CPD for Mastering a New Vascular Ultrasound Domain.

Post- Fistula Ultrasound Scans

Ming Yeung (MY) and Sophie McDermott (SM)

June 2015 – Vascular Audit Meeting (Vascular Scientists and Renal Surgeon)

- discussed the benefits of implementing a post fistula surgery ultrasound service (no current routine imaging offered; fistulogram requested when imaging is required)
- discussed how to scan post-fistulas e.g.
    - how to accurately record volume flow measurements
    - branches, steal, stenosis, false aneurysms in a fistula
- discussed reporting formats (diagram, written report, or both)
- discussed the need to design a referral form specifically for fistula patients

1st Sept 2016 – Post fistula meeting (Vascular Scientists and Renal Surgeon) regarding the potential to start scanning fistulas. Agreed to start scanning post-fistula patients and discussed which information to record and report. Agreed to scan ~2 patients a week, prior to patient having a fistulagram (scanning only patients with fistula problems).

October 2016 – contacted Radiology and observed fistulograms, liaised with Radiologists to determine which information would be useful to obtain via ultrasound in order to assist in future fistulogram/fistuloplasty. Radiologists find the diameter of the anastomosis useful to know as they often access the peri-anastomosis.

November 2016

- contacted London hospitals to arrange visits to observe fistula scans
- created a list of questions to ask at other hospitals (e.g. which vessels they take measurements from, if they take an average of 3 vol flow measurements or just one measurement, diameters, depths recorded etc).
- liaised with Renal department to plan logistics of scanning patients prior to fistulogram

18th November 2016 – MY visited Imperial College Healthcare NHS

28th November 2016 – SM visited to King's College Hospital

14th December 2016 – MY and SM visited to St Georges Hospital

Visits to other hospitals involved: observing post fistula scans, observing patient's position for scan, liaising with Scientists, discussed how their fistula clinic runs, discussed disease grading criteria, protocols and reporting formats.

December 2016

- drafted protocol
- created own diagram report templates for left and right arm fistulas
- meeting with Renal Nurses, organised to scan patients before their fistulogram starting Jan 2017
- started attending weekly Renal MDTs on Thursday morning where fistulograms are discussed.

Jan – April 2017 – scanned patients before they had fistulogram

- amended scan time slots when had poor attendance – MY and SM changed scanning time availability to accommodate patients suitability e.g. scanned early in the morning or across lunch

March 2017

- amended protocol for post-fistula scans
- created spreadsheet and inputted data to compare ultrasound findings with fistulogram reports e.g. location and severity of stenoses
- arranged meeting with Renal Surgeon, Vascular Access Nurse Specialists and Interventional Radiologist to discuss the findings of the two imaging types

April 2017 – Audit meeting of post fistula scans

- Total 22 patients scanned using ultrasound and findings were compared to fistulogram report (ultrasound and fistulogram performed on the same day as each other).
- 13 patients (59%) had full agreement / very good correlation between ultrasound and fistulogram.
- See summary document April 2017

Acknowledgements

We would like to acknowledge with much appreciation the staff at Imperial College Healthcare NHS, King's College Hospital and St Georges Hospital who provided their insight and expertise in post-fistula scanning.

Summary of findings from Post-Fistula Service Development Study.

Meeting: Tues 18th April 2017

Attendees: P. Gibbs (Consultant Surgeon), D Flowers (Consultant Radiologist), C Whitehill (Vascular Access Nurse Specialist), M. Yeung (Vascular Scientist)

Apologies: A Charig, S Mcdermott

- Total 22 patients scanned and results were compared to fistulogram report performed on the same day as ultrasound scan.
- 13 patients (59%) had full agreement / very good correlation between ultrasound and fistulogram.

Number of patients	Ultrasound more advantageous	Comment
1	Radial artery stenosis seen on ultrasound but not visualised on fistulogram	Incidental finding which ultrasound can provide but unsure about how this will affect patient treatment.
2	Significant stenosis just after anastomosis on ultrasound but fistulogram did not report stenosis.	Compression views can not always clearly visualise anastomosis.
1	Suggested significant stenosis in cephalic arch on ultrasound but fistulogram reported no stenosis.	Grading criteria for ultrasound yet to be determined; stenosis reported based on visual appearance and raised velocities.

Number of patients	Fistulogram more advantageous	Comment
1	No reported stenosis on ultrasound but had many branches. Fistualgram suggested potential central stenosis.	Discussed that we should use the term 'collaterals' instead of labelling them as branches.
1	Axillary, subclavian and innominate vein stenosis on fistulogram but was not assessed on ultrasound.	Ultrasound can not often visualise around clavicle and innominate vein.
1	Ultrasound findings had good correlation with fistulogram but anastomosis was not visualised on ultrasound due to recent intervention.	Ultrasound cannot scan open wounds/dressings.
1	1xstenosis identified on ultrasound but 3xstenosis on fistulogram.	Findings would result in same treatment pathway.

- One patient had stenosis at peri-anastomosis and tortuous cephalic arch on ultrasound. Fistulogram had poor views of anastomosis but found central cephalic stenosis.

Meeting Summary

- Overall, 13 of the 22 (59%) patients had very good correlation with fistulogram.
- 4 patients (18%) where ultrasound findings identified stenosis but did not correlate with fistulogram.
- 4 patients (18%) where fistuolgram identified stenosis but did not correlate with ultrasound.
- Ultrasound is more advantageous in identifying fistula stenosis near to the anastomosis and fistulogram is more advantageous in detecting proximal stenosis ie. cephalic / central stenosis.
- Ultrasound scans are cheaper compared to fistulogram and more importantly avoid contrast load.
- Ultrasound is useful to scan patients who are not dialysising as they avoid contrast which can be harmful to an already poor-performing kidney.
- Ultrasound is useful to scan fistulas that require superficialisation (to identify any problems prior to further surgery)

Referral Form

VASCULAR ASSESSMENT UNIT – REQUEST FOR INVESTIGATIONS
Queen Alexandra Hospital Tel: 7700 6456/6724 FAX 6729

*** PLEASE FAX THIS FORM ON COMPLETION ***

Patient Name:
Date of Birth:
Address:
Phone No:
Unit No:
NHS No:

☐ **In-patient (Ward.....)**
☐ **Out-patient**

RENAL FISTULA ASSESSMENT:
Post-Surgery (Please provide details under clinical history) ☐

Limb: LEG ARM

Fistula: RIGHT LEFT

Vein/Prosthetic: CEPHALIC BASILIC FV

Artery: BRACHIAL RADIAL ULNAR SFA

Date fistula created:

RELEVANT CLINICAL HISTORY:
(circle relevant reason for referral)

?pseudoaneurysm ?aneurysm no thrill

arm swelling difficulty in cannulation

low flow/pressures high pressures

prolonged bleeding post dialysis

SOB on exertion digit ischaemia/gangrene

Any other relevant history?

IN-PATIENTS
Infectious Status:
Clear ☐
MRSA? ☐
C-Diff? ☐
Other ☐

Oxygen Dependent: ☐
(An escort will need to accompany in-patient on O2).

HOSPITAL TRANSPORT (Out-Patients)
Please note: The referrer is responsible for arranging the appropriate hospital transport where necessary.

Signature: **Consultant:**

Print Name: **Bleep/Ext:** **Date of Request:**
(We cannot process this request without your name and contact details)

VASCULAR ASSESSMENT UNIT USE ONLY:

How long for scan?:	See within? (Urgency):	AVS:
Appointment Slot:		

Diagram Report Forms

Vascular Assessment Unit
Queen Alexandra Hospital
Ext. 6456, Direct Line 023 9228 6456, Fax 6729

Portsmouth Hospitals NHS
NHS Trust

To:

Date of Test:

Re:

DOB:

NHS No:

RIGHT Arteriovenous Fistula Duplex Assessment

d.r = diameter reduction

~~**Volume Flow Brachial Artery (mls/min):**~~

Signature_____

Queen Alexandra Hospital
Ext. 6456, Direct Line 023 9228 6456, Fax 6729

NHS Trust

To:

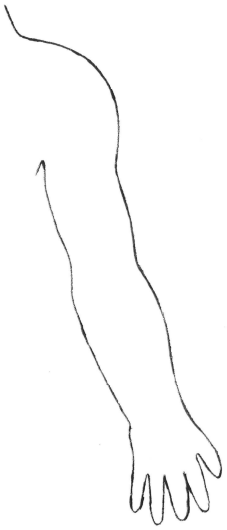
Date of Test:

Re:

DOB:

NHS No:

LEFT Arteriovenous Fistula Duplex Assessment



Signature_____

Example Reports

Referral Form

RENAL FISTULA ASSESSMENT:
Post-Surgery (Please provide details under clinical history) ☐

Fistula: RIGHT (LEFT)

~~Vein~~/Prosthetic: (CEPHALIC) BASILIC

Artery: BRACHIAL (RADIAL) ULNAR

Date fistula created: 08/9/15

RELEVANT CLINICAL HISTORY:
(circle relevant reason for referral)

?pseudoaneurysm ?aneurysm no thrill

arm swelling difficulty in cannulation

low flow/pressures high pressures

prolonged bleeding post dialysis

SOB on exertion digit ischaemia/gangrene

Any other relevant history?

Reduced access flow
? inflow problem

IN-PATIENTS

Infectious Status:
Clear ☐
MRSA? ☐
C-Diff? ☐
Other ☐

Oxygen Dependent: ☐
(An escort will need to accompany in-patient on O2).

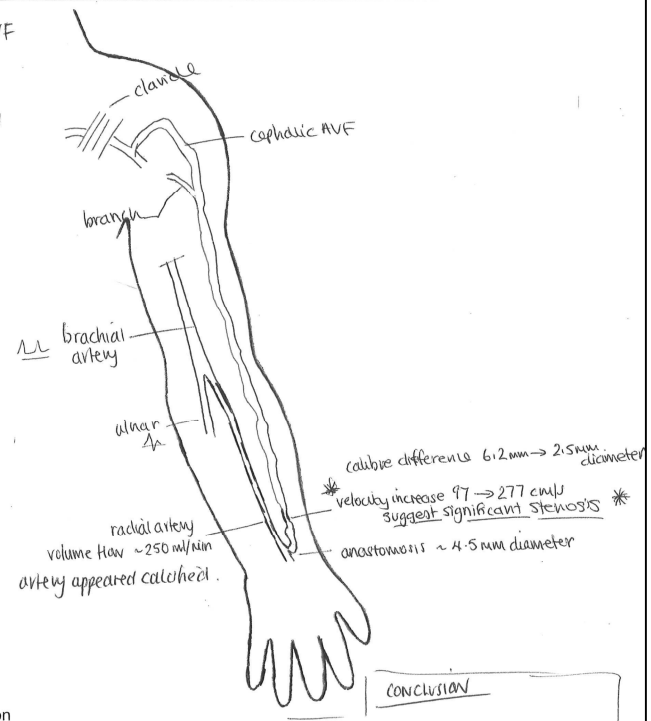
HOSPITAL TRANSPO
(Out-Patients)
Please note: The refer
is responsible for arrang
the appropriate hospital
transport where necessa

Diagram Report

LEFT Arteriovenous Fistula Duplex Assessment

(L) radial-cephalic AVF created Sept 2015

- reduced access flow
? inflow problem



d.r = diameter reduction

Signature M.Yeung. M.Yeung

CONCLUSION

- velocity increase just after anastomosis suggest significant stenosis in AVF in distal lower arm.

Fistulogram findings

Clinical History : Left RC performed 8/9/15, plasty 5/4/16, patch plasty 10/8/16, reduced flow on transonic

Fistulogram upper limb Rt :

Verbal consent, aseptic technique. Fistula cannulated close to the arterial anastomosis with a blue cannula. Contrast infused.

Findings:

The arterial anastomosis itself is widely patent. There is a weblike stenosis within the first 5 mm of the fistula and then a further stenosis within the first 5 cm just central to the patch plasty/ site of vein tie off previously. There is what either represents a single large collateral or a bifurcated cephalic arch but no definite central stenosis is seen.

Haemostasis by manual compression. Well tolerated, no immediate complications.

Referral Form

RENAL FISTULA ASSESSMENT:
Post-Surgery (Please provide details under clinical history) ☐

Fistula: RIGHT (LEFT)

Vein/Prosthetic: (CEPHALIC) BASILIC

Artery: (BRACHIAL) RADIAL ULNAR

Date fistula created: 02/10/12

Patient is in Renal outpatients, ready to come down when you are ready will need chair.

RELEVANT CLINICAL HISTORY:
(circle relevant reason for referral)

?pseudoaneurysm ?aneurysm no thrill

arm swelling difficulty in cannulation

low flow/pressures high pressures

prolonged bleeding post dialysis

SOB on exertion digit ischaemia/gangrene

Any other relevant history?

Post de-clot check

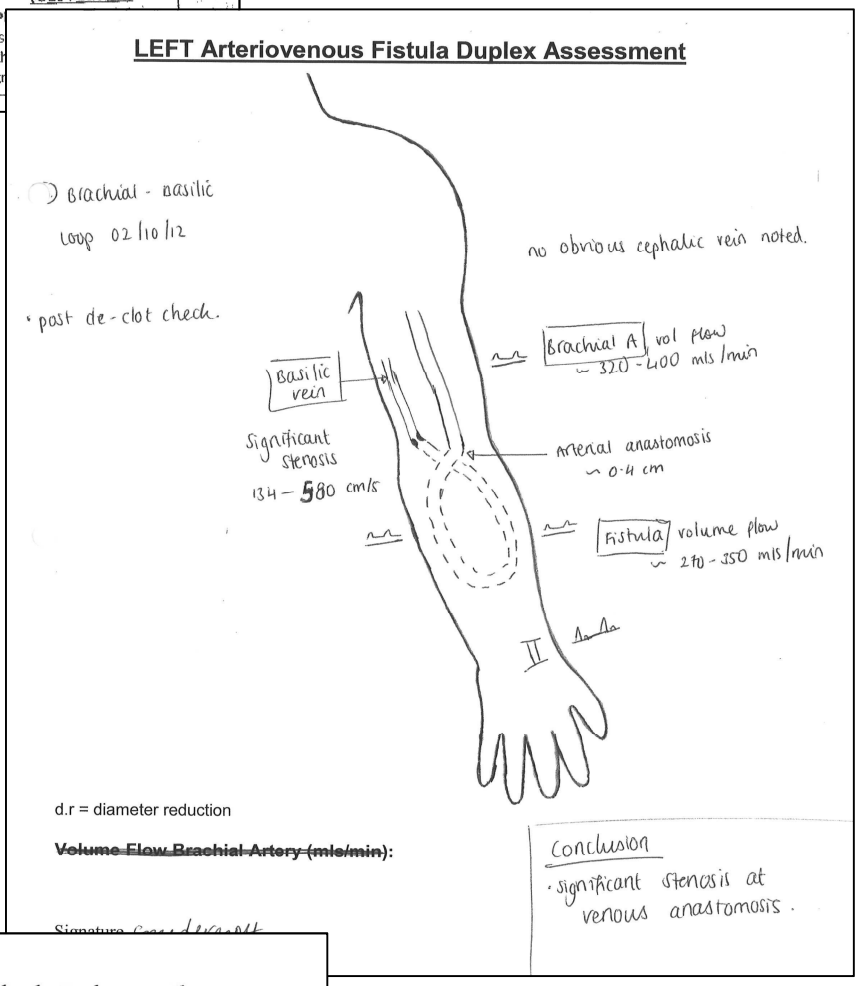
IN-PATIENTS

Infectious Status:
Clear ☐
MRSA? ☐
C-Diff? ☐
Other ☐

Oxygen Dependent: ☐
(An escort will need to accompany in-patient on O2).

HOSPITAL TRANSPORT (Out-Patients)

Diagram Report



Fistulogram findings

Clinical History : upper arm PTFE loop declotted recently

Fistulogram upper limb Lt :

Compression views show a good supplying artery and widely patent anastomoses. Slight change in calibre at the anastomoses is thought normal postsurgical appearance. The loop shows minor outpouchings at the puncture site is otherwise patent with good flow and no clot. There is a 50% stenosis at the graft venous anastomosis. No central stenosis.

The graft venous anastomosis would be amenable to angioplasty.

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Visit to Vascular Laboratory & Surveillance Clinic, Hammersmith Hospital. Imperial College Healthcare NHS Trust. (Oct 2016) (MY)

Visit to Vascular Laboratory, Kings College Hospital, London (Nov 2016) (SM)

Dialysis Access Fistula/Graft Assessment protocol (July 2014) Vascular Laboratory, St Georges NHS Healthcare Trust

Visit to Vascular Laboratory, St Georges NHS Healthcare Trust London (Dec 2016) (SM and MY)