

Haemodialysis Vascular Access Practice Patterns in North Pakistan

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ABSTRACT

Introduction: Mortality and morbidity rates in patients on haemodialysis vary among different countries widely due to variation in vascular access practices. Documented evidence of patterns and practices of various vascular access modalities in our population is scarce to allow for development of local guidelines or formulating steps to encourage adoption of international guidelines in Pakistani healthcare setup.

Objective: To assess Vascular Access practices for haemodialysis patients in five dialysis facilities of Northern Pakistan

Study Design: cross sectional study

Place and Duration of Study: This study was carried out at five dialysis facilities in three cities of Northern Pakistan over a period of one year from March 2011 to March 2012.

Materials and Methods: This cross sectional survey was completed by interviewing 536 end stage renal disease patients between 18 to 70 years of age over a period of one year. Duration of dialysis, types of access, current state and past history of vascular access were recorded and compared with International guidelines.

Results: Commonest 'current vascular access' was found to be AV fistula in 317 out of 536 patients (almost 60%) and the most common mode of 'first Vascular Access' (i.e. vascular access first used for haemodialysis) was catheter (83%). Amongst patients who had dialysis during last eight months, 76.27% were still being dialysed via percutaneous catheters while this figure is less than 34% in Europe.

Conclusion: Although the initial mode of dialysis in most cases is a line yet, majority of patients are dialyzed through native fistula. Need for a pre-emptive fistula is required to have superior longevity and fewer complications in haemodialysis patients.

Key Words: Vascular access, haemodialysis practices.

INTRODUCTION

In Pakistan approximately, 15-20% of persons 40 years of age or above have a reduced estimated glomerular filtration rate¹. About 16000 patients with end stage renal disease (ESRD) are added annually to the existing pool. According to the Dialysis Registry of Pakistan 2008 report, 6351 patients (3725 males and 2626 female) were receiving dialysis in 175 Centres in Pakistan. The cost of treatment is about Rs. 150,000 - 200,000 per patient / per annum (US\$ 2300).^{2,3}

Although haemodialysis provides symptomatic relief, these patients have increased mortality and poor quality of life than general population. Mortality and morbidity rates in patients on haemodialysis vary widely among different countries. 5-year mortality rates for ESRD patients in Europe and Japan are 20–35% lower than those reported for patients in the USA. Even within USA a fivefold variation in crude mortality was observed across different facilities⁴. A prospective observational study, 'The Dialysis Outcomes and Practice Patterns Study (DOPPS)' was started in 1996 to explore whether such differences were due to variation in haemodialysis practice patterns. DOPPS was designed to investigate inter facility variation in

dialysis practice across seven countries: France, Germany, Italy, Japan, Spain, the United Kingdom and USA and the associations between multiple practice patterns with four specific outcomes (mortality, hospitalization, quality of life, and vascular access events). Substantial variability in choice of angioaccess was noted between European countries and the United States in DOPPS^{4,5,6}.

The management of vascular access (VA) has always been one of the critically important components in the care of haemodialysis patients. VA complications account for 16-25% of hospital admissions in haemodialysis (HD) patients⁷. Vascular access is not only a major determinant of the high cost care for dialysis patients, it has direct impact on the quality of life of patients on dialysis^{8,9}. To optimize vascular access care of haemodialysis patients, the National Kidney Foundation (NKF) of USA has published the Dialysis Outcomes Quality Initiative (DOQI) clinical practice guidelines (CPG) for vascular access since 1997¹⁰. No such local guidelines are available in Pakistan. Data about use of various VA modalities in our population is scarce to allow for development of local guidelines or formulating steps to encourage adoption of international guidelines in Pakistani

healthcare setup. Current study (Haemodialysis Vascular Access Practice Patterns in Pakistan-HVAPPP) was designed to assess VA practices for HD patients in Northern Pakistan, in an attempt to fill this vacuum in data for identifying opportunities in improvement of care in HD patients.

MATERIALS AND METHODS

This cross sectional survey was carried out at five dialysis facilities in three cities of Northern Pakistan over a period of one year from March 2011 to March 2012. Among these hospitals two were military, two government and one was trust hospital.

End stage renal disease patients of either sex between 18 to 70 years of age, on regular haemodialysis for more than three months were included in the study. Patients with acute renal failure requiring short term dialysis were excluded.

Data collection and analysis: A study questionnaire was designed to assess duration, types, current state and

past history of vascular access. This questionnaire was either self administered by the patient or filled in by health care professional after interviewing the patients while at dialysis centre. A study coordinator was nominated among the staff at each dialysis centre to manage and co ordinate data collection

‘Current VA’ type was defined as the vascular access used at the last haemodialysis session at time of response to questionnaire. Accesses that were maturing but not in use were not recorded as current access. ‘First VA’ was considered as the access type used for first ever haemodialysis.

RESULTS

Out of 580 patients interviewed from five dialysis centres in Rawalpindi/Islamabad, Peshawar and Lahore, 536 questionnaires were found complete and were analyzed for descriptive statistics using SPSS version 17.

Table No.1 Demographic data

Institute	1	2	3	4	5	Total
n	197	110	92	88	49	536
Male : female	131:66	80:30	26:66	48:40	23:26	308:228
mean age (years)	48.19 + 16.183	39.55 + 13.752	47.87 + 18.351	43.43 + 15.105	55.54 + 7.746	46.24+ 15.99 years
Duration of Dialysis						
Up to 8 months	76	36	64	22	38	236
8 – 12 months	20	6	4	20	2	52
More than 12 months	101	68	24	46	9	248

Table No.2: Types of VA

INSTITUTE	1	2	3	4	5	Total	%age
Current VA							
AVF	135	72	5	84	21	317	59.2%
Tunnelled Catheter					14	14	3%
Uncuffed non-tunnelled catheter	62	38	87	4	14	205	38.2%
AVG	0	0	0	0	0	0	
First VA used							
AVF	28	23	17	18	5	91	16.9%
Tunnelled Catheter	0	0	0	0	14	14	3%
Uncuffed non-tunnelled catheter	169	87	75	70	30	431	80.4%

Table-2 shows current VA stratified by duration of dialysis.

(Duration of dialysis)	Current VA	Institute					Total	%age
		1	2	3	4	5		
Upto 8 months	n	76	36	64	22	38	236/536	44%
	AVF	24		2	18	12	56/236	23.7%
	Percutaneous Catheter	52	36	62	4	26	180/236	76.2%
8-12 months	n	20	6	4	20	2	52/536	9.7%
	AVF	12	4	0	20	2	38/52	73%
	Percutaneous Catheter	8	2	4	0	0	14/52	26.9%
More than 12 months	n	102	68	24	46	8	248/536	46.2%
	AVF	100	68		46	6	220/248	88.7%
	Percutaneous Catheter	2		24		2	28/248	11.2%

Demographic data regarding age, sex and duration of dialysis is given in table 1. Although, commonest 'current venous access' was found to be AV fistula in 317 out of 536 patients (almost 60%) yet, the 'first VA access' least used was also AV fistula i.e 17%. The same trend is further elaborated in table 3 and figure 1, where type of access is described according to duration of HD. The mean distribution of sites used in 'current VA access' patients included in the study are also shown in figures 2 and 3.

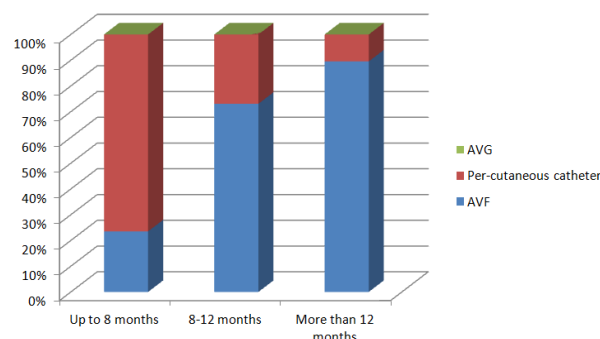


Figure No.1: Depicts %age use of various VA modalities at three different timelines

AVF sites currently in use

■ Radiocephalic ■ Brachiocephalic/brachio basilic

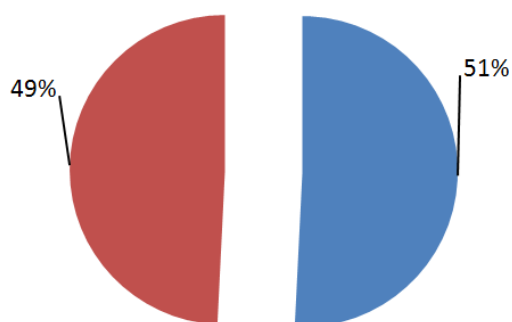


Figure No.2: Shows distribution of sites of AVF among 'current VA' being used

Insertion sites of per-cutaneous catheters

■ Internal jugular ■ Subclavian ■ Femoral



Figure No. 3: Shows distribution of sites of percutaneous catheters currently being used

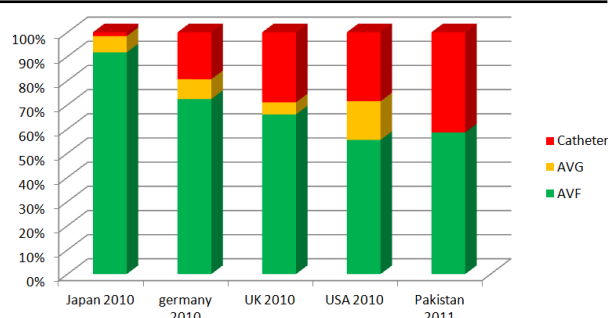


Figure No.4: Comparison of %age use of various VA modalities in different countries

DISCUSSION

The requirement of VA in patients undergoing haemodialysis (HD) may be temporary (from several hours to weeks) or permanent. Temporary access is commonly established by the percutaneous catheters while AVF are the preferred VA for chronic HD^{10,11}. Vascular access practice variability is implicated for increased mortality among dialysed patients in the USA compared with Europe and Japan^{12,13}. Greater mortality is observed for patients using a catheter (relative risk, 1.32) or graft (relative risk, 1.15) versus an AVF^{7,12}. Patient's gender, age, race, anthropometric attributes, and duration of renal replacement therapy have also shown to affect type of angioaccess for haemodialysis patients¹⁴.

The National Kidney Foundation, Inc. USA, developed and released evidence-based guidelines (The National Kidney Dialysis Outcome Quality Initiative (K/DOQI) Clinical Practice Guidelines CPG) on vascular access for haemodialysis in 1997 in order to standardize the vascular access protocols¹⁵. These guidelines, which are regularly updated, are the standard against which VA practice patterns are compared in DOPPS study and also the reference for current study. These guidelines recommend that an autologous AV fistula be constructed in at least 50% of all new kidney failure patients likely to receive haemodialysis as their initial form of renal replacement therapy. In addition, AVF should be the vascular access for at least 40% of prevalent patients¹⁶. CPG also recommends that AVF should ideally be created at the wrist or, barring that possibility, at the elbow, failing which upper arm (brachio-basilic) AV fistula be created or an AV graft used¹⁷. Most countries now report that fistulas are the most common types of vascular access in use for dialysis⁽⁸⁾. Although more planning and time for placement and maturity is needed for an autologous fistula, they have superior longevity and fewer complications, and are associated with the lowest morbidity, mortality and cost among all types of dialysis access^{8,9,18,19}.

CPG recommended that less than 10% of maintenance haemodialysis patients should be chronically dialyzed

using catheters^{9,15}. Although they can be used immediately after placement, catheters are discouraged as permanent vascular access because of their increased risk of luminal thrombosis, infection and endocarditis, unreliable blood flows, risk of central venous stenosis, mortality, shorter use life and patient cosmetic concerns^{9,20,21,22}.

The overall condition in Northern Pakistan in 2011-2012 is comparable to that of other countries in 2010 (DOPPS-IV) in Figure-4²³. Fortunately, in Pakistan, in chronically dialysed patients only 11.29% were dialysed using simple non-tunnelled catheter as chronic vascular access (table 2) (KDOQI-CPG recommends less than 10 %), it is the new patients (duration of dialysis up to 8 months) where results are not meeting the guidelines. Among these patients, 76.27% were being dialysed via percutaneous catheters. It is likely that some patients receive a percutaneous catheter as a temporary angioaccess because they presented too late for the establishment of a permanent angioaccess. Unfortunately even up to a year 67.36% were having dialysis through catheter. The situation is better in rest of the world; about 66% of the incident patients (having dialysis for 6 months or less) had AVF in Europe compared with 15% in the USA and 31% of the patients had catheters for dialysis in Europe compared to 60% in the USA²⁴. It is therefore required to launch a 'fistula first initiative'²³ like campaign so that majority of patients with ESRD can have their first HD through native AVF.

Patients who are older, diabetic, obese, and/or female may have relatively smaller or even compromised vascular anatomy and have a higher rate of fistula failure^{9,25}. Female gender and decreased time since the initiation of haemodialysis has independently been associated with increased catheter use²⁶. Interestingly, this trend was also seen in our study where frequency of functioning AVF was significantly higher in males compared to females ($p < 0.05$)

CONCLUSION

In Pakistan majority of patients are dialyzed through native fistula, although the initial mode of dialysis in most cases is a line. Practices of VA for haemodialysis in Pakistan need improvement especially for newly diagnosed ESRD patients.

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