



ORIGINAL ARTICLE

Types of Vascular Access for Patients of Chronic Kidney Disease Leading Haemodialysis

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Introduction

Dialysis is a treatment procedure to clean the blood of a person from waste whose kidneys are unable to function properly. This condition is mainly referred as Chronic kidney disease (CKD). The main goal of this procedure is to remove waste product, excess fluid and toxins from the blood to prevent their buildup in the body and

maintain fluid and electrolyte balance in the body.¹ There are two main types of dialysis available for the patients; Hemodialysis and Peritoneal dialysis. Former requires removal of blood from the body and passing it through a dialyser machine (artificial kidney) and returning clean blood to the body. Later involves insertion of dialysate solution in the peritoneal cavity (which acts

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as a filter) through which waste material passes from blood to the solution. The solution is then removed from the body.²

According to Pakistan Kidney Disease Journal approximately 22,000 patients in Pakistan require maintenance dialysis to sustain life. Chronic kidney disease (CKD) is ninth major cause of death in Pakistan¹. In 1990 CKD, was 27th leading cause of death worldwide which rose up-to 18th leading cause of death in 2010². In 2013 around 1 million people died of CKD related issues³.

An AV fistula is created at arm to insert the needles of dialyser machine which require dissection of radial artery and cephalic vein or brachioradialis, artery basilic vein and arteriovenous fistula and tubing of these vessels however, there are other options e.g catheters available for patients.⁴

AV fistula is usually considered best choice for patients. However a permanent dialysis catheter and AV graft are also considered by the patients. Route of vascular access where Arteriovenous fistula cannot be constructed. A dialysis double lumen catheter is a type of vascular access device used for hemodialysis treatment. It is a soft, flexible tube inserted into a vein in the chest or leg with formation of subcutaneous tunnel, allowing blood to be removed and returned during dialysis. It has two types a tunneled catheter (permanent) and a non-tunneled catheter (temporary).⁵

An AV (arteriovenous) graft is a synthetic tube surgically connected to an artery and a vein, creating a pathway for blood to flow from the artery through the graft and into the vein. This access type is used for hemodialysis treatment where AV Fistula formation not possible.

According to an article published in Pakistan Journal of Kidney Disease (PJKD)⁴ mode of initiation of HD was temporary catheter in 88.8% patients however permanent route of vascular access was shifted to AVF in 85% of patients.⁶

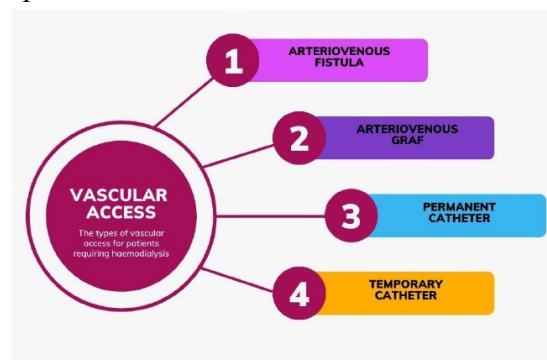


Figure-I

Objectives: To study the types of vascular access for the patients of chronic kidney disease (CKD) and document the initial and permanent route of vascular access along with duration of patency of those particular routes of VAs.

Methodology:

A cross-sectional study was conducted at Imran Idrees teaching hospital and Sialkot kidney centre between June 03, 2024 and August 08, 2024, after approval from Institutional Review Board (IRB). A total of 171 patients were evaluated and 137 patients were included in the study after obtaining informed consent. Rest of the patients (n=34) were excluded because they failed to accurately recall their VA history or refused to participate in the study. Data was collected on a specialized proforma. Data collected included demographics (age, gender, cause of chronic kidney disease (CKD) as well as particulars about vascular access.

Results

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After evaluating 137 patients following data was obtained:

	Number of Patients	%
Mode of initiation:		
Temporary Catheter:	113	82.48%
AV Fistula:	21	15.32%
AV Graft:	3	2%
Time lapse:		
< 1 year:	103	75.18%
> 1 year:	29	21.16%

Table-1;

In the above table it was observed that most used primary route of vascular access is temporary catheter (82.48%). After which AV fistula (15.32%) and AV Graft (2%) follow. Data of the permanent vascular access and failure frequency is mentioned in the table #2 and table #3.

	Number of Patients	%
Permanent route of VA:		
AV Fistula:	116	84.63%
Permanent Catheter:	13	9.4%
AV Graft:	5	3.64%
No PVA5:	3	2%

Table-2;

	Number of Patients	%
Failure of PVA:		
AV fistula:		

None:	99	85.3%
Once:	13	11.2%
More than once:	4	3.4%
AV Graft	4	80%

Table-3;

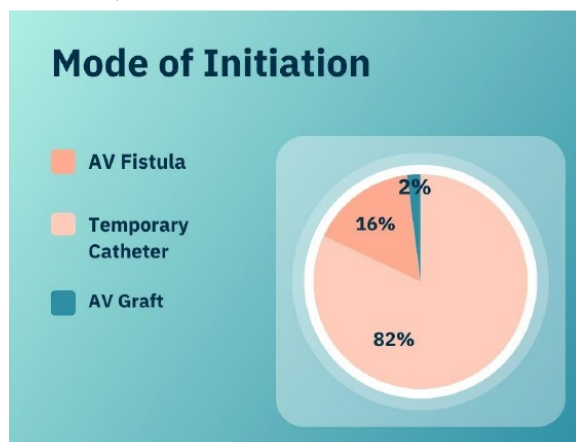


Figure-1;

The study reveals that permanent route of VA is quite different in patients of CKD requiring HD than primary VA. Permanent vascular access is most commonly achieved through an arteriovenous Fistula (84.63%) followed by a permanent catheter (9.4%). The Graft is used to lesser extent (3.64%) as a mode of PVA. The incidence of failure of is least in AV fistulas with 85.3% patients never facing any complications. 11.2% patients faced complications once and fistula had to be reconstructed in those patients. Only 3.4% patients faced fistula related complications more than once.

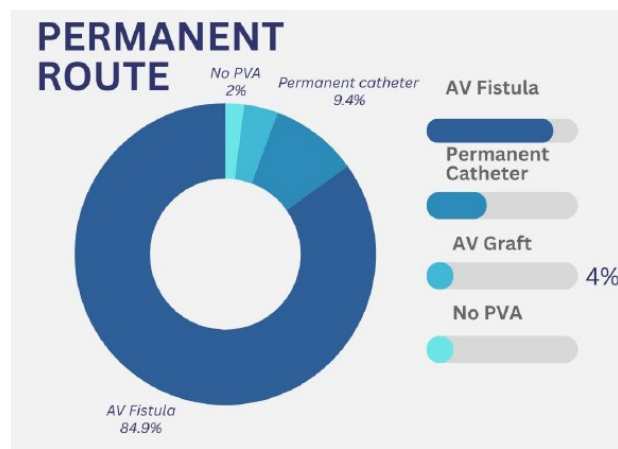


Figure-2;

The patients with an AV graft as PVA faced complications a lot more than AV fistula. Vascular access had to be reconstructed in 80% of the patients with AV Graft as permanent vascular access.

FAILURE OF PERMANENT AV FISTULA

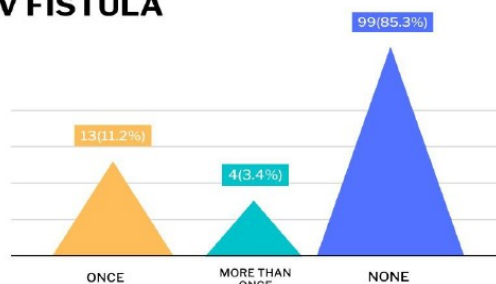


Figure-3;

Discussion: The data collected by our research team concludes that the most used primary route of vascular access in patients requiring haemodialysis is a primary double lumen dialysis catheter (82%) however, a lot of patients have faced complication like Catheter dysfunction, Central venous stenosis, Infection, Thrombosis and Air embolism due to this route and a permanent vascular access route was made in such patients within one year of their treatment.⁷ Catheter dysfunction is more common in patients with end stage renal disease⁶. The

second most used route was an AV fistula (16%) and AV graft is least used temporary VA (2%). Out of technical errors, hypotension, site of insertion, size of vessels, diabetes & atherosclerosis are the common causes of failure in AVFs⁸.

Conclusion: The data collected by our research team concludes that the most used primary route of vascular access in patients requiring haemodialysis is a primary double lumen dialysis catheter.

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References

1. GBD Compare 2019, Pakistan
2. Abubakar II, Tillmann T, Banerjee A. Global, regional, and national ge-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the global burden of disease study 2013. Lancet. 2015;385(9963):117–71. [https://doi.org/10.1016/S0140-6736\(14\)61682-2](https://doi.org/10.1016/S0140-6736(14)61682-2).
3. Jha V, Garcia-Garcia G, Iseki K, Li Z, Naicker S, Plattner B, et al. Chronic kidney disease: global dimension and perspectives. Lancet. 2013; 382 (9888) : 260–72. [https://doi.org/10.1016/S0140-6736\(13\)60687-X](https://doi.org/10.1016/S0140-6736(13)60687-X)
4. Pakistan Journal of Kidney Disease/ Fistula First – Are We There Yet? A Multicenter study. <https://pjkd.com.pk/index.php/pjkd/article/download/42/37>



5. Permanent Vascular Access
<https://www.kidneyfund.org/treatments/dialysis/about-vascular-access>
6. <https://bmjopen.bmj.com/content/5/11/e007136>
7. Epidemiology of haemodialysis catheter complications: a survey of 865 dialysis patients from 14 haemodialysis centers in Henan province in China.
8. <https://pjms.com.pk/issues/octdec06/article/article19.html#:~:text=Out%20of%20technical%20errors%2C%20hypotension,causes%20of%20failure%20in%20AVFs>.