South African Journal of Surgery 2020; 58(3):113-114
https://doi.org/10.17159/2078-5151/2020/v58n3a3452

South African
Journal of Surgery
ISSN 038-2361

EDITORIAL

Renal replacement therapy and vascular access: the South African situation

PP Mistry,[1] DA le Roux,[2] MJ Mashabane,[1] T Gerntholtz[3]

[1] *Chris Hani Baragwanath Academic Hospital, South Africa*
[2] *Netcare Sunninghill Hospital, South Africa*
[3] *Rondebosch Dialysis Centre, South Africa*

Corresponding author, email: *mistry@vascare.co.za*

In this issue a VASSA task team in conjunction with leading nephrologists has published the first South African guideline for renal replacement therapy access. The preparation of this guideline is testimony to the Society's resolve to ensure the highest quality in access surgery for chronic kidney disease (CKD) patients.

However, it is important to put this into context by outlining the current situation for the management of end-stage CKD in our dichotomous healthcare system before summarising the key developments in vascular access for dialysis.

Dialysis and kidney transplantation have been available as a treatment modality since the 1950s. However, both remain expensive and inaccessible to most South Africans. The South African Renal Registry is a valuable resource that documents the state of renal replacement therapy in our country.

The last available report, from December 2015 found that 10 360 patients were receiving either dialysis or had a functioning kidney transplant. Given that there were 54.96 million South Africans at the time, it would represent a prevalence of 189 patients being treated per million population (pmp). This compares very unfavourably with the United States, where the prevalence is 2 034 pmp. The major conditions (diabetes, hypertension, familial) causing CKD are just as prevalent in South Africa as they are in high-income countries (HIC). In addition, we have a greater proportional burden of HIV when compared with HIC.[1]

The private sector, which serves 8.81 million people, is able to support 7 042 dialysis patients (799.3 pmp), while the state sector, which serves 46.15 million people, is only able to provide for 3 318 patients on dialysis (71.9pmp). This serves to highlight the poor availability of dialysis services in the state sector. There are wide provincial variations in the provision of dialysis services ranging from the highest in the Western Cape (327 pmp) to the lowest in Limpopo (59 pmp). There are also wide ethnic differences in accessing dialysis ranging from 927 pmp in Indians to 125 pmp Blacks.[1]

The prevalence of patients by treatment modality is 7 529 on haemodialysis, 1 440 on peritoneal dialysis and 1 391 functioning kidney transplants. In the private sector, 85% of patients are on haemodialysis, versus only 46% in the state sector. The causes of kidney disease include: "unknown" (34.1%), "hypertensive" (33.7%), "diabetic" (14.4%). This is in contrast with HIC where the prevalence of diabetes is closer to 50%.[1]

Over the last 25 years 7 191 kidney transplants have been performed in South Africa. To date most kidney transplants have been performed in the state sector but this is steadily declining. The overall kidney transplant rate was 6.4 pmp, averaging 4.8 pmp in the public sector and 15.2 pmp in the private sector.[2]

Until now, 58.3% of donor kidneys were derived from cadavers. However this is a declining trend and at current rates the expectation is that living related donors will surpass cadaver donor transplants in the next few years if there are no changes in policy, awareness and resources.[2]

Despite the well-recognised increasing prevalence of CKD and resultant renal failure, the focus so far has been around increasing resources and different treatment strategies for managing patients with end-stage renal disease. One of the neglected areas is linked to a myriad of ethical dilemmas surrounding withholding and withdrawing dialysis treatment. This is the reality that patients with end-stage CKD are more likely to die on dialysis treatment and in a hospital setting than other patients where end-of-life care is managed in a palliative care setting. Most renal care practitioners have not been trained to manage terminally ill patients. There is a definite need to provide palliative care options for patients with advanced kidney disease (stage 4 and 5) associated with a high comorbidity score. The palliative care specialist should be part of the renal care team ab initio.

Vascular access has historically been treated as an orphan condition with little emphasis in the postgraduate curriculums of nephrology, general surgery, vascular surgery, transplant surgery and radiology. With no one specialty taking on leadership of a multidisciplinary team necessary to provide optimal access, patients have suffered from poor access longevity. The guideline supplement in this issue provides a framework for those performing vascular access and we highlight the developments that may improve longevity.

The recent technological advances in the form of ultra-sonography, endovascular and hybrid techniques, mean the

vascular surgeon is ideally suited to perform the role of the access surgeon for the end-stage CKD team in order to plan, create and salvage dialysis access.

Duplex doppler ultrasonography (DDUS) has become essential in planning vascular access procedures. Assessing the patency, diameter, and compressibility of the artery and vein as well as outflow velocities has proven to improve patency and maturation outcomes.[3] DDUS is also an important adjunct during salvage procedures. Timeous identification and management of residual stenosis and thrombosis is often the difference between a successful and a failed reintervention.[4,5]

Dialysis catheters are best placed under ultrasound guidance and radiological screening via the jugular veins.[6] The right jugular vein route should be the first vein accessed. The catheter-related complication of superior vena cava (SVC) syndrome is a common occurrence. Venography with repeated angioplasty and/or stenting has not only resulted in alleviation of SVC syndrome symptoms but has also restored in-line flow to the heart resulting in prolongation dialysis access via the upper limb.[6,7] This approach has almost banished long-term lower limb access procedures to the history books.

The management of cephalic arch stenosis associated with brachiocephalic fistulas and venous anastomotic stenosis with arteriovenous grafts (AVG) remains a massive challenge. Endovascular techniques such as angioplasty or stenting have shown improved patency of limb access but current primary-assisted and secondary patency rates are still far too low.[8,9]

With the increased role of salvage endovascular technologies, antiplatelet drug use has also increased to maintain the patency for vascular access. Aspirin and clopidogrel are often used in combination after a salvage vascular access procedure.[10,11] While clopidogrel is used to prevent thrombosis it does pose a bleeding risk for patients undergoing renal transplantation.

This guideline is hopefully the first step towards more uniform best practice, highlighting the options for salvage and stimulating research to address identified shortcomings in the current literature. In addition, it highlights the broader context of the provision of equitable services for end-stage CKD in South Africa.

ORCID

PP Mistry https://orcid.org/0000-0002-4287-3673
DA Le Roux https://orcid.org/0000-0002-6356-6218

REFERENCES

1. Davids MR, Marais N, Jacobs JC. South African Renal Registry Annual Report 2015. African Journal of Nephrology. 2017;20:201-13.
2. Moosa MR. The state of kidney transplantation in South Africa. SAJM. 2019;109(4):235-40.
3. Malovrh M. Native arteriovenous fistula: preoperative evaluation Am J Kid Dis. 2002;39:1218-25.
4. Fahrtash F, Kairaitis L, Gruenewald S, et al. Defining a significant stenosis in an autologous rado-cephalic AVF for HD. Semin Dial. 2011;24:231-8.
5. Raju AV, May KK, Zaw MH, et al. Reliability of DDU for detection of haemodynamically significant stenosis in HD access. Ann Vasc Dis. 2013;6(11):57-61.
6. Kundu S, Modabber M, You JM, et al. Use of PTFE stent grafts for hemodialysis-related central venous occlusions: intermediate-term results. Cardiovasc Intervent Radiol 2011;34:949-57.
7. Ronald J, Davis B, Guevara CJ, et al. Treatment of central venous in-stent restenosis with repeat stent deployment in hemodialysis patients. J Vasc Access. 2017;18:214-9.
8. Katsanos K, Karnabatidis D, Kitrou P, et al. Paclitaxcl-coated balloon angioplasty vs plain balloon dilation for the treatment of failing dialysis access: 6-month interim results from a prospective randomized controlled trial. J Endovasc Ther. 2012;19:263-72.
9. Lerardi AM, Franchin M, Fontana F, et al. Usefulness of paclitaxel-releasing high-pressure balloon associated with cutting balloon angioplasty for treatment of out flow stenoses of failing hemodialysis arteriovenous shunts. Radiol Med. 2017;122:69-76.
10. Trimarchi H, Young P, Forrester M, et al. Clopidogrel diminishes haemodialysis access graft thrombosis. JVA. 2005;6:29-33.
11. Kaufman JS, O'Connor Z, Zhang JH, et al. Randomized controlled trial of clopidogrel plus aspirin to prevent haemodialysis access graft thrombosis. J Am Soc Neprol. 2003;14(9):2313-21.