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Haemodialysis access: clinical and epidemiological profile of patients and their vascular access in interior of Brazil

ORIGINAL

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Abstract

Background: The analysis of vascular access for haemodialysis is relevant for the quality of life of patient. In this study we investigated the profile of vascular access used for haemodialysis patients in a poor place, interior of Brazil.

Objectives: To identify the percentage of vascular access for haemodialysis in this unit conforms to international standards.

Methods: We evaluated the reference haemodialysis service in a specific poor place in Brazil. There are 120 patients of both genders who have undergone implant or manufacture of vascular haemodialysis access; there aren´t patients on renal replacement therapy by peritoneal dialysis.

Results: Associated diseases were unknown cause, diabetes mellitus and hypertension. 93 (77.5%) had arteriovenous fistula, with 89 held by the same dialysis and four of them were still maturing. 27 patients on dialysis used central venous catheter. 91 were native and two were made using polytetrafluoroethylene prosthesis (PTFE). Among the 27 patients with central venous catheters, twenty were short-

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term catheter and 7 were long-term catheter. Among the fistulas for dialysis patients, the highest prevalence was radiocephalic fistula in 60 patients (50%).

Among all the fistulas, the left radiocephalic was the most found, in 37 patients (39.8%) and right, in 23 patients (24.7%). The number of patients that they had only one fistula manufactured corresponded 60 patients (50%) and mean duration of use was 1,74 ±1,64 years, ranging from two months to 9 years.

Conclusion: Our unit of haemodialysis is above the limits established by international norms.

Keywords
Vascular access, haemodialysis, arteriovenous fistula, profile.

Background

The need for a vascular access is essential for effective maintenance dialysis [1]. The arteriovenous fistula (AVF) are widely recommended to offers higher patency rates, lower mortality and morbidity, and lower costs compared with central venous catheters or arteriovenous grafts. [2-4]. An ideal access delivers a flow rate adequate for the dialysis prescription, has a long use-life, and has a low rate of complications (infection, stenosis, thrombosis, aneurysm, and limb ischemia).

Compared with the general population, dialysis patients have a 100-fold greater risk of sepsis-related death, with infection-related and all-cause mortality highest with catheters. [5] Use of Central Venous Catheters for haemodialysis has increased in recent years, comprising approximately 25% of prevalent haemodialysis patients in the United States [6, 7]. Long-term dialysis using tunneled, cuffed catheters increases a patients risk of death 2- to 3-fold and serious infection 5- to 10-fold compared with dialysis using AVF. [8].

Because of this, the National Vascular Access Improvement Initiative-Fistula First has set a goal of 66% fistula prevalence in haemodialysis patients by June 2009. [3, 9] They should be made 6 months prior to initiating haemodialysis. [10] If an AVF cannot be created, an AVF graft or venous catheter may be needed [11, 12] but they should be avoided [6, 13]. The studies showed that the native access presents the best patency (4 to 5 years) and lower rate of reoperation when compared with other accesses [14, 15].

The analysis of frequent dialysis services is important for improving patient care essential aiming adequacy in relation to recommended guidelines and also to improvements of vascular. The monitoring the quality of service and maintain control over the goals are advocated by THE NATIONAL KIDNEY FOUNDATION KIDNEY DISEASE OUTCOMES QUALITY INITIATIVE (NKF KDOQI™) Clinical Practice Guidelines [16, 17]. Thus, this analysis tries available the adequacy of the haemodialysis service with the guidelines.

Method

Population

This is a descriptive transversal observational study conducted on January 2013. We performed the study on the dialysis unit, Juazeiro Nephrology Center (CNJ), in a pour area in Brazil, in a reference dialysis unit located in the largest city in the interior of Ceará. The sample consisted of 120 patients (77 males). The study was approved by the Ethics Committee of the ABC Medicine College, with questionnaires and physical examination in all patients on dialysis. All patients gave informed consent. All procedures were in compliance with the Helsinki Declaration.

Inclusion and exclusion criteria

We included all patients, which were in agreement with the consent term, who have undergone implant or manufacture of haemodialysis vascular access.

Variables

We evaluated the following variables: gender, age, time which the subject was using haemodialysis, financing, cause, co-infection by hepatitis and HIV virus, actual and previous access.

Statistical Analysis

For the descriptive statistics we used the Microsoft Excel® program.

Results

Data from 120 patients were analyzed on January 2013, this represented, 100 % of patients in the Nephrology Center of Juazeiro-CE, reference dialysis clinic in the poor area in the Country Brazil that it was five years old.

The most prevalent sex was male in 77 (64.2%).

The people had the Brazilian Health Public System as the funding source of treatment, represented by 110 (91.6%) and only 10 (8.33%) had private health plans.

The average age was 53.77±17.7 years old, ranging between 13 and 92, had greater prevalence between the fifth and sixth decades of life.

The average time on Renal Replacement Therapy (RRT) was 22.46±21.42 mounts or 1.87±1.78 year, 96 (80) patients were less than three years and there aren't patients with more than 10 years in treatment.

Table 1: Distribution of patients according of the sample composition from CNJ, Juazeiro do Norte, CE, Brazil, January 2013.

Demographic characteristics		n(120)	% (100)
Sex			
	Male	77	64.2
	Female	43	35.8
Age			
	≤20 years	03	2.5
	21-40	26	21.7
	41-60	48	40.0
	61-80	35	28.2
	≥ 81 years	08	6.7
Dialysis time			
	Less than 1 ano	44	36.7
	≥ 1 e <3 years	52	43.3
	≥ 3 e <5 years	15	12.5
	≥ 5 e <10 years	09	7.5
	> 10 years	00	0.0

The most common End Stage Renal Disease (ESRD) etiology was unknown cause, affecting 38 (31.7%) patients, diabetic nephropathy was the most specific cause found with 31 (25.8%) patients and hypertension, 10 (8.3%). Remember that is not accounted number of hypertensive patients, but numbers of patients with Nephrosclerosis Hypertensive causing the ESRD condition.

Table 2: Cause Chronic Kidney Disease patients from CNJ, Juazeiro do Norte, CE, january 2013.

		n (120)	% (100)
Cause Chronic Kidney Disease	Unspecified	38	31.7
	Diabetes Mellitus	31	25.8
	Hypertension	10	8.3
	Policystic Kidney	05	4.2
	Glomerulonephritis	13	10.8
	Prolonged IRA	06	5.0
	Others	17	14.2

Regarding access to dialysis, 93 (77.5%) had undergone creating an AVF, and only 89 (74.1%) were suitable for use, or were undergoing haemodialysis through an AVF and four were in the process of maturation. Among the 93 patients who had fistulas, two (1.7%) was prepared by a synthetic material such as polytetrafluoroethylene (PTFE). Catheter were undergoing how haemodialysis via central venous access in 27 (22.5%) patients. Among the 27 patients using central venous catheter, seven were long-term and the short-term were 10. The average time in use of fistulas was 1.61±1.64 years, ranging from 2 months to 8 years and the implanted catheters, 3.2±6.9 months for short-term and 5.2±5.4 for long-term catheter.

Table 3: Number of vascular access made for patient from CNJ, Juazeiro do Norte, CE, january 2013.

		n (120)	%(100)
Number of fistulas made/ patient	None	16	13.3
	01	60	50.0
	02	28	23.3
	03	10	8.3
	04	06	5.0
Number of cateter implanted/ patient	None	02	1.7
	01	60	50.0
	02	24	20.0
	03-04	13	10.8
	05-06	11	9.2
	06-07	08	5.8
	09 or more	03	2.5

Considering the arteriovenous fistulas, 59 (63.5%) were located in the left arm and 37 (39.8%) were radiocephalic, 17 (18.3%) were brachiocephalic, 5 (5.4%) were Brachiobasilic; 34 (36.6%) were located in the right arm and 23 (24.7%) were radiocephalic, 9 (9.7%) were brachiocephalic, 2 (2.2%) were brachiobasilic. Fifty percent of the fistulas were distal.

Considering the mean number of catheters used by patients, there was an average of 2.51±2.43 catheters per patient, and an average of 1.41±0.99 fistulas per patient.

Considering the sites of puncture catheter, 16 (59.3%) were implanted in the right jugular vein, 5 (18.5%) in the right femoral vein, 3 (11.1%) in right subclavian; 1 (3.7%) in left subclavian, jugular and femoral vein.

If we consider the patency time of the last used access, we found 1.32±1.56 years; for fistulas, 1.61±1.64 and 0.31±0:54 for all catheters.

Table 4: Distribution of vascular access in use on CNJ. Juazeiro do Norte, CE, january 2013.

Vascular access		n (120)	% (100)
Initial access for dialysis	Central Vein Catheter (CVC)	118	98.3
	Arteriovenous fistula	02	1.7
	Peritoneal cateter	00	0.0
Vascular acess in use	Native	91	75.8
	PTFE	02	1.7
	CVC long-term	07	5.8
	CVC short-term	20	16.7
Location of arteriovenous fistula	Right radiocephalic	23	24.7
	Left radiocephalic	37	39.8
	Right brachiocephalic	09	9.7
	Left brachiocephalic	17	18.3
	Right Brachiobasilic	02	2.2
	Left brachiobasilic	05	5.4
Sites of puncture catheter in use	Vein jugular - right	16	59.3
	Vein jugular – left	01	3.7
	Vein femoral – right	05	18.5
	Vein femoral – left	01	3.7
	Vein subclavia – right	03	11.1
	Vein subclavia - left	01	3.7

Discussion

The NKF-DOQI created in 1997 guidelines for standardization of care for renal disease to dialysis in relation to vascular access in order to decrease the complications and cost, improve the dialysis quality. The improvement of the patients quality of life can be reported lower number of use and complications of vascular access for haemodialysis due to catheter use and fistula with prosthesis. [18].

The periodic review of access for haemodialysis is intended to be performed on all services in order to monitor their adequacy in relation to international guidelines. According to these premises, we performed at the Juazeiro Nephrology Center as investigation which aims to verify the adequacy and monitor the vascular access, within the standards established by the guidelines [1, 19-21].

The most patients had less than three years on dialysis; the fact could be a consequence of the short time of opening of the dialysis unit.

According to the latest Brazilian Census of Dialysis, 2012, 84% of patients had the health public system funding source, this shows that it is the main financier. In our study, we found that treatment of 91.7% of patients were funded by the SUS – Sistema Único de Saúde and is above the national average possibly by lower purchasing power of the local population when compared to the Brazilian population. In further, accordance with the data of Brazilian Nephrology Society, we found dissonant, 57.7% of the patients were female compared with 35.8% of our sample. [22].

As the distribution of patients according to age group, most patients were aged below 64 years, consistent with data from the Sense of Brazilian Nephrology Society - SBN [22].

We found that the main cause leading to ESRD was of unknown origin and represented 31.7%, followed by 25.8% of Diabetes and Hypertension occurred in 8.3%; finding different census indicated that the SBN as first cause Hypertension (33.8%), followed by diabetes (28.5%), chronic glomerulonephritis (12.6%) and undetermined origin (9.5%). A significant proportion of patients with unknown etiology are reported in the literature, 16.2% of the elderly Indian Affairs, [12] 5.9% in the United States, 18% in the United Kingdom [13] and, similarly, 14, 8% in Iran. [14] Our finding of 31.7% of cases of unknown etiology may reflect the lack of awareness of the disease, deficiency in early diagnosis and delay in referral before you get to the specialist. [23].

According to our results, the percentage of patients on dialysis with arteriovenous fistulas was higher than recommended by NKF - DOQI 2006 (70%) and represented 77% of vascular access. However, in the national census data represented 85.5% of accesses. Our data could still not the best if not consider that 12.5% of patients had less than three months on haemodialysis. During

this time, they might improve renal function, no needed of fistula and our percentage would increase to 88.6% without considering them. This dialysis service attends many patients diagnosed with Acute Renal Failure and this finding can mix up the results.

Furthermore, the location of leaks is in accordance with international guidelines. We have reported prevalence radiocephalic localization (64.5%), which has a high rate in primary fistula. It is an ideal combination to the patient because it is associated with a lower rate of complications and, therefore, improving the quality of life [18, 24, 25]. We still showed that 50% of patients underwent a single preparation of fistula. The access should be placed distally and in the upper extremities whenever possible. It's preferred primary radiocephalic fistula, an elbow (brachiocephalic) primary fistula, to a transposed brachial basilic, vein fistula [10].

The preferred insertion site for tunneled cuffed venous dialysis catheters or port catheter systems is the right internal jugular vein. Subclavian access should be used only when no other upper-extremity or chest-wall options are available. In our study, there was a predilection to implant catheters in the jugular veins, especially the right as the main guidelines recommend and it was represented to 63% of all catheters. [10].

An intriguing finding was that 14.8% of patients were catheterized in subclavian veins. Subclavian vein catheterization is associated with central venous stenosis [26-28]. Significant subclavian vein stenosis generally will preclude the use of the entire ipsilateral arm for vascular access. Thus, subclavian vein catheterization should be avoided for temporary access in patients with kidney disease. [10] All these catheters were implanted in the largest hospital in the region. Therefore, this finding mischaracterizes the actual statistics of the haemodialysis service.

Conclusion

The KDOQI was designed to improve patient outcome by investigating hemodialysis patients. The results of this study in patients selected from Juazeiro Nephrology Center suggest that patient characteristics and treatment patterns are same the goals of Current Guidelines.

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