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Vascular Access Profile at Sentra Medika Hospital

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Abstract: ***Background: Fistula, graft, or catheter through the blood for hemodialysis is called vascular hemodialysis access. According to the data of Indonesian Renal Registry (IRR) 2018, the number of new hemodialysis (HD) patients and the use of vascular access for HD in Indonesia increases annually. Methods: This research is a descriptive study, sampling retrieval using non-probability sampling methods with total sampling technique. Data collection was taken from the patient's medical records. We included all patients who underwent AVF and CDL procedures as vascular access for hemodialysis during April 2018 to April 2020. Results: We diagnosed 4073 patients who need vascular access for HD with 2208 (54,2%) patients performed AVF and 1865 (45,8%) CDL procedures. Then a total of (65, 5%) AVF are performed on radiocephalica or distal forearms and (34, 5%) in brachiocephalica or proximal forearms. As many as (69, 1%) CDL in the jugular area, (18,8%) subclavia, (12,1%) femoral. We recorded more patients with female gender (51, 5%) than male (48, 5%) and the majority of patients age distribution at 51-60 years (38,9%) with risk factors (85,3%) have hypertension, (82, 9%) diabetes mellitus, (88,3%) dyslipidemia, and (88,3%) with history of smoking.***

Keywords: Vascular access; Chronic kidney disease; Hemodialysis

AVF, Arteriovenous Fistula; AVG, Arteriovenous Graft;CDL, Catheter Double Lumen; CKD, Chronic Kidney Disease; ESRD, End Stage Renal Disease; HD, hemodialysis; VA, Vascular access

1. Introduction

Base on the 2015 study of the global burden of disease (GBD), there are 1,2 million people died because of kidney failure, it's increased 32% since 2005. In 2010, about 2, 3-7,1 million people with chronic kidney disease (CKD) died without access to chronic hemodialysis. In general, five to ten million people died of kidney disease. Reducing the global incidence rate of kidney disease is one way to achieve a global balance of the 17Sustainable Development Goals (SDGs), which will do global action by controlling and do preventif about non-communicable disease from 2013 till 2020, which is called The 2013 Action Plan. The decline of non-communicable incidental disease rates can be achieved by eliminating associated risk factors, that is hypertension, diabetes, dislipidemia, alcohol, tobacco use, an unhealthy diet, and inadequate exercising.[2] Besides, CKD is a worldwide public health problem. In the last ten years, it's an increase in cases resulting from CKD like kidney failure, cardiovascular disease and premature death.[9]

According to the Indonesian Renal Registry (IRR) data in 2018, the number of new patients chroonic HD in Indonesia increases annually. In 2007, New patients with chronic HD are only 4977 and are active 1885, whereas new patients in 2018 increase to 66433 and active 132142. With the increase in the incidence of chronic HD, the number of patients made vascular access to HD is also increasing.[3]

2. Definitions

Chronic kidney disease is (1) a kidney damage for 3 month or more, which is defined as an abnormality functional or structural with or without a decrease of GFR, (2) CKD is GFR <60 mL/min/1,73 m^2 for 3 month or more with or without a kidney damage.[9]Fistula, graft, or catheter through the blood for hemodialysis is called vascular hemodialysis access..[4]

According to K-DOQI, there are several risk factors that can cause a CKD, consisting of clinical factors (e.g diabetes, hypertension, dislipidemia, autoimmune disease, urinary tract infection, urinary tract stone, inferior urinary tract obstruction, malignancy, family history with CKD, acute kidney injury, nefrotoxic drug exposure) and sociodemographic factors (e.g older age, smoking, African-American race, American-Indian race, Hispanic race, Asian race, and poor educational).[9]

There are various type of vascular access, which is arteriovenous fistula (AVF), arteriovenous graft (AVG), and catheter double lumen (CDL).[1]

Then get the AVF location organized, it starts with a non-dominant hand and from distal to proximal (snuffbox, distal radiocephalica, proximal radiocephalica, brachiocephalica), whereas the main choice for the CDL location of the jugular area because it has high success rate and low complications rate. The location of CDL is start from interna or externa jugular, femoral, subclavia, and lumbalis.[7,8]

There are three AVF canulation technique. 1. Buttonhole / constant-site (this is done at the same location, angle, and with the same depth between the skin and vein access each time HD), 2. General area (this technique is performed with

the needle insertion of arteries and veins at a considerable distance every time HD), 3. Rope-ladder / step-ladder (it works by rotating arterial and vein canulation sites every time HD).[7]

3. Research Methods

This research is a descriptive study, sampling retrieval using non-probability sampling methods with total sampling technique. Data collection was taken from the patient's medical records. We included all patients who underwent AVF and CDL procedures as vascular access for hemodialysis during April 2018 to April 2020. We pulled the data from medical record in two months from June to July 2020 in The Department of Cardio-thoracic and Vascular Surgery Sentra Medika Hospital, and then we analyze according to the research variables.

4. Results

On this research, we diagnosed 4073 patients who need vascular access for HD with 2208 (54, 2%) patients performed AVF and 1865 (45,8%) CDL procedures. Of all patients who underwent the AVF procedures, 1447 (65,5%) patients performed the AVF procedure on radiocephalicaor distal forearms and 761 (34, 5%) in brachiocephalica or proximal forearms. Then of all patients who underwent CDL procedures, 1289 (69, 1%) patients did the procedures in the jugular, 351 (18,8%) insubclavia, and 225 (12,1%) in femoral.

Then of the 4073 patients we examined, we obtained 1975 (48,5%) menand 2098 (51,5%) women. Beyond that in terms of age, there were an age group <30 years 364 (9%) patients, 30-40 years 602 (14, 8%) patients, 41-50 years 1222 (30%) patients, 51-60 years 1586 (38, 9%) patients, and>60 years 299 (7,3%) patients. Then for the risk factors, we are found 3475 (85,3%) patients with hypertensionand 598 (14,7%) without hypertension, 3378 (82, 9%) patients with diabetes melitusand 695 (17,1%) without diabetes melitus, 3595 (88,3%) patients with dyslipidemia and 478 (11,7%) without dyslipidemia, 3596 (88,3%) patientshave history of smokingand 477 (11,7%) do not smoke.

Table 1: Characteristic AVF Patients Population

		*Arteriovenous Fistula (AVF)*N=2208
Gender	Male	1094 (49,5%)
	Female	1114 (50,5%)
Age	<30 years	186 (8,4%)
	30-40 years	327 (14,8%)
	41-50 years	659 (29,8%)
	51-60 years	867 (39,3%)
	>60 years	169 (7,7%)
Location	Radiocephalica	1447 (65,5%)
	Brachiocephalica	761 (34,5%)
Hypertension	Yes	1883 (85,3%)
	No	325 (14,7%)
Diabetics	Yes	1832 (83%)
	No	376 (17%)
Dyslipidemia	Yes	1949 (88,3%)
	No	259 (11,7%)
Smoking	Yes	1950 (88,3%)
	No	258 (11,7%)

5. Discussion

Based on the results of the above research came up to 4073 patients in Sentra Medika Hospital from April 2018 untill April 2020. This results indicates that numerous CKD patients performed vascular access procedures in the last two years with many of the patients conducted by the vascular access procedural, it suggest high CKD incident numbers. This data corresponds to data from The Indonesian Renal Registry (IRR) which lists that patients with HD continue to increase every year.[3]

From the above data, 2208 (54,2%) patients performed AVF and 1865 (45,8%) patients performed CDL procedures. Then, from 2208 patients who underwent the AVF procedures, 1447 (65,5%) patients performed the AVF procedure on radiocephalicaor distal forearms and 761 (34,5%)in brachiocephalica or proximal forearms. Then from 1865 patients who underwent CDL procedures, 1289 (69,1%) patients did the procedures in the jugular, 351 (18,8%) insubclavia, and 225 (12,1%) in femoral.It harmonizes with what is described in K-DOQI Guideline in terms of selection of type and vascular access location.[7,8]

Table 2: Characteristic CDL Patients Population

		Catheter Double Lumen (CDL) N=1865
Gender	Male	881 (47,2%)
	Female	984 (52,8%)
Age	<30 tahun	178 (9,5%)
	30-40 tahun	275 (14,7%)
	41-50 tahun	563 (30,3%)
	51-60 tahun	719 (38,5%)
	>60 tahun	130 (7%)
Location	Jugular	1289 (69,1%)
	Subclavia	351 (18,8%)
	Femoral	225 (12,1%)
Hypertension	Yes	1592 (85,4%)
	No	273 (14,6%)
Diabetics	Yes	1546 (82,9%)
	No	319 (17,1%)
Dyslipidemia	Yes	1646 (88,3%)
	No	219 (11,7%)
Smoking	Yes	1646 (88,3%)
	No	219 (11,7%)

Based on the gender and the age of the total 4073 patients, We recorded more patients with female gender 2098 (51,5%) than male 1975 (48,5%) and the majority of patients age distribution at 51-60 years is 1586 (38,9%) with risk factors 3475 (85,3%) have hypertension, 3378 (82,9%) diabetes mellitus, 3595 (88,3%) dyslipidemia, and 3596 (88,3%) with history of smoking.

6. Conclusion

Vascular access arrangements must be made and selected with the best effectiveness levels (corresponding to K-DOQI Guideline) considering the patient's needs and circumstances. After the vascular access has been established, it must be well maintained and canbe used for extended periods. The preferred vascular access for HD patients is AVF and it must be prepared before the patient reaches The V Stage of CKD for HD measurements. The

CDL installation procedures are only in emergency condition or if the AVF makes it impossible.

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