise hands.	▪ To optimise blood flow rate, ensuring satisfactory needle placement and maintaining AVF / AVG health ▪ To prevent blood clotting in the extracorporeal blood circuit ▪ Ensure patient safety and prevent needle dislodgement. Promote privacy and dignity. ▪ To ensure machine parameters are in accordance with the treatment prescription. ▪ Prevent blood borne virus infection. ▪ To ensure patient safety in case of early termination of treatment.
Document all relevant information such as AVF/AVG assessment, cannulation, any events during treatment and actions taken.	▪ To keep track of patient's treatment history ▪ To maintain health and safety of the patient. ▪ Maintain legal documentation of care in line with NMC documentation Standards
Monitoring During Dialysis Treatment ▪ Check vital signs every 30 minutes and document on the NEWS chart, dialysis treatment	▪ Ensure patient safety and security

chart and CV5 - Inform Nurse in charge and consultant of the week of any clinical complications during dialysis. - Check if the patient needs any medication during dialysis eg: erythropoietin, iron infusions, blood transfusion, antibiotics and any medications that may be due during dialysis. - Check if patient is comfortable. Provide meals if stable on dialysis. - Ensure call bell is still in reach - Check AVF/AVG needles are securely in place minimum hourly and document.	and prevent patient deterioration. - Prevent delay in medication administration. - Prevent needle dislodgement and blood loss
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Disconnection Via AVF / AVG

Action	Rationale
Preparation of Equipment. - Renal dialysis OFF pack - Connector (recirculating adaptor) 2 luer lok 10ml syringes 2x10ml 0.9% sodium chloride ampoules - Blood collection set if required. 2x clean gloves as required/ sterile gloves with AVG - Apron - Full face visor - Tape - Kaltostat if appropriate 2 x red luer lok caps 1 large orange clinical waste bag - Big deep sharps bin - Clearsurf wipes	- To ensure safe completion of dialysis treatment - To reduce the risk of infection - To ensure safe disposal of needles to prevent needle stick injuries and dialysis biomaterials
Explain the procedure to the patient.	To ensure patient understands the procedure.
- Perform hand hygiene as per WHO guidelines. - Put on apron and visor (personal protective equipment (PPE)) - Check patient's condition, vital signs and document.	To assess appropriate reinfusion volume as per patient's blood pressure

▪ Clean tabletop with Clinell wipes ▪ Open renal OFF pack and drop content onto the clean trolley, sanitise hands and open pack ▪ Open all other materials needed by dropping onto dialysis pack. ▪ Sanitise hands using alcogel. ▪ Place the large sterile drape under the patient's arm. ▪ Remove any securing tapes i.e. those on the dialysis lines (but not the chevron tapes securing needles) ▪ Follow the HD machine reinfusion instructions to the point where the blood pump has stopped. ▪ Sanitise hands using alcohol rub ▪ Don clean gloves for AVF (sterile gloves for AVG) ▪ Clamp the arterial needle and bloodline, disconnect the arterial line from the arterial needle. Join the arterial bloodline to the connector. ▪ Take post dialysis bloods if required. ▪ Flush the arterial needle with 10ml 0.9% sodium chloride. ▪ Open the door of the machine and attach arterial bloodline with the connector to the safe line. ▪ Close the door and unclamp the arterial bloodline. ▪ Apply a luer lock red cap to the arterial needle. ▪ Start reinfusion + check blood pressure. ▪ Complete the reinfusion process until all blood has been reinfused. Continue to infuse if patient is hypotensive. ▪ Recheck patient BP if they were hypotensive check for improved BP ▪ Disconnect venous line once all blood re-infused. Clamp and cap off the access with a luer lock red cap. ▪ Remove the venous needle first apply pressure with a gauze and wait for haemostasis. Minimum of 10 minutes pressure. Remove the arterial needle then apply	and general condition. ▪ Adhering to and maintaining infection control, health & safety and unit policy. ▪ To prevent and minimise infection and cross infection. ▪ To prevent and reduce blood borne virus infection. ▪ Prevent blood loss. ▪ Ensure patient's safety and security. ▪ Prevent unnecessary blood loss as per NICE guidelines. ▪ Patient may assist if able, to hold gauze over venous site once needle removed. While arterial needle is removed ▪ Ensure patient is stable.
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pressure with a gauze until haemostasis is achieved. Redress both needle sites with a clean dressing provided in the renal off pack. Sometimes kaltostat may be helpful to aid haemostasis. ▪ Remove gloves and perform hand hygiene. ▪ Check patient's vital signs, weight and general post dialysis condition. ▪ Check Thrill & Bruit of fistula is present post needle removal before discharge . ▪ Document all patient's vital signs/NEWS and machine data on NEWS chart, the Dialysis Summary chart, Drug chart, hot bed check list and CV5.	▪ Escalate to Consultant on call if thrill/bruit not present or any issues with AVF/AVG. Inform renal vascular access CNS. ▪ Ensure legal documents are completed as per Trust guidelines and NMC guidelines
Machine Disinfection ▪ Perform hand hygiene and don gloves, apron and visor. ▪ Remove dialysate tank and Bi-bag from the machine and dispose safely down the sink in the sluice. Any residual fluids should be drained in the sluice room sink. Bi-Bags if fluids remain should be drained by the dialysis machine. Then should be disposed in the orange clinical bags. ▪ Follow the 5008 Fresenius machine disinfection operating instructions, infection control and unity policy. ▪ Perform heat disinfection after each treatment. Every Friday the machine should undergo cold disinfection/degreasing. Residual disinfection test must be done after cold disinfection/degreasing with potassium iodine starched paper.	▪ Prevent blood borne virus and cross contamination. ▪ Preserving the life of the dialysis machine, preventing the formation of biofilm and ensuring safe dialysis treatment. ▪ Ensure safe disposal of marine contaminants.

▪ Make sure that all disinfectants are within date. ▪ All disinfectants Citrosteril and Sporotol must be safely disposed via estates department. Please check expiry date when cleaning the machine. ▪ Machine must be isolated to the patient until virology status is known. ▪ Restricted dialysis machine sign must be in place on the machine with patient's details and date of virology test. ▪ Contact Fresenius Technical Service department in case of any machine problems. ▪ I am clean sticker applied after cleaning	▪ Prevent blood borne virus and cross contamination. ▪ Maintain machine's integrity. ▪ Name date time for traceability
Educate the patient regarding AVF/AVG care and surveillance. Encourage to contact their Dialysis Unit or GP if they have any concerns	▪ To facilitate prompt action in the event of a possible complications.

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Full version control record

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Version History

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Related Documents

Document Type	Document Name
Guideline	Frimley Park Hospital (2024) Management of needlestick injury and exposure to BBVs for use at Frimley Park ED
Guideline	Blood Borne Viruses - Prevention and Control on the Renal Unit