National survey of vascular access services for haemodialysis patients

There is much variation in the provision of dialysis access in the UK. To address this, a multiprofessional vascular access special interest group was formed to raise awareness and encourage implementation of clinical guidelines, and share good practice. Mick Kumwenda, Catherine Fielding and Alayne Gagen discuss the findings of the group's survey of haemodialysis vascular access services.

■ vascular access ■ renal dialysis ■ surveys and questionnaires ■ arteriovenous fistula

With an increasing number of patients with end-stage kidney disease on dialysis, the provision of timely definitive access is both challenging and a marker of good clinical practice. The Renal Association (RA) guidelines on vascular access (VA) recommended that an arteriovenous fistula (AVF) should be the first-line choice of access for patients on this renal replacement therapy (Fluck and Kumwenda, 2011). AVF is associated with reduced risks for morbidity, as well as better access and patient survival, when compared with arteriovenous grafts (AVG) and central venous catheters (CVC) in patients on haemodialysis (HD) (Almasri et al, 2016).

The most recent annual report published by the UK Renal Registry (UKRR) demonstrated that early referral to nephrologists and access surgeons is essential to plan the establishment of definitive access (AVF, AVG or Tenckhoff catheters) well in advance of the need to start dialysis (Hole et al, 2017). This avoids the use of CVC, which carry the highest risk of dialysis-related complications (Hole et al, 2017).

Mick Kumwenda
Consultant Nephrologist, Glan Clwyd Hospital, Denbingshire and Member, British Renal Society Vascular Access Special Interest Group (BRS VA SIG)
Email: mick.kumwenda@wales.nhs.uk

Catherine Fielding
Professional Development Officer, Renal Dialysis Unit, Derby Royal Hospital; MDT Fellow, UK Renal Registry; and Co-Chair, BRS VA SIG

Alayne Gagen
Vice Chair, BRS VA SIG and Renal Vascular Access Nurse Specialist, Manchester Royal Infirmary

Between 10–54% of patients started their first HD session via AVF, which is below the audit standard of 60% recommended in the 2015 RA guidelines (Kumwenda et al, 2015). Out of 53 centres which submitted complete data, only 10 had >80% of prevalent patients (disease developed or was diagnosed before the study) dialysing via definitive access, confirming that such high rates were achievable.

To address this variation in dialysis access provision, the British Renal Society (BRS) formed a multiprofessional VA special interest group (VA SIG) in December 2015 to raise awareness and encourage implementation of the RA guidelines, standardise and improve VA care in the UK, and facilitate the sharing of good practice. One aim of the group was to survey the structure of VA services across the UK and to identify the best models for care provision. This article describes the development and results of this national survey.

Survey methodology

BRS VA SIG initially developed a series of questions that were used for the survey to identify good practice and barriers to success in access care. These arose from discussions with experienced VA nurses, HD nurses and a nephrologist, from multiple centres represented in BRS VA SIG.

Once the questionnaire was formed, it was piloted via telephone surveys with VA nurses from six top-performing units in the UK, which had achieved the RA audit standards (85% of prevalent or 65% of incident (newly diagnosed) HD patients dialysing via AVF/AVG), as identified by the UKRR (Rao et al, 2016). Following the pilot, the survey was published on SurveyMonkey and the weblink was sent via email to 72 renal units across the UK.

The key findings of the survey were used to benchmark the structure of VA services across the UK. The findings also helped to identify the

Box 1. Factors included in the questionnaire

- Use and structure of regular multidisciplinary team meetings
- Use of distal-first arteriovenous fistula policy
- Use of vessel mapping before surgery
- Vessel mapping waiting time of <8 weeks
- Prioritisation of access surgery by vascular access nurses or multidisciplinary team
- Dedicated access theatre lists
- Education programmes for patients and staff
- Support for emergency access interventions
- Surveillance protocols
- Examples of good practice
- Number of vascular access nurses per centre

proportion of units that employed the access parameters outlined in *Box 1*.

Results

A total of 38 VA nurses (*n*=34) and VA link (*n*=4) nurses responded to the questionnaire. In total, 10.5% of responses were from Wales, 7.8% from Ireland, 10.5% from Scotland, and 71.2% from England. The number of patients on HD (including satellite units) for >90 days in the units covered by the survey was 11 847 (range=56–719; median=280). In 13 units, ≥80% of the patients were dialysing via AVF/AVG, 60–79% were dialysing via AVF/AVG in 14 units, and <60% of patients had AVF/AVG and were dialysing via CVC in 11 units. To assess vasculature and suitability for the planned access surgery, 25 (66%) of the units ensured vessel mapping was performed prior to surgery, 11 units (29%) performed vessel mapping only in selected patients, and the remaining two (5%) did not do any vessel mapping at all prior to surgery.

VA surgery was done by vascular surgeons in 32 (84%) units. In three (8%) of the units, transplant surgeons performed VA procedures, and there was a dedicated surgeon for all access procedures (AVF/AVG/Tenckhoff catheter placements) in the other three (8%) units. The survey findings indicated that 34 (89.4%) of the units had dedicated theatre lists, and from these units, 19 (56%) had theatre lists weekly.

It was found that 30 (80%) of the units had a 'distal-first' policy. In terms of waiting times, patients waited:

- <4 weeks for their first access surgery after assessment by surgeons in 13 (34%) units
- 4–8 weeks in 13 (34%) units
- 8–12 weeks in 11 (29.4%) units
- >12 weeks for their first AVF/AVG surgery in 1 (2.6%) unit.

Maturation times before needling were 3–6 weeks in 6 (16%) units, >6 but <8 weeks in 27 (71%) units, and >8 weeks in 5 (13%) units.

There was considerable variation in the use of multidisciplinary team (MDT) meetings to plan VA provision for individual patients. Eight units never held MDT meetings for VA. Of the 30 units who did hold MDT meetings, 14 units had them 1–2-weekly, nine units had them once a month, and seven units held them less frequently than monthly (*Figure 1*). Attendees of MDT meetings included VA nurses, surgeons, nephrologists, sonographers/radiologists and chronic kidney disease nurses (*Table 1*).

Prioritisation of access theatre lists was mostly done by VA nurses in 32 (84%) units. The trigger for referral to surgeons was slope of decline in estimated glomerular filtration rate (eGFR) trends in 21 (55%) of the units. In the other 17 (45%) units, referral was done when eGFR fell to <20 ml/min.

In terms of choice of access, 24 (63%) of the units were using AVG, 9 (37.5%) were using Acuseal (W.L.Gore and Associates), 4 (16.7%) were using Flixene (Maquet), 2 (8.3%) were using HeRO Grafts (Merit Medical Systems), and 9 (37.5%) had stopped using grafts at the time of the survey having had patients with grafts previously.

Some 25 (64.86%) of the units undertake regular audits of access outcomes. A total of 32 (84%) units hold educational sessions for patients before dialysis, and 31 (81%) for staff. It was found that 24 (63%) of the units had written dialysis access care pathways.

Patients' refusal rate for access surgery was <5% in 21 (55%) units, 5–20% in 15 (40%) units, and >20% in 2 (5%) units. None of the patients refused surgery in just one unit.

All units had arrangements for surgical and radiological emergency interventions to deal with VA complications when needed. Out of hours surgical intervention was available in 26 (68%) of units, and interventional radiology was available out of hours in 13 (34%) of the units.

Table 1. Multidisciplinary team meeting attendance

Who attends?	What proportion of the time do they attend?
Vascular access nurses	100%
Surgeons	85%
Nephrologists	73%
Sonographers/radiologists	80%
Chronic kidney disease nurses	20%

Table 2. Number of vascular access nurses (whole-time equivalent) per unit

Number of vascular access nurses	Number of units
0	3
<1	7
1–2	24
>2–3	4

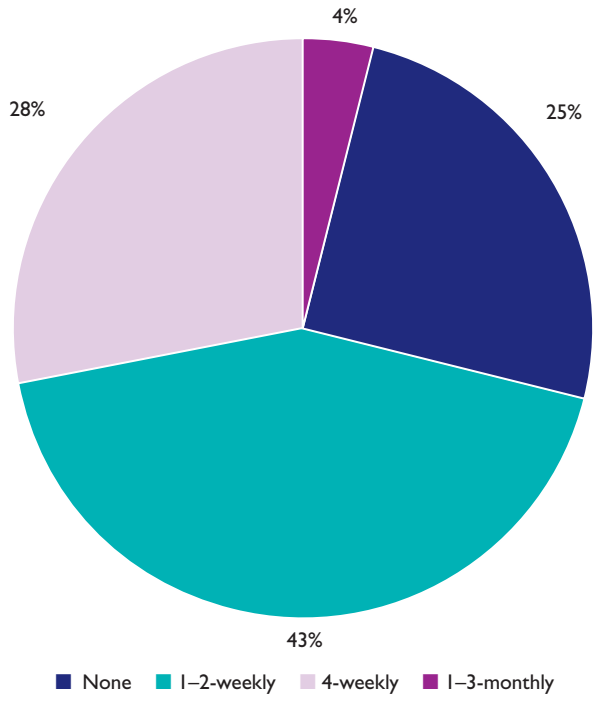

Figure 1. Frequency of multidisciplinary team meetings

Box 2. Areas of good practice

- One-stop clinics
- Cannulation competency assessments
- Multidisciplinary team meetings established recently
- Access surveillance
- Discussion of difficult access cases
- Recently written-up access care pathway
- Education programme for patients and staff

Box 3. Most important barriers to service development

- Shortage of interventional radiology and sonographer time
- Lack of theatre spaces
- Poor clinical leadership and administrative support
- Lack of dedicated vascular access team
- Inadequate training for expert cannulation

In 20 (52%) of the units, antiplatelets and/or warfarin were used routinely as an adjuvant therapy for access patency. Moreover, in 12 (31%) of the units, far infrared was used to enhance maturation of AVF access. Access flow measurements were done using Transonic (Transonic Systems) 1–3 times per month.

The number of VA nurses (whole-time equivalent) per unit varied between 0–3 (*Table 2*). Barriers to service development and areas of good practice were reported by the VA nurses (*Boxes 2 and 3*).

Discussion

Overall, 38 VA nurses and VA link nurses, representing 53% of the 72 renal units in the UK, took part in this survey. The results highlighted that patterns of practice were similar in the majority of units; however, there was a wide variation of reported rates of AVF/AVG. This would suggest that there are many other factors that determine how effectively patterns of practice can achieve successful outcomes.

The number of VA nurses per patient population was surprisingly very low: three of the units did not have any; seven units had <1 whole-time equivalent nurse each; 24 units had 1–2 whole-time equivalent nurses each; and 4 units had 2–3 VA nurses each. It is plausible to argue that one of the key roles of VA nurse is to provide integrated coordination of the VA pathway, and it is essential that the shortfall of VA nurses in the UK is addressed as soon as possible. They will need full support from all members of the MDT to ensure that robust access care pathways are continually being audited and adjusted as necessary to achieve national standards.

Interestingly, one high-performing unit did not have any VA nurses, and yet they maintained high rates of definitive access of >80%. Another high-performing unit reported that having three VA nurses ensured the maintenance of definitive access at a rate of >80%. The roles of VA nurses are variable, but valued; in those units without VA nurses, VA link nurses or clinicians stepped up to coordinate the service.

The UKRR has reported shortfalls in achieving RA standards in the majority of dialysis centres in the UK (Hole et al, 2017). This survey has shown that the infrastructure to support delivery of quality services is in place in most units, and that the provision of access service is improving. VA nurses, MDT, VA care pathways, dedicated theatre lists, and patient education are characteristics that are well-embedded within renal care in the UK.

Year-on-year audit data from UKRR have shown that early referral to the nephrologist, followed by

timely assessment by access surgeons, has increased rates of AVF in the UK (Hole et al, 2017). However, there needs to be an ownership and recognition of the importance of good access functionality from the entire renal MDT in order for there to be a timely referral for either creation or intervention.

Education also plays a significant role in the understanding of dialysis access, and this should be a continual part of renal nurses' education. It should start at their induction and an annual assessment should form part of the audit process in order to ensure and maintain a full understanding of the need for good AVF care.

In this survey, concerns were raised about lack of theatre spaces, beds and interventional radiology out of hours, in addition to poor attendance of MDT by nephrologists, and lack of clinical leadership and championship in driving the service forward in some units. Several units also reported high patient refusal rates for AVF. There was a strong view that all these factors were the key drivers for the variation in the provision AVF/AVG in the UK.

Conclusion

Overall, the BRS VA SIG national survey identified strong enthusiasm from renal units for the provision of quality VA services for dialysis patients. Although practice patterns were similar in most units, there is a need to both explore in detail how high-performing units have maintained rates of definitive dialysis access, and to understand how the constraints experienced by low-performing centres affect their delivery of services. Strong clinical leadership, well-coordinated and resourced access care pathways, and well-informed patients about the benefits of definitive access, were highlighted as key drivers for success by respondents to the survey.

There are vast opportunities for VA nurses to work in collaboration with the renal MDT to develop robust access care pathways, and to ensure an organised approach to access management and achievement of best model of care, using the 10 steps below:

- Individualised access plans for each patient
- Regular MDT meetings
- Referral for vessel mapping and timely surgical assessment
- Coordination of access surgery through dedicated 'access champion(s)'
- Assessment of AVF maturation and readiness for needling
- Promotion and support of good nursing VA procedures and competencies
- Development of access surveillance
- Adherence to and implementation of national access guidelines
- Maintenance of regular audit programmes in collaboration with the UKRR
- Implementation of educational programmes for staff and patients. JKC

Key points

- Data from the UK Renal Registry have revealed wide variation in the provision of vascular access care in the UK
- The majority of dialysis units do not achieve the Renal Association target standards for incident and prevalent patients on long-term haemodialysis
- This survey conducted by the British Renal Society Vascular Access Special Interest Group showed that the infrastructure to support dialysis access service in already in place in the UK
- There needs to be ownership and recognition of the importance of good dialysis access functionality from the entire renal multidisciplinary team to ensure timely creation of arteriovenous fistulae/arteriovenous grafts in advance of the need for haemodialysis

CPD reflective questions

- Do you actively take part in access education programmes for patients and staff? Do you have access to high-quality educational material?
- Who should 'champion' vascular access services?
- What are the characteristic factors that determine success of dialysis access provision in your unit?

Acknowledgements: All VA nurses and VA link nurses that supported the survey. Matthew Kingswell (workforce and organisational development), Glan Clwyd Hospital, for his assistance with SurveyMonkey. BRS VA SIG national survey workstream: Paula Debling East Kent University NHS Foundation Trust, Anne Young, Western Trust, and Richard Dick Cole, Xtramed.

References

Almasri J, Alsawas M, Mainou M et al. Outcomes of vascular access for hemodialysis: a systematic review and meta-analysis. J Vasc Surg. 2016;64(1):236–243. https://doi.org/10.1016/j.jvs.2016.01.053

Fluck R, Kumwenda M. Renal Association clinical practice guideline on vascular access for haemodialysis. Nephron Clin Pract. 2011;118(Suppl 1):c225–c240. https://doi.org/10.1159/0003280

Hole B, Caskey F, Evans K et al. UK Renal Registry 19th annual report: chapter 12 multisite dialysis access audit in England, Northern Ireland and Wales in 2015 and 2014 PD one year follow-up: national and centre-specific analyses. Nephron. 2017;137(Suppl 1):269–296. http:/doi.org/10.1159/000481374

Kumwenda M. Mitra S, Reid C. Clinical practice guideline. Vascular access for haemodialysis. 6th edition. 2015. http://tinyurl.com/y8qkoo36 (accessed 25 October 2017)

Rao A, Evans R, Wilkie M et al. UK Renal Registry 18th Annual Report: Chapter 11 2014 multisite dialysis access audit in England, Northern Ireland and Wales and 2013 PD one year follow-up: national and centre-specific analyses. Nephron. 2016;132(Suppl 1):253–278. http:/doi.org/10.1159/000444825