University Hospitals Coventry & Warwickshire NHS Trust

Clinical Guideline (full)

Management of an Arterio-venous Fistula/Graft

E-Library Reference	CG 1802

Version:	V3
Approving forum (QIPS or equivalent):	Renal Services Procedure and Guideline Approval Group
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Department(s) / Primary Speciality:	Renal

Approval Date:	16th November 2016
Expiry Date:	November 2019
Target Audience:	All healthcare professionals working in Renal Services

Superseded UHCW Clinical Guideline(s): (if applicable)	
UHCW Associated Records:	
Keywords:	Arterio-venous Fistula/Graft

Clinical Operating Procedures relating to this guidance (please list)	
Summary version available	☐

Guideline clinical content

Clinical Guidelines assist in decision-making; they do not replace clinical judgement. Regardless of the strength of evidence, it remains the responsibility of the clinician to interpret the application of the clinical guidance to local circumstances and the needs and wishes of the individual patient. Where variations of any kind do occur, it is important to document the variations and the reason for them in the patient's health record. If in doubt, seek senior advice.

Introduction
(Why this Trust-wide Clinical Guideline is necessary. Include reference to any relevant national guidelines, statutory requirements or other recommendations Identify the risk(s) the guideline will address.)

This guideline applies to renal clinicians/nursing staff who are involved in the care of a patient receiving haemodialysis via a arterio-venous fistula or graft (AVF/AVG). The preservation of vascular access ensures the delivery of effective and timely haemodialysis therapy. The care and management of a patient with a AVF/AVG is therefore, in important aspect of the care and management of a renal patient.

Summary

(Summarise the main points of the guidance. Use flow diagrams where appropriate and limit to a single side of A4)

This document outlines the care and management of either an AVF/AVG and is a pathway of care to follow from referral in the pre-dialysis stage for the creation of vascular access to the time when the AVF/AVG is undergoing cannulation so that haemodialysis can take place. Additionally, guidance is provided so that nursing staff can escalate concerns over the access to the Renal Access Nurse who will then contact the renal medical/surgical team.

Definitions
(List and define terms / abbreviations / acronyms used in the document. If there are none, write NONE)

Guideline details
(This is the main body of the guideline containing the detailed requirements, which will support implementation and decision-making. Use subheadings as required.)

Introduction

The purpose of the clinical guideline is to guide all haemodialysis staff in the best way to manage and preserve arterio-venous fistulae (AVF) or arterio-venous graft (AVG). Poor vascular access for haemodialysis may contribute to increased infection, unnecessary repeated admissions to hospital and potentially increased mortality.

The National Service Framework for Renal Services Part One (2004) states that:

- All children, young people and adults approaching established renal failure are to receive timely preparation for renal replacement therapy, so the complications and progression of their disease are minimised and their choice of clinically appropriate treatment options maximised (Standard 2)

- All children, young people and adults with established renal failure are to have timely and appropriate surgery for vascular or peritoneal access which is monitored and maintained to achieve maximum longevity (Standard 3)

The UK Renal Association clinical practice guidelines (2015) state that:

- The preferred mode of vascular access for haemodialysis patients is a native arteriovenous fistula.
- At least 60% of patients presenting more than 3 months before initiation of dialysis should start haemodialysis with a suitable native arteriovenous fistula.
- 80% of patients on dialysis should have a functioning fistula or graft (AVF/AVG)

Why fistula first?

The arteriovenous fistula (AVF) remains the gold standard access to haemodialysis, showing better survival and lower complication rates than grafts and catheters (Brunori et al 2005). The presence of a catheter and/or its complications may affect the longevity of a native fistula through its earlier utilisation or less favourable maturation (Rayner et al 2003). The Dialysis Outcome Quality Initiative (DOQI) Guideline 3 states that in order to determine which type of access is most suitable to the individual patient, an evaluation of the patients venous, arterial and cardiopulmonary systems must be performed. Previous placement of a central venous catheter is associated with central venous stenosis.

Central venous catheters should be discouraged as permanent vascular access. In the absence of factors associated with contraindications for the formation of AVF, this would be the first preference for vascular access (DOQI 2006).

Premature cannulation of a fistula may result in a higher incidence of infiltration with associated compression of the vessel by haematoma and permanent loss of the fistula (DOQI Guideline 2006). There is a significant body of evidence that shows people starting haemodialysis with a functioning AVF have significantly less morbidity and mortality than having to start via a vascular catheter.

An AVF should be:

- Patent
- Palpable with bruit present
- Clean and free from signs of infection
- Able to deliver adequate haemodialysis

The success of vessel access is best assessed by:

- its capability to supply and return blood to the general circulation at acceptable flow rates
- its duration of effective function
- the degree of patient discomfort and limitation
- the rate and severity of complications

The K/DOQI (National Kidney Foundation 2006) have registered the rule of 6's, which define that a good functioning access

- has a flow of approximately 600ml/min

- is less than 6mm below the surface of the skin
- has a minimum diameter of 6mm and
- can be easily cannulated

Preventing Infections in AVF's and AVG's

Vascular infections are the second leading cause of death in patients on Haemodialysis. Prevention of infections starts by nursing staff and patient education about how important it is to care for this lifeline.

Studies have shown that dialysis patients have more bacteria on their skin than the general population; patients with Type 2 Diabetes have the highest bacterial count (NKF K/DOQI 2006).

Nursing staff will follow the Clinical Operative procedures relating to cannulation of either AVF's or AVG's

Nursing staff need to carry out audits on the care and management of AVF'/AVG's – and effective completion of the patients AVF/AVG Monitoring Form at each HD session will assist nursing staff in assessing patients for the presence of infection. (refer to Appendix 8)

Pre-dialysis preparation and care

Marker of Good Practice: preservation of veins, selection of access site and monitoring of fistula.

Standard	Rationale	How is it being achieved
Referral for vascular access at the pre-dialysis stage should be made when it is anticipated that the patient will require haemodialysis within 6 months depending on the kidney function of the patient and the Glomerular Filtration Rate (e-GFR – less than 15) Progression can be dependent on individual disease progression.	To enable plan and discuss fistula graft placement with patient ensuring best permanent access with fewer complications for those patients with CKD Stages 4 and 5	- By implementation of UHCW Renal Services patient pathway and audit - All patients will be assessed at shared access clinic and will be assessed for fistula/graft placement by vascular surgeon and consultant nephrologist. - Vein mapping will have been requested prior to this clinic. -selection of fistula site discussed at this clinic - fistula will when possible be sited distally in the non-dominant arm, if this unsuccessful or not suitable other sites will be discussed and plan discussed with patient.
Patients requiring vascular access for haemodialysis should have their veins preserved and not utilised for any intervention before access is created.	To prevent damage to vessels required for fistula/graft formation due to blood taking.	All patients will be educated in the pre dialysis stage on how to preserve veins prior to access surgery. Education/Information verbal and written at information day and shared care access clinic. -access nurse will liase with all health care workers in the Trust are trained/educated on vein preservation for this CKD stage 4 patients. Preserve the veins blood form stamps are available to identify patients who require blood samples to alert blood taking staff to preserve veins.
Applies to patients who have had access created, but is failing to mature or stopped working	- By maintaining and supporting open communication between patient,	-Referrals to access nurse, access co-ordinator, medical staff, surgeons, radiologists

To allow for any intervention to take place. To facilitate easier access of the fistula during cannulation.	nursing staff, doctors and surgeon.	(multidisilpinary approach required) If patient not on haemodialysis RNS will check fistula at 1 week and 6 weeks post creation. If on haemodialysis fistula will be checked at each visit. All patients will then be seen 3 weeks post creation by a vascular surgeon. If fistula failing to mature-a duplex scan will be performed followed by intervention if problem identified. If fistula fails the patient will be reviewed by vascular surgeon for new access creation.

Pre-operative preparation and care

Marker of Good Practice: Refer to Appendix 1. Blood screening for urea, electrolytes, full blood count and clotting screen must be checked before theatre. NEWS (National Early Warning System) should be within acceptable limits.

Standard	Rationale	How is it being achieved
The patient should be educated regarding fistula creation using a selection of evidenced based material tailored to suit the individual needs of the patient.	To empower the patient to make informed decisions about the forthcoming procedure and encourage participation in recommended treatment	- Designated nurse provides information, advice and support for patient/carer where appropriate before fistula creation. Refer to Appendix 1 -patient will have been seen prior to listing and will have been given information and consent obtained to perform procedure.

Post-operative preparation and care

Marker of Good Practice: Refer to Appendix 2.

Standard	Rationale	How is it being achieved
The patient should be educated regarding fistula creation using a selection of evidenced based material tailored to suit the individual needs of the patient.	To empower the patient to make informed decisions about the forthcoming procedure and encourage participation in recommended treatment	- Designated nurse provides information, advice and support for patient/carer where appropriate before fistula creation.
Post-operative care will follow Ward 50 nursing guidelines.	To ensure patient safety during the post-operative period.	- Nursing staff involved in the post-operative period are familiar with the nursing guidelines

Access Surveillance

Marker of Good Practice: For patients known to require haemodialysis commence this with a functioning fistula and patients already on haemodialysis continue to dialysis with a functioning fistula.

Standard	Rationale	How it is being achieved
If required, patients will have had vein mapping prior creation of fistula/graft. Currently pre dialysis patients are followed up at 1 and six weeks by their RNS. Patient on HD are followed up at each dialysis session All patients who have fistula/graft are seen by the by the vascular surgeon and access nurses at 3 weeks at a follow up clinic. If problems identified at these stages the patients will be referred to the access nurse	To assess patency, vessel size and suitability for creation of vascular access To assess success of surgery To continue monitoring fistulas and grafts as required .	- All patients are followed up as Renal Service procedure -Patient referred for access assessment in a timely fashion and listed for fistula creation 6-12 months prior to commencing haemodialysis. -To allow for maturation and development and actions should problems be identified, which may include fistula/graft failure or stenosis. -patient's access once in situ is monitored at clinic or dialysis session. -problems escalated to prevent fistula/graft failure. -patient may require duplex scan to identify problems -Patients may require radiological interventions.

Prior to the patient commencing haemodialysis the RNS team, Access Nurse or a senior member of the haemodialysis team will assess the patients fistula/graft. All grafts will be on a 3 month surveillance programme.		
Patients who attend for treatment with unexpected non-functioning vascular access	Rescue vascular access	-vascular access surgeon contacted -patient may require urgent surgery/intervention -patient may require temporary vascular catheter -patient may require tunnelled vascular catheter -patient may require reassessment of access.

Cannulation of an arteriovenous fistula (AVF) Marker of good practice: all dialysis staff who cannulate must be trained and assessed as competent to cannulate.

Standard	Rationale	How it is being achieved
All AVF/AVG will be graded by an senior experience needler, using a Red, Amber, Green model. All newly created AVF/AVG should be examined by designated senior renal nurse prior to first cannulation using the Access Grading Tool (Refer to Appendix 14) It is essential that vascular access should be: • free from redness • free from signs of infection • bruit and thrill are present	To establish readiness for cannulation. To ensure continuity and cannulation by staff with appropriate level of knowledge and demonstrating best cannulation technique To prevent contamination and minimise transfer of skin flora during cannulation process	- Procedure in place for examining of new fistula - Procedure for anticoagulation usage in place - Refer to Appendix 7 and 8 (AVF/AVG monitoring tools) Patients and family/carers must receive a patient information leaflet regarding the care of the fistula/graft and how to escalate problems. Document in patients care plan that this has been given

A strict clean technique should be used to clean the fistula site prior to cannulation, non-sterile gloves, apron and visor must be worn during the procedure. Two techniques are currently used to cannulate arterio venous fistula presently o Rope ladder technique o Buttonhole technique (**this technique will never be used to cannulate a arterioveous graft (AVG)** **Avoid Area Puncture at all times – this is not a recommended technique and will result in the patients AVF/AVG becoming very aneurysmal** **A fistula needle may be inserted in an antigrade or retrograde position in an AVF or AVG – please refer to COP 231**	Chlorhexidine 2% is recommended for cleaning the fistula site All patients must their hands and fistula arm when they arrive at the dialysis unit (McCann et al 2009) To prevent development of pseudo-aneurysm use of rope ladder or buttonhole cannulation is recommended (Ball 2005)	- Procedure in place, nursing staff and patient education on effective skin preparation technique - See Appendix 3 - Use of RAG AVF/AVG grading tool (Appendix 14) - See Appendix 4 & 6 - Staff education Patient information leaflet (buttonhole technique)
<u>Rope ladder technique</u> First and subsequent cannulations while fistula is developing are performed by designated experienced renal nurses Use 2 16 gauge needles OR if dialysis catheter in place and needs to used as only one needle can be inserted use 1 x 16 G needle for arterial access and vascular catheter as venous return line. If 1st week is successful change to 15G needles, rotating cannulation sites and increasing blood flow rate. Some patient's AVF may be suitable for use of a 14G fistula needle and will need to be assessed by a senior experienced renal nurse	Small gauge needles to minimise risk of infiltration, maximum distance away from anastomosis to prevent damage to anastomosis. If AVF well developed – the 'experienced' needler can decide to use a 15G needle immediately. 14g needle used if suitable/or when for the patient	- Fistula grading tool will be used (RAG model) - Patient information leaflet. - Staff education - AVF/Graft creation follow-up chart (Appendix 5) - Use of grading tool - Individual assessment of AVF

Nurses will follow the Haemodialysis Unit clinical Operative Procedures for cannulating either a AVF/AVG using a Buttonhole or Rope Ladder technique. (COP 231)	To ensure the correct procedure is followed by all cannulators.	- Haemodialysis Clinical Operative Procedures - Staff education
Tape needle extensions and lines in a loop to the patient, NEVER to the chair or pillow. Instruct patient not to move access extremity.	To avoid accidental needle dislodgement (Mactier & Worth 2007)	- Haemodialysis procedure - Staff education
Use blood flow rate of 200ml/min MAX in the 1st week of needling and reduce if not tolerated, increase the blood flow rates ONLY if infiltration or other problems are not noted	To demonstrate cannulation history and communication	
Map the fistula and cannulation sites used, report any problems to the Renal Access Nurse	To reach optimum delivered blood flow and dialysis adequacy	- Haemodialysis procedure - Staff education
If 1st week is successful continue to increase blood flow rate	To prevent further damage to fistula and allow healing	
<u>Infiltration guidelines</u>: -all infiltrated needles must be removed immediately. - if the fistula infiltrates let it rest for 1 week then go back to using smaller gauge needles. - if it infiltrates a second time, rest for 2 weeks and then reduce needle size. - if infiltration occurs a 3rd time notify a member of the medical team for further advice and follow-up.	Consecutive infiltration could signify a problem with the fistula which requires radiological or surgical intervention	- See Appendix 5 - Staff/patient education and training
Pressure should be applied for at least 10 minutes without being released. Cannulation sites should be monitored throughout the dialysis session.	To allow time for clot formation to occlude the puncture site and to prevent bruising from seepage under the skin between the skin surface and the vessel wall	- Staff/patient education and training - Patient information leaflet including information for carers of patients with AVF/AVG.
Dialysis blood lines should be secured to the patient in a loop and secured on the upper arm or if the patient requests secured around the hand.	Movement of needles may result in trauma to the fistula and/or haemorrhage	- Refer to Appendix 7 and 8 (AVF/AVG monitoring tools)

	To reduce the risk of needle dislodgement	- A record is kept of the information given to patients
	To avoid accidental needle dislodgement (Mactier & Worth 2007)	- Documentation related to the event has been written in the patients care pathway. The sites for needling are mapped on the fistula diagram in the patients care pathway. - Staff education - If bleeding is prolonged review anticoagulation regime
Needles should be removed at the same angle as insertion. Firm but gentle pressure should be applied AFTER the needle has been completely removed from the vessel. The dressing of choice for the HD unit should be applied and secured once bleeding has stemmed from the needle site.	To prevent trauma to the intima of the vessel caused by the cutting edge of the needle and to minimise pain If bleeding is prolonged review anticoagulation regime	
If AVF/AVG is suspected to be infected, a Registered Nurse will escalate to a member of the renal medical team using the SBAR model. A Registered Nurse will complete the AVF/AVG monitoring tool accurately and legibly each dialysis – this will allow for effective follow-up.	An AVF/AVG monitoring tool is completed each dialysis to assess the AVF/AVG	Staff education
All patients should be informed about emergency situations and how to deal with them including how to best care for their dialysis access	Patient must be aware of what action to take in the event of haemorrhage.The patient plays an important role in the development and preservation of the fistula and in the early detection of complications. Complications may include the following: infection, haemorrhage (burst AVF/AVG), thrombosis, ischaemia - parasthesia(Steal Syndrome)	- Staff education - Patient education Patient (and carers) must receive patient information leaflet fistula care for patients/family/carers from E library. Encourage patient to discuss any concerns.
If a fistula has matured but the vessels are too deep the fistula will need to be 'superficialised', this will be carried out by the vascular surgeons. In this case, the fistula can be needled once the wound has healed	Correct procedure for needling is followed	- Documentation - Staff education and training

and a senior renal nurse has assessed the fistula as ready for needling using the RAG model of assessment.		
<u>Buttonhole technique.</u> Please note: ANY PATIENT IDENTIFIED AS STAPH AUREUS +ve (MRSA/MSSA) SHOULD BE DISCUSSED WITH THE RENAL CONSULTANT FOR BUTTONHOLE TECHNIQUE. If the decision is to commence or continue with this technique this must be entered onto the haemodialysis units Risk Registers and emphasis placed on correct cleansing and scab removal adhered to. Nursing staff to refer to Haemodialysis Unit clinical operative procedures Patients must be encouraged to wash their fistula arm with soap and water prior to cannulation. Buttonhole technique is recommended and more successful for patients who are self caring/home dialysis who are cannulating their own fistulas.	Increased risk of infection Prevent risk of infection Correct creation of track. To remove bacteria and reduce risk of infection/sepsis	- Staff education and training - Staff education and training - Annual needling assessment -Buttonhole monitoring record should be completed while the track is being created for communication and identification of any problems. - Staff and patient education and training - Ensure the patient has received a patient information leaflet on buttonhole technique

End of clinical content

Guideline Governance

Implementation
(If the guideline relates to a service, pathway or external agency, provide details and reference any associated clinical operating procedure (COP) or corporate business record (CBR))

COP 231

Training
(Provide details of how any associated training is delivered, target audience, and if online training is available provide link. If training provided in Trust or Departmental induction, please specify to which staff groups.)

Haemodialysis Registered Nurses taught about the management of an AVF/AVG when they complete their competence for AVF/AVG cannulation

Patient Information
(Reference any associated Patient information leaflets)

There are a number of patient information leaflets related to the management of AVF/AVG for patients and carers on the e-library

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Audit & Monitoring
(Detail how the implementation and effectiveness of the clinical guideline will be monitored)

Aspect being monitored	Monitoring method	Responsible department(s)	Frequency	Group / committee receiving report & responsible for actions
Number of patients with AVF/AVG	Audit	Renal Services - Access	monthly	QIP's
Number of patients with a Vascular Catheter	Audit	Renal Services - Access	monthly	QIP's

End of Governance content

Guideline References

CEBIS Evidence Summary (, NICE Guidelines, and other National Guidance. Other national guidance may include those issued by speciality college, patient safety agency, monitoring agencies, or other external governing bodies)

References cited in guideline	Grade*
Ball (2005) On Course with Cannulation Techniques and Troubleshooting AV fistulas for Dialysis Staff. Northwest Renal Network Seattle, America.	1
Beathard G.A. (2003) Improving Dialysis Vascular Access *Dialysis & Transplantion* 32: 4 pp 210 - 217	1,5
Brunori et al (2005) Fistula Maturation, doesn't time matter at all? *NDT* April 20(4) pp 684 – 687	1
National Kidney Federation (2006). K/DOQI Clinical Practice Guidelines for Vascular Access: page 262.	1
Mactier R.A. & Worth D. P. (2007) Minimising the Risk of Needle Dislodgement during Haemodialysis *Association of Renal Technologists* Issue 41 p. 9	1
McCann, M. Murphy, F. (2009) Vascular Access Management II : AVF/AVG Cannulation Techniques and Complications. Journal of Renal Care pg 90-98.	1,5
National Service Framework for Renal Services (2004) Part One Department of Health.	5
Rayner et al (2003) Creation, cannulation and survival of arterio-venous fistulae. Data from the Dialysis Outcome and practice Study. *Kidney International* January 63(1) pp325 – 330	1,5
The Renal Association Renal Registry (2011) The Fourteenth Annual Report Renal Association Bristol	1,5

***Grade:- The references are graded through the CEBIS process according to the criteria outlined below.**

Grade of evidence	Based on
1	Systematic review or meta-analysis
2	Randomised controlled trial/s
3	Controlled study without randomisation (e.g. case controlled) or quasi-experimental study, such as a cohort study
4	Descriptive studies such as case series and reports.
5	Expert opinion, narrative review

Add any Appendices below

(Please use a "Page Break" before each appendix, and list each clearly in the section on the title page. Appendices may include a summary, a flowchart, a proforma, or other materials, but its purpose must be clearly identified)

APPENDICES

Appendix 1

Clinical Nursing Guidelines for a Patient receiving Pre-operative Care prior to AVF formation and graft insertion for access to haemodialysis

1. Carry out a NEWS assessment (National Early Warning System)

2. Anti-hypertensive medication may need to be omitted prior to surgery – this is assessed by clinical judgement/anaethetist on the day of surgery.

3. Obtain a blood sample for:

- Full Blood Count
- Biochemistry
- Clotting

May be obtained at pre-op clinic

4. Availability of the patients access pack which will identify the site of the AVF/Graft and the Vein Mapping results may be included if this investigation has been carried out (surgeons decision)

5. The patient must be given a patient information leaflet explaining the procedure

6. The patient must have consented to the procedure and the consent form must be in the patient's medical notes.

May be obtained at pre-op clinic

7. A fistula dressing will accompany the patient to theatre for dressing post operativel

8. All pre-operative checks will be carried out according to pre-operative checklist and UHCW guidelines.

9. The majority of fistulae are performed under local anaesthetic, therefore the patient should be encouraged to drink up to an hour prior to surgery (please confirm this with the surgeon on the day).

Appendix 2

Clinical Nursing Guidelines for a Patient receiving Post-operative Care following AVF formation and graft insertion for access to haemodialysis

Please note: A patient may require up to 48 hours admission due to the insertion of a drain being inserted during either local or general anaesthetic.

Local Anaesthetic

The majority of renal patients undergoing the creation of an arterio-venous fistula (AVF) with a local anaesthetic are planned for discharge later the same day.

General Anaesthetic

All patients undergoing creation of an arterio-venous graft (AVG) have a general anaesthetic and maybe kept in hospital overnight for observations as there is an increased risk of bleeding.

1. Carry out all basic nursing care as for any patient following a general anaesthetic.

2. A NEWS assessment is monitored as follows:

- Recordings of observations - Blood Pressure, Pulse every 15 minutes for 2 hours, half hourly for 2 hours and hourly for 2 hours for a total of 6 hours. Continue monitoring as per NEWS score until discharge unless clinical judgement infers closer monitoring. Nurses should be aware that there is an increased risk of the patient's access clotting if their blood pressure drops, therefore, ensure the patient is clinically assessed by a member of the renal medical team even if the patient is non-symptomatic of hypotension.

3. If the bruit/thrill is quieter/softer than before and if the bruit is lost escalate to the senior nurse on duty and a member of the medical team. Ensure fistula dressing in place. if evidence of bleeding, escalate to the senior nurse on duty and a member of the medical team. In the case of extreme haemorrhage immediately refer to the procedure for 'Management of Haemorrhage from an ANF or AVG. This includes immediate application of a tourniquet and pressure applied directly over the bleeding site and immediate review by clinicians.

4. The limb should be kept warm and well supported to help peripheral circulation. Observe for signs of coldness or parasthesia (numbness, excessive pain, 'pins and needles' sensation) in the patients hand. Steal syndrome can be an early complication of AVF/graft formation. Escalate to the senior nurse on duty and a member of the medical team.

5. Give the patient advice and education literature before discharge eg: patient information leaflet. Record this in the patients nursing kardex.

8. Patients should be advised to contact the hospital immediately if they notice bleeding, swelling or absence of bruit or thrill.

10. All pre-dialysis patients will have a review of their fistula 2 weeks post creation in the Access Clinic to assess the progress of maturation. All dialysis patients will be monitored in the haemodialysis unit.

Appendix 3

Skin Preparation Technique for AVF/AVG access

It is important to note the following in accordance with UHCW Haemodialysis Unit Clinical Operative Procedures.

- Ensure the patient washes their fistula arm with soap upon arrival to the Haemodialysis Unit. If the patient is unable to get to the sink – the nurse caring for the patient washes the patients fistula arm at the dialysis station.

- Locate, inspect and palpate the needle cannulation sites prior to skin preparation.

- Cleanse the skin by using a 2% Chlorhexidine wipe using a back and forth (# friction motion) for each needling site and allow to dry naturally (30 seconds)

- 2 wipes are needed for an AVF using rope ladder technique
  4 wipes are needed for an AVF using Buttonhole technique (2 prior to scab removal and 2 post scab removal

- Repeat the preparation if the skin is touched by the patient or staff once the skin preperation has been applied, but the cannulation not completed.

- Effective skin preparation prior to insertion of fistula needles is paramount to reduce the risk of infection – nurses must follow Haemodialysis procedure

Appendix 4

Cannulation of new AVF's and Grafts

Purpose:

To successfully cannulate matured AVF/graft and to prevent infiltration

Procedure:

Newly created primary AVF's shall be allowed to mature for at least 6-8 weeks prior to cannulation.

Initial attempts to perform dialysis via new fistulas shall proceed with caution. Without exception, fistulae shall not be progressed faster than these guidelines without consultation with the Consultant Nephrologist. All healthcare professionals are responsible for implementing this standard.

It is also important to note that newly created fistulae under 6 weeks must not be needled even if the nurse is instructed by a member of the medical team – in this case please seek further advice from a senior nurse or renal consultant. If the AVF is needled verbal and written justification is required.

1. All new fistulae are examined by a designated senior renal nurse before cannulation is initiated using the red, amber, green assessment tool.

2. It is important to note that all grafts have a maturation phase of 6 weeks.

3. Only nursing staff identified as demonstrating long standing experience and expertise should be assigned to cannulate newly matured fistulae.

4. Always use a tourniquet when needling a fistula. No exceptions.

5. Decision to be made what needling technique to use for the fistulae Please note: Buttonhole technique is not to be used for arteriovenous grafts

6. Sterile gloves to be worn when cannulating an AVG

7. Fistula needles may be inserted in an antigrade or retrograde position in an AVF?AVG – refer to COP 231

8. Explain the procedure to the patient.

9. Educate the patient on:

- checking the access daily for a thrill and for signs and symptoms of infection

- performing fistula exercises to promote maturation process

- understanding that haematoma could occur most likely during the first 2 weeks of using the access.

- Ensure the patient is given a Patient Information Leaflet on caring for their fistula also to be given to family members/carers if deemed appropriate for the ongoing care and support for the patient.

Appendix 5

Post- Operative AVF / Graft creation follow up

Name
ID Number
DOB

Date created __/___/__

AVF □ Graft □

Right □ Left □ Brachial □ Radial □ Femoral □ loop□

Care of Access advice and information leaflet given to patient □ carer□

AVF Development Monitoring

Date checked	Wound healing	Thrill present	Bruit present (use stethoscaope if unsure)	Taking aspirin	comments	Signature

Needling Record

Grading tool completed □ Diagram completed □

	Date	D/N or S/N	Needle Ga ge	Blood flow rate	Comments	Needler signature
1st						
2nd						
3rd						
4th						
5th						
6						

Date vascular catheter referral form sent to renal day case unit _/_/_

Date Vascular Catheter removed __/__/__

Please ensure any problems with fistula maturation or cannulation are reported to access nurse or senior nurses.

Problems / Referral _____

Appendix 6

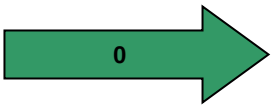
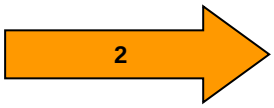
Types of cannulation techniques to use for AVF	Technique	Advantages	Disadvantages
Rope Ladder	Cannulate the entire length of the fistula, ensuring subsequent needle insertions are positioned just above the former cannulated site. When the entire length of the fistula has been needled recommence at the bottom of the vessel – this results in the symmetrical use of the AVF and is intended to lead to less aneurysm formation.	Prevent aneurysm formation	If the AVF is small eg: brachial AVF then it is difficult to move up and down sites. Often the same sites are cannulated
Buttonhole cannulation	Create a track so blunt needles can eventually be used in order to facilitate dialysis	Less infiltration Less pain Reduced bleeding time	Same person needs to cannulate the AVF in order to ensure exact track formation Takes time and 2 experienced nurses to develop track
Area Puncture **(not advised and never to be used)**	To cannulate same or close to same area as before Only one or two areas of the fistula are regularly used.	Less infiltration Easy for staff to identify needle sites	Thinning of skin causes increased bleeding time Infection due to skin breakdown Increased risk of aneurysms

Cannulation of graft	Technique
Cannulation of grafts is very different to AVF The graft is made of a synthetic material and is tougher than native vessels A tourniquet MUST NOT be used when needling an AVG	Cannulate at 20 – 30 % angle, bevel UP Force the needle through the skin and graft and straighten the needle when the flashback is seen It is important to note that all grafts have a maturation phase of 6 weeks.

Appendix 7

Arterio-venous Fistula/Graft (AVF/AVG) Scoring Tool

Please tick the boxes as appropriate

AVF and needling sites appears healthy i.e clean, dry and not inflamed		No signs of infection ☐ Observe only
ONE of the following is evident: • Patient complains of slight pain on needling sites of AVF or the whole length of fistula • Appearance of slight red areas as above		Early signs of infection ☐ Observe only and monitor patient temperature. Avoid needling into the inflamed area/s. Document AVF status against patients name in the diary for follow up next dialysis
TWO of the following are evident: • Pain • Inflamed area/hot to touch • Swelling/ Pain along the vessels or areas of the fistula		Probable infection ☐ Swab site. Obtain bloods for CRP. Discuss with medical team re: obtaining a set of blood cultures peripherally. Continue to monitor the patients temperature ☐ Assess site for appropriate sterile dressing.
THREE **ALL** of the following are evident and **extensive** • Pain along the vessels • Inflamed area/hot to touch • Any signs of oozing (pus) from red/inflamed areas • Pyrexia		High likelihood of infection ☐ Check for previous swab and blood culture results and Initiate treatment as indicated. Follow UHCW Sepsis Pathway as appropriate OR ☐ Swab site if previously not swabbed and obtain a set of blood cultures as above, Obtain bloods for CRP. Consider initiating antibiotic treatment immediately. Discuss with medical team. Follow UHCW Sepsis Pathway as appropriate ☐ Assess infected site for application of appropriate sterile dressing ☐ Ensure patient Information Leaflets given to patient/carer

Appendix 8

Arterio-venous Fistula/Graft (AVF/AVG) Monitoring Form

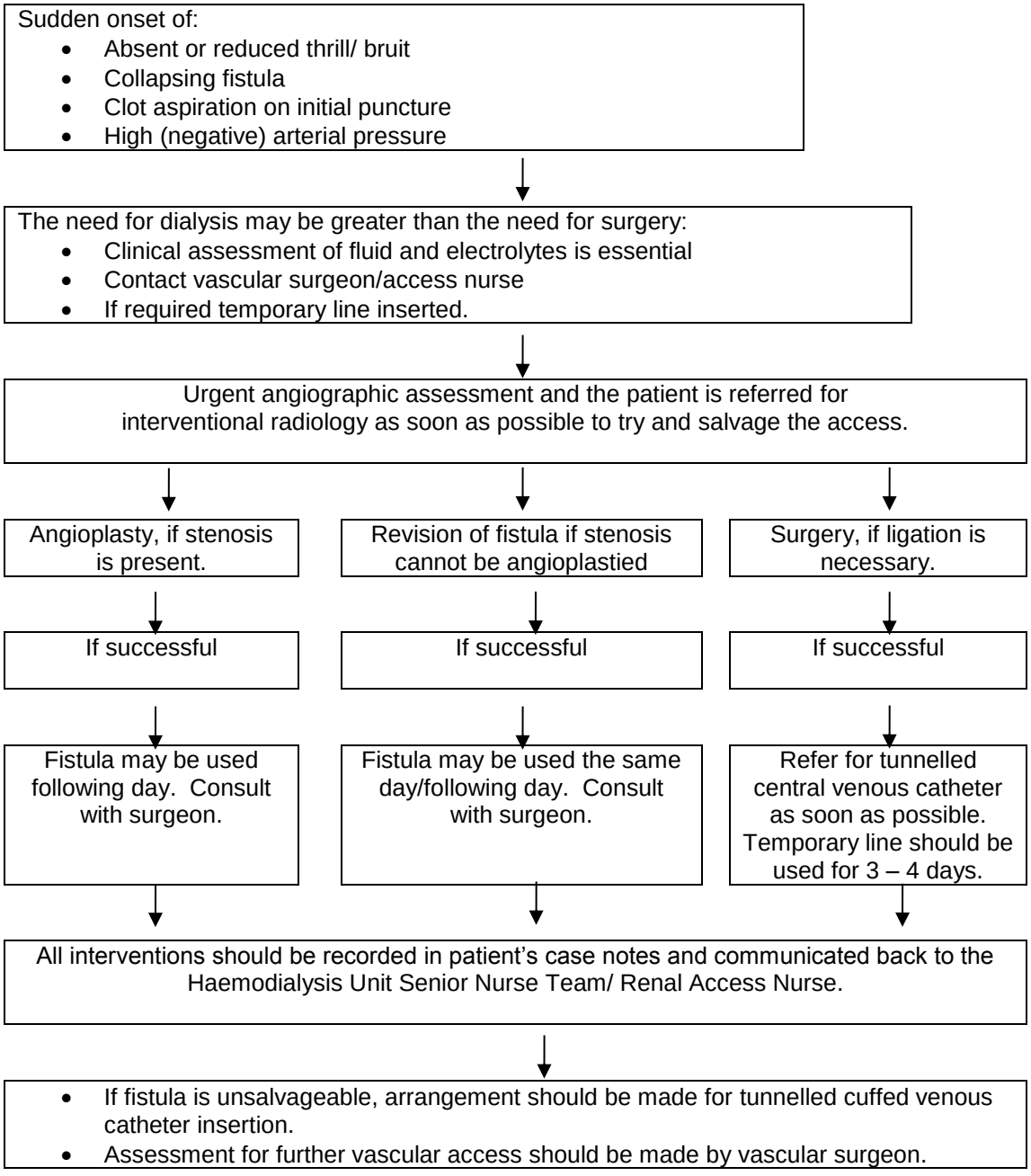
Date	0	1	2	3	Bruit present	Thrill resent	Further AVG/F assessment See below	Appearance of AVF/AVG Actions to take – to include date that an MRSA /MSSA swab has been obtained	Signature

Scoring Matrix used for further nurse assessment:
1 = is AVF/G aneurysmal?
1 = bleed for > 10 minutes?
1 = is the skin thin and shiny?
3 = is the scab > 3mm?
3 = ;if AVF/G has bled in between dialysis
Score 3 or above – to be seen by access surgeon immediately
Score 1 – 2 – clinical review

Appendix 9

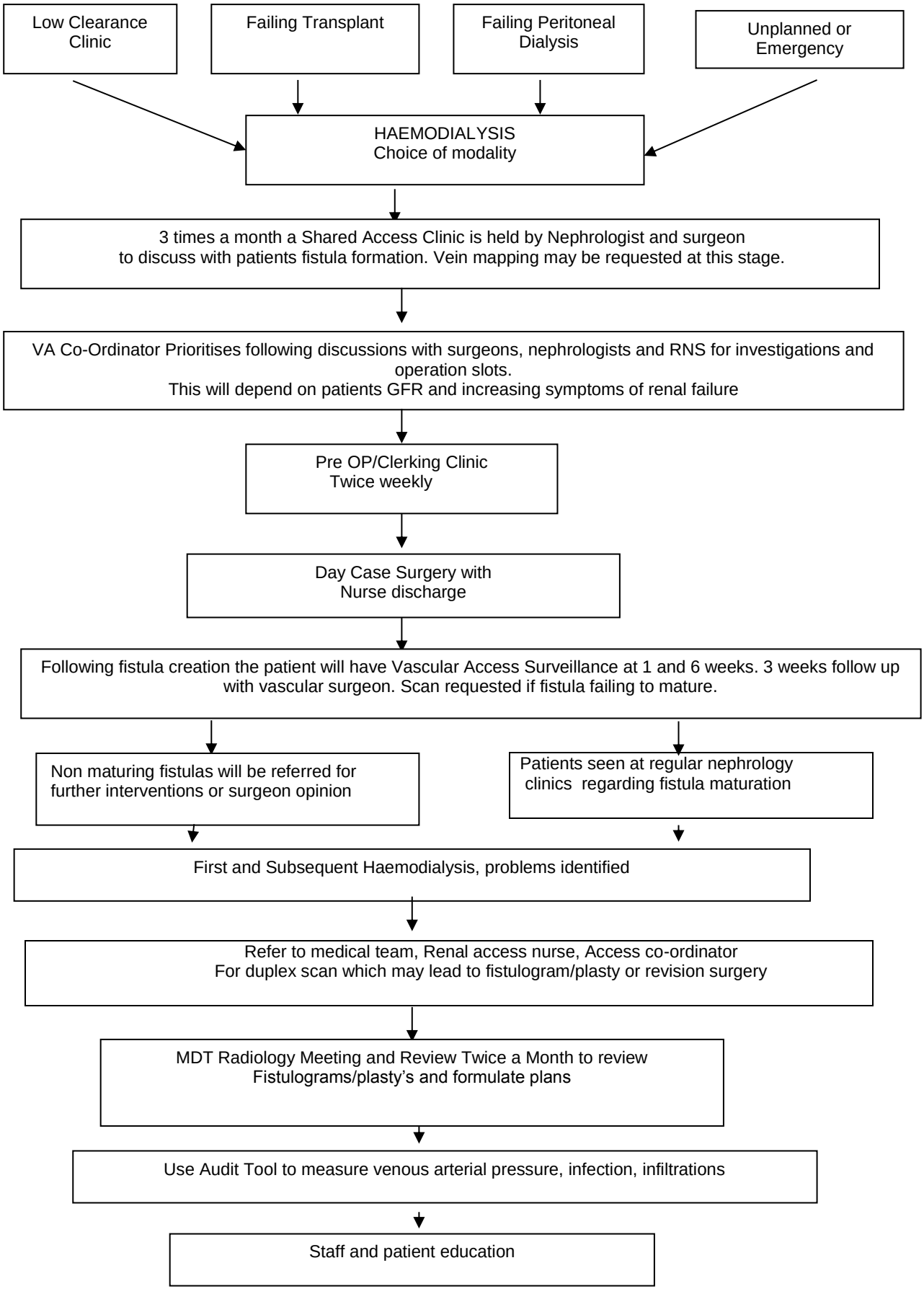
Management of Dysfunctional AVF/AVG

Surveillance of the fistula is based around observation, dialysis adequacy and monitoring techniques based on fistula blood flow. Inspection occurs on every occasion the access is used based on "Look, Feel and Listen" to detect local swelling, infection, the presence of a haematoma, aneurysm and potentially the presence of stenosis. Palpation and auscultation are carried out when stenosis is suspected. (Monitoring Assessment Tool). A baseline venous pressure will be recorded at a pump speed of 200mls/min and this along with the maximum pump speed achieved will highlight problems with the access. Blood flow through the fistula would be determined by ultrasound scan on request. If a problem is suspected then a request would be made for fistulogram with option for fistuloplasty via the Renal Access Nurse or directly by a Clinician. Patients are advised to observe their own fistula daily and feel for the thrill. Absence of thrill should be reported immediately and not wait until the next dialysis session.



Appendix 10

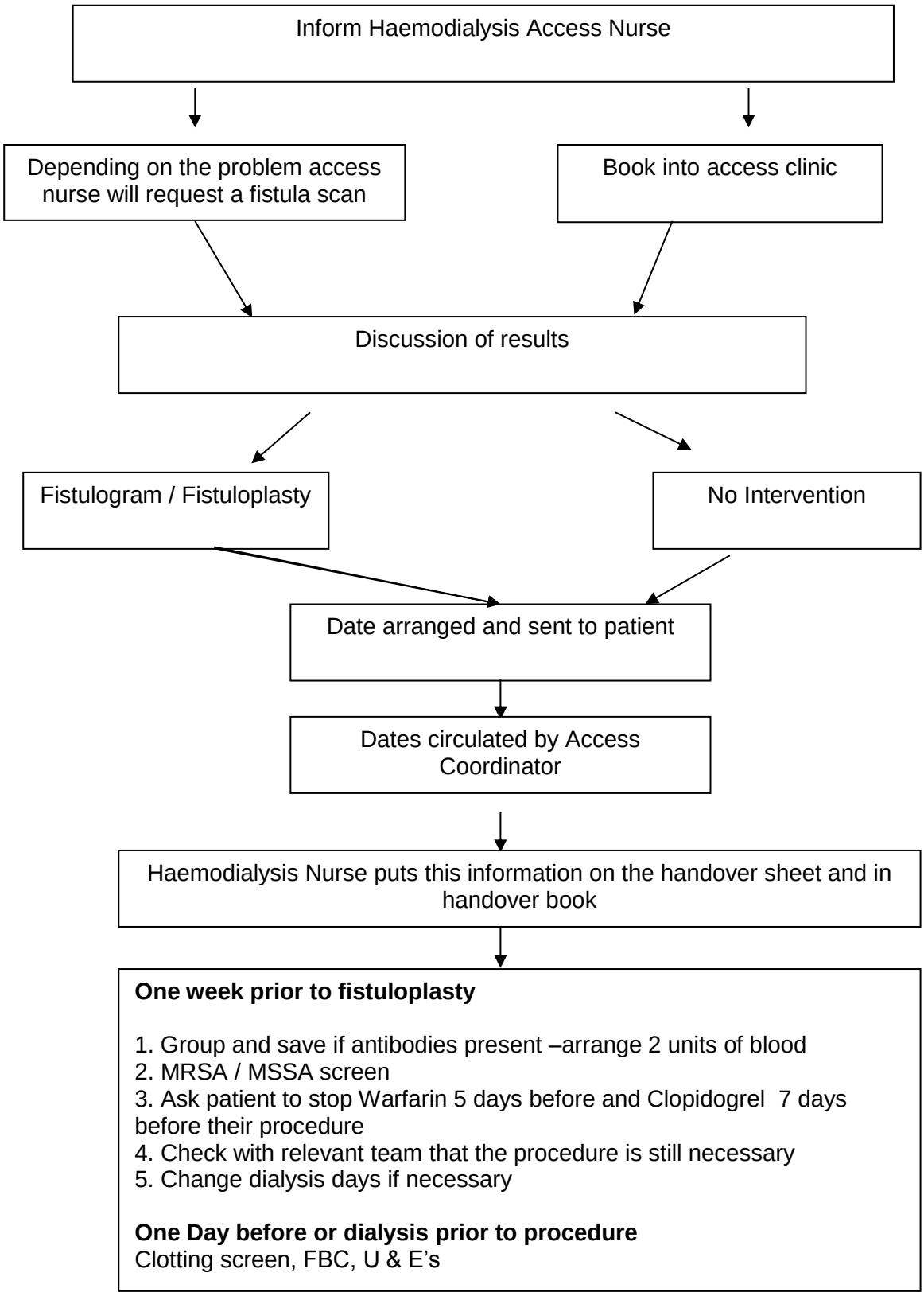
University Hospitals Coventry and Warwickshire NHS Trust
Renal Services Vascular Access Pathway.



Appendix 11

Fistuloplasty Pathway

Fistula problem identified by Haemodialysis Nurses



Appendix 12 Glossary

Term	Definition
Adequacy	Refers to how well dialysis replaces the function of the kidneys
Anastomosis	An artificial connection between two tubular organs eg two blood vessels
Arteriovenous fistula	A surgical connection between an artery and a vein, usually in a limb to create arterial and venous access for haemodialysis. It can be a direct anastomosis between the artery and vein
Autogenous	Originating in the body of the patient
Bruit	A sharp or harsh systolic sound heard on auscultation that is due to turbulent blood flow in a peripheral artery. Bruits can be heard over arteriovenous fistula
Cannula	A hollow tube designed for insertion into a body cavity or blood vessel
Cannulation	Insertion of a cannula /fistula needle
Co-morbidity	The presence of one or more disorder or disease in addition to the primary disease
DOQI	The National Kidney Foundation Dialysis Outcomes Quality Initiative. Established in the USA.
End stage Renal Failure	The most advanced stage of kidney failure, which is reached when the glomerular filtrate rate falls to 5mls/min (normal GFR = 120ml/min)
Extravasation	The leakage and spread of blood or fluid from vessels into the surrounding tissues eg. following injury
Fistulogram	A diagnostic technique used to study the flow in blood vessels
Glomerular filtration rate (GFR)	The rate at which substances are filtered from the blood of the glomerulus into the Bowmans Capsule of the nephron. It is calculated by measuring the clearance of specific substances eg creatinine and is an index of renal function
Haematoma	An accumulation of blood within the tissues that clots to form a solid swelling
Haemodialysis	The removal of waste products and water from the blood across a semi-permeable membrane (dialyser)
Heparin	An anticoagulant which acts by inhibiting the action of the enzyme thrombin in the final stage of blood coagulation
Infiltration	The abnormal entry of a substance into tissue eg. blood
Intima	The inner layer of the wall of a artery or vein
Patency	The condition of being open eg. Blood flow present
Thrombosis	A condition in which the blood changes from a liquid to a solid state and produces a blood clot
Tourniquet	An instrument for the compression of a blood vessel by application around an extremity to control the circulation and prevent the flow of blood to or from the area