1. Introduction

Bleeding from an arteriovenous fistula or graft is potentially life threatening and deaths have occurred from uncontrolled bleeding. The blood is under arterial pressure and flows in an AVF/AVG are often greater than 1000ml/min. Any patient with bleeding, seepage or ulceration of the skin over an AVF/AVG requires immediate assessment by a senior doctor (i.e. SpR or above) and observation in hospital is often required. The patient should be reviewed by a consultant before discharge. 0.4-1.6% of all deaths on HD have been attributed to fatal vascular access haemorrhages (FVAHs). In the US, more than 200 deaths per year are attributed to FVAHs for HD patients. Half of these occur in patients with AVFs. 75% of FVAHs occur whilst the patient is away from the HD unit/hospital. Therefore, predicting those who are high risk of bleeding and require urgent assessment (including surgical input) is important, as is ensuring the patient and/or their carer is aware of how to initially manage an access haemorrhage.

Following on from recent M&M cases in relation to bleeding AVF/AVGs, this information has been collated to improve the assessment and management of AVF/AVGs at risk of bleeding.

2. Scope

These guidelines are designed to give guidance on assessing risk of and managing haemodialysis access haemorrhage.

3. Recommendations, Standards and Procedural Statements

3.1 Risk Factors

3.1.1 History

High risk
- Previous access haemorrhage (herald bleed)
- Prolonged bleeding post-HD
- Infection of access site
- Bleeding around needle sites

Lower risk
- Hypertension
- Anti-coagulation (patient may be on this for previous thrombosis of access)
- Age>50
- Type of access – grafts have higher risk than AVFs

3.1.2 Examination

3.1.2.1 Aneurysm and Pseudoaneurysm

These may be caused by lack of distance between needling sites and/or inadequate length of AVF to allow site rotation (area puncture). Review for following signs:
• colour change - in darker skinned individuals this result in separation of pigment
  • very high risk if ulcerated over the aneurysmal site - impending rupture
  • Increasing size - as an aneurysm increases in size it becomes shinier – think of a balloon
    o deflated - opaque and dull
    o inflated - shiny and tight
  • Palpate either side of the aneurysm - is it soft or firm?
    o firmness suggests higher pressure in the ‘balloon’ and therefore higher risk of bursting i.e. sudden, high volume haemorrhage
• compare the original vessel diameter to the base of the aneurysm
  o if >3 times the original size further evaluation of the access site should be undertaken

3.1.2.2 Pseudoaneurysms
The skin acts as a dressing for the haematoma, particularly as it enlarges, as it progresses further it may lead to skin breakdown/ulceration too.

3.1.3 Skin
Review skin integrity. Risk is increased in the case of:
• Overlying cellulitis/infection
• Non healing scab or ulceration of tissue – high risk of rupture.
• Change in pigmentation
• Evidence of trauma or erosion

3.1.4 Stenosis
A stenosis increases the pressure within the access (effectively localised hypertension within the AVF). This can be assessed by the ‘Arm Raise Technique’.
Patient raises arm above head
• AVF immediately flattens out - unlikely to be significant stenosis
• proximal portion flattens but distal part distends - suggests a stenosis at the point of distension

3.2 Management

Patients presenting with vascular access problems must have a surgical review and should not be discharged without senior (SpR or consultant) opinion.

3.2.1 All patients should with an AVF receive education including
• signs and symptoms of above risk factors including infection
• how to deal with a AVF bleed
  ■ seek help
  ■ elevate
  ■ direct pressure over area of rupture
● at least 10 minutes with pressure (i.e. do not release pressure to check site)
● do not delay pressure to find bandage/gauze
● do not wrap towel around site risk of ‘wicking’ and worsening bleeding and risk of tourniquet related ischaemia

■ access should be reviewed ASAP
  ○ Dial 999 and advise bleed occurring from a dialysis fistula.
  ○ if bleed stops quickly patient should still be advised to make immediate contact with usual HD unit if in hours or ward if out of hours and then directed to attend for a review.

3.2.2 Access
● rotation of needling site will improve the evenness of the AVF dilation
  ○ rest areas if signs of infection/ulceration and seek medical review
  ○ do not needle aneurysmal site
    ■ again consider the balloon analogue and putting a needle in it!
    ■ take photograph(s) of the patients fistula if patients complain of pain, redness, swelling or if there are any concerns about the appearance of the fistula/skin or the needling sites. Photographs to be repeated and compared on each attendance to provide permanent record and guide management until problem resolved (UHL written consent form for photography to be completed and filed in notes).

3.2.3 Medications
  ○ review medications
    ■ little evidence for warfarin use for access patency
    ■ aspirin, clopidogrel etc

3.2.4 Investigations
● clotting - INR, APTT, platelets
● if blood loss - Hb (bearing in mind most pts will be anaemic prior to any blood loss)
● imaging
  ○ US
    ▪ patency/size of AVF
    ▪ may be useful in identifying alternative needling sites
  ○ fistulogram+/-plasty
● surgical intervention

3.2.5 KDOQI guidance for referring to surgeons
● aneurysms
● compromised skin over AVF
● risk of rupture
● limited availability of puncture sites
● pseudoaneurysms
  ○ greater than twice the size of the graft
● haemostasis difficult post-HD
• spontaneous site bleeding

3.2.6 Consideration of ligation

3.3 Suggested reasons for immediate admission for vascular access problems

• Any evidence of active bleeding
• Previous haemorrhage or infection of the access in last 6 months
• Ulceration/infection of access - especially if it is over a non-needling site
• Stenosis leading to localised raised pressure in the access
• Systemic hypertension (there is no evidence in the literature regarding a threshold of systolic BP where haemorrhage becomes more likely)
• Deranged clotting
• Shiny/taut skin over fistula suggesting imminent rupture of AVF

4. Education and Training

All staff caring for patients with advanced chronic kidney disease should be familiar with the contents of this guideline.

5. Monitoring and Audit Criteria

<table>
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<th>Key Performance Indicator</th>
<th>Method of Assessment</th>
<th>Frequency</th>
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<td>Datix incidents</td>
<td>Ad hoc</td>
<td>HD matrons</td>
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6. Legal Liability Guideline Statement

See section 6.4 of the UHL Policy for Policies for details of the Trust Legal Liability statement for Guidance documents

7. Supporting Documents and Key References


8. Key Words

Vascular access, arteriovenous fistula, arteriovenous graft, bleeding, haemorrhage

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Bleeding from an Arteriovenous Fistula or Graft UHL Renal Guideline

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NB: Paper copies of this document may not be most recent version. The definitive version is held on INsite Documents

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**DEVELOPMENT AND APPROVAL RECORD FOR THIS DOCUMENT**

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<thead>
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**REVIEW RECORD**

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