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Characteristics Of Chronic Kidney Failure Patients Using Vascular Access For Hemodialysis In Vascular Surgical Division Dr. Mohammad Hoesin General Hospital Period 1 Januari – 31 Desember 2018

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ABSTRACT

Hemodialysis has been accepted as a method of treatment in patients with CKD in stage 5. A-V fistula is the closest ideal hemodialysis vascular access, so that it can reduce morbidity and mortality of CKD patients. This research is a retrospective descriptive study with data obtained from the A-V fistula surgery form archive in the Vascular and Endovascular Division of the Department of Surgery, FK UNSRI in January 2018-December 2018 and from the patient's medical record. Data processing was carried out with SPSS 16.0. The results of the study obtained 203 patient data with the use of AV Shunt that met the inclusion criteria. The mean age of patients was 50.53 years. There were 114 (56%) male patients and 89 (44%) female patients. Risk factors such as smoking were found in 9 (4%) patients. History of the disease prior to experiencing chronic renal failure was hypertension in 115 patients (56.6%) and diabetes in 81 (40%). There were 69 patient's Hb data before AV shunt with Hb <7 (1%) in 2 people, 7-8.9 (33%) 67 people, 9-10.9 (53%) 108 people, > 11 (13%) 26 people. 128 (63%) patients had double lumen catheters installed in the right jugular, 5 (2%) patients were placed in the left jugular, and 70 (34%) patients did not have a double lumen catheter. A total of 169 (83%) patients had a history of using AV Shunt. There were 71 (35%) patients with the wrist region anastomosis, 132 (65%) patients with cubiti region anastomosis. Native AV shunt was the most commonly performed in 202 (99.5%) patients.

There were no recorded complications after AV Shunt placement in 99 (48.8%) patients, 51 (25.2%) patients had AVF branches, 23 (11.3%) had AV Shunt rupture, 18 (8.8%) AVF stenosis, 1 (0.5%) central stenosis, 1 (0.5%) thrombus, and 11 (5.4%) infections. A total of 167 (82.2%) patients took AV Shunt after 3 months.

Keyword: *End stage chronic kidney failure, hemodialysis vascular access, A-V fistula*

Introduction

The number of patients with chronic kidney failure increases progressively. More than 10% or 20 million people aged 20 years or more in the United States suffer from chronic kidney disease (CKD). In 2007, around 110.000 patients in the United States with CKD continued to develop kidney failure (End Stage Renal Disease/ESRD).[1] The prevalence of CKD increased with increasing numbers of the elderly population and the incidence of diabetes mellitus (DM) and hypertension.[2]

The treatment of choice for ESRD is hemodialysis (HD) or kidney transplantation.1 More than 300.000 individuals in the United States relied on vascular access to receive hemodialysis therapy.[1] In 1998, the number of hemodialysis patients in Indonesia numbered around 3000 and in 2007 rise to 10,000 people.3 Based on the Indonesian Renal Registry (IRR) of 249 reporting renal units, there were 30.554 active patients undergoing dialysis in 2015, most of whom were patients with CKD.[2]

Vascular access continues to be a major cause for hospitalization and morbidity in patients with kidney failure.[4] Ideal vascular access provides optimal doses, adequate therapy, long-term use and has a low morbidity and mortality rate.[5]

Arteriovenous Fistula (AVF) is one of the most commonly used vascular access techniques and gives better results compared to other techniques. Proper placement of AVF access is needed.[5,6] The primary alternative to AVF is the use of a double-lumen catheter (DLC).7 Although it is a safe choice in emergency situations, unlike permanent vascular access, temporary venous catheters have an high incidence of complications, such as infections, thrombosis, and lower blood

flow rates that reduce the effectiveness of hemodialysis.[8,9] Stenosis can occur because HD catheters in veins are foreign bodies, which will cause an inflammatory reaction that results in scar / damage to the blood vessels wall so that blood flow is inadequate for HD.

The incidence of chronic kidney failure and the use of hemodialysis vascular access is increasing and there are no accurate data of this case. Therefore, it is necessary to do research on the characteristics of chronic kidney failure with hemodialysis vascular access in dr. Mohammad Hoesin General Hospital Palembang for the period of 1 January - 31 December 2018.

Methods

Research Design

This research is a retrospective study with a descriptive research design.

Time and Place of Research

The research took place in July 2019 to September 2019 in the Medical Record Department of dr. Mohammad Hoesin General Hospital Palembang.

Population and Research Samples

The study population was all patients with chronic renal failure with vascular access of hemodialysis whom hospitalized at Dr. Mohammad Hoesin General Hospital Palembang from 1 January 2018 to 31 December 2018. The sample in this study was the entire population that met the inclusion criteria, namely chronic renal failure patients with hemodialysis vascular access with complete variables in patient data, while incomplete data were excluded from this study.

Research Data Collection

The data used are secondary data, in the form of medical records of patients with chronic renal failure with hemodialysis vascular access at Dr. Mohammad Hoesin General Hospital Palembang for 1 year, from 1 January 2018 to 31 December 2018. The data was then entered in a Microsoft Excel worksheet.

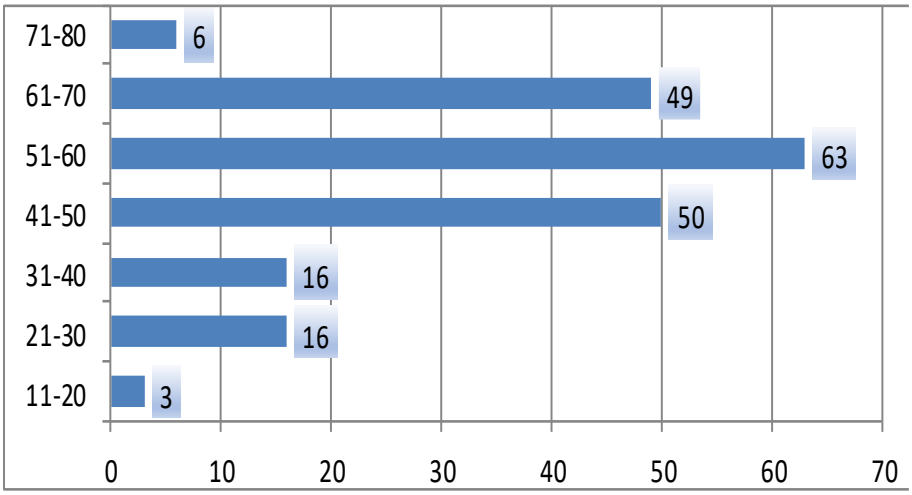
Processing and Presentation of Research Data

The secondary data obtained are then grouped based on research variables with predetermined operational restrictions. The data is then presented in tables and diagrams. Variables are analyzed descriptively.

Results

In the period from 1 January 2018 to 31 December 2018 there were 203 patients who received an AV shunt procedure with complete medical record data.

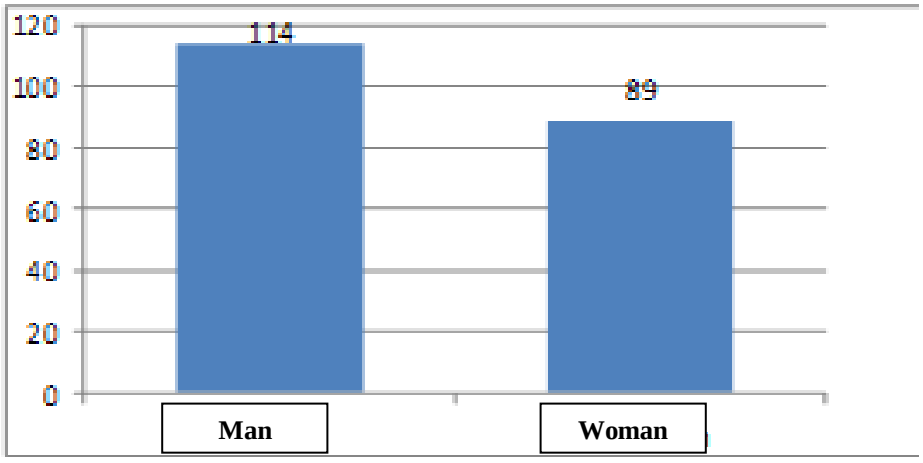
The youngest age of patients with inpatient chronic kidney failure with AV shunt installation is 16 years, while the oldest age is 77 years, with the average age is 50.53 years as shown in **graph 3.1.**



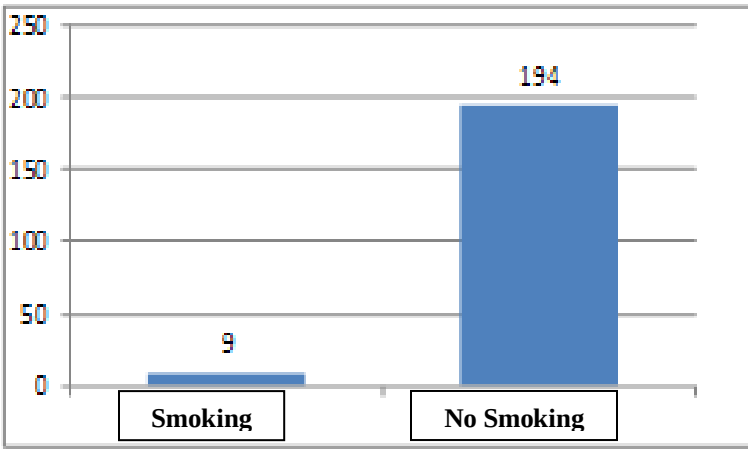
Graph 3.1 Distribution of patients with chronic kidney failure by age

Distribution based on sex in patients with chronic kidney failure with hemodialysis vascular access found that there were 114 male and 89 female as shown in **graph 3.2.**

Lifestyle which is a risk factor for patients in the form of smoking was found in 9 patients, while in 194 other patients there were no risk factors for smoking as shown in **graph 3.3.**



Graph 3.2 Distribution of patients with AV Shunt by sex

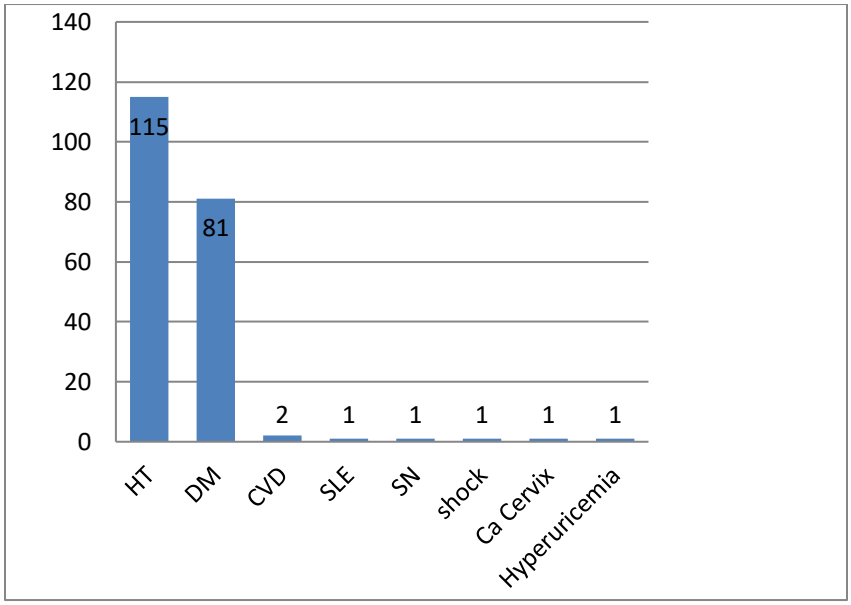


Graph 3.3 Graphs of smoking behavior in patients with AV Shunt

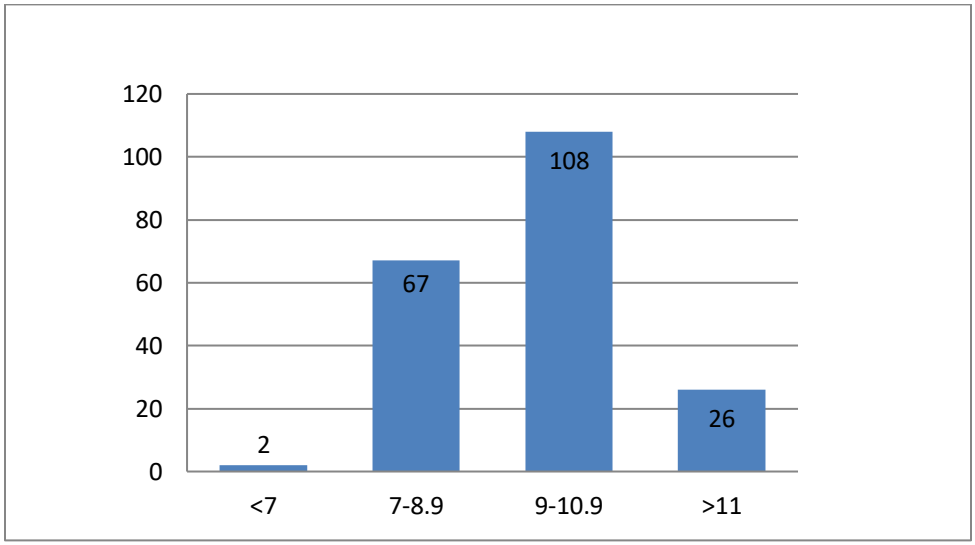
Of 203 kidney failure patients 115 subjects had a history of hypertension. Other risk factors include pre-existing disease, 81 diabetes mellitus (DM) patients, 1 Cerebrovascular Disease (CVD) patient, 2 systemic lupus erythematosus (SLE) patients, 1 nephrotic syndrome (SN) patient, 1 acute kidney injury (AKI) patient, 1 cervical carcinoma patients, 1 hyperuricemia / gout patient as shown in **graph 3.4**.

In the study sample the highest Hb was 14 mg/dL, the lowest Hb was 6mg/dL, the average Hb was 9.5 mg/dL. With Hb data <7 (1%) 2 people, 7-8.9 (33%) 67 people, 9-10.9 (53%) 108 people,> 11 (13%) 26 people as shown in **graph 3.5**.

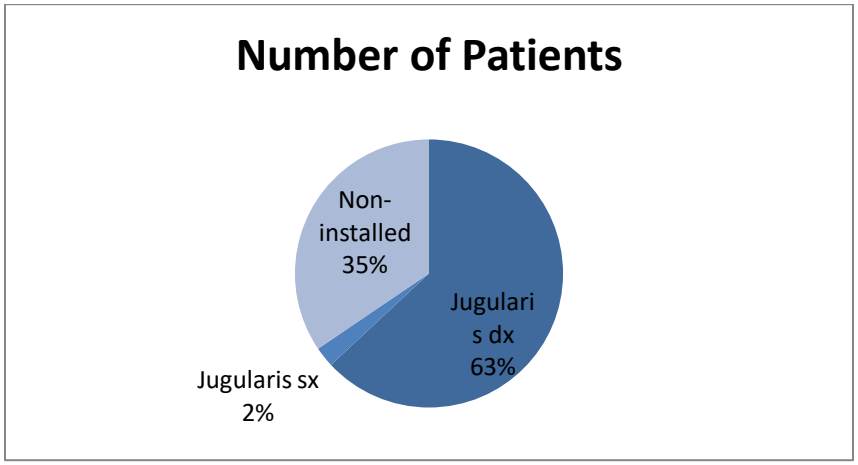
128 patients put double lumen catheters in the external jugular, 5 patients put in the jugular sinister, and 70 patients did not install a double lumen catheter as shown in **graph 3.6.**



Graph 3.4 Graph of the patient's past medical history

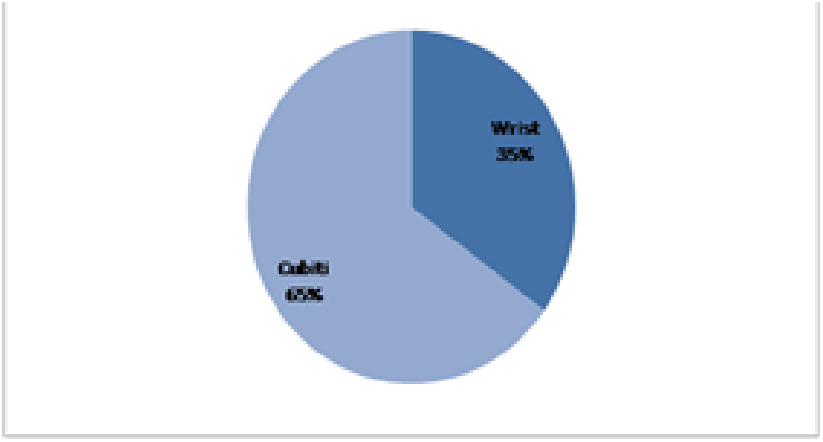


Graph 3.5 Graph that shows the Hb before AV-Shunt



Graph 3.6 Graph Showing History of Use of Double Lumen Catheters.

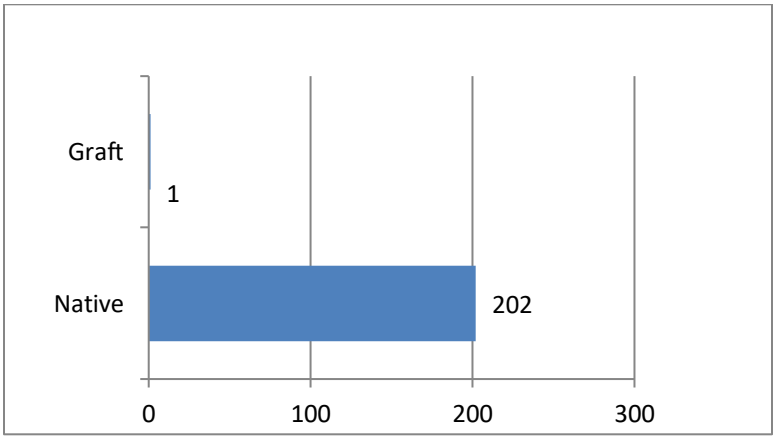
There are several types of use of vascular access for hemodialysis. There were 71 (35%) patients with Wrist anastomosis, 132 (65%) cubital region anastomosis. As shown in **Graph 3.7**.



Graph 3.7 Graph of Anostomosis Region

202 patients were performed with AV Shunt Native and only 1 patient with Graft as shown in **graph 3.8.**

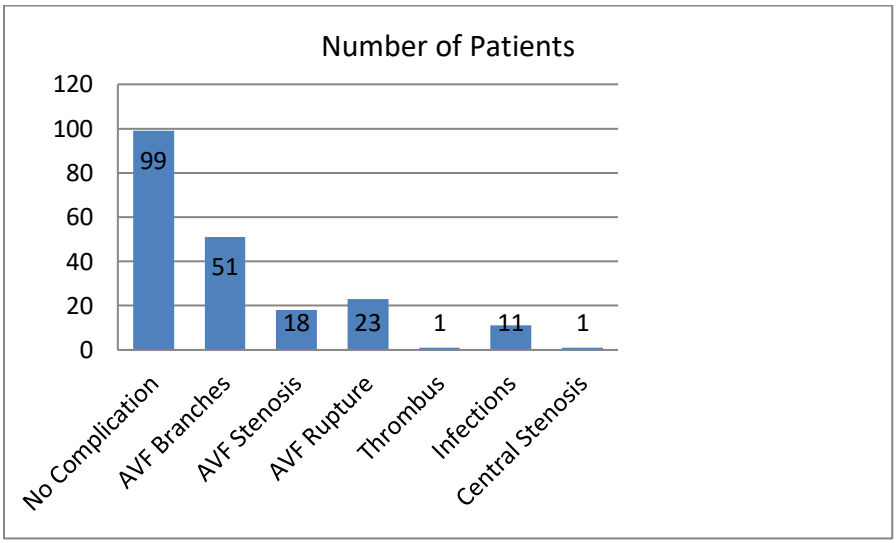
99 patients did not require intervention after AV shunt insertion, 51 patients arose with AVF branches, 23 patients experienced AV Shunt rupture, 18 patients had AVF stenosis, 1 with thrombus, 1 with central stenosis, and 11 had infection as shown in **graph 3.9**.



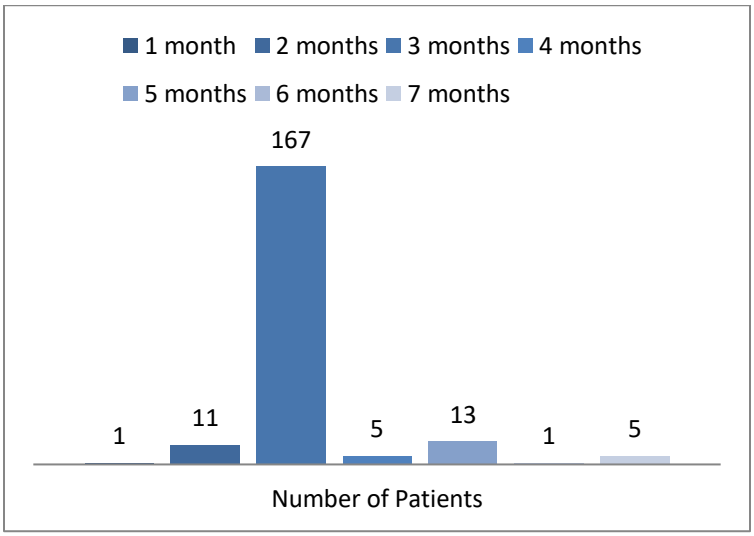
Graph 3.8 Graph that shows the type of AV Shunt

167 patients took AV Shunt after 3 months, 1 patient after 1 month, 11 patients after 2 months, 5 patients after 4 months, 13 patients after 5 months, installation, 6 months 1 patient and 5 patients after 7 months of AV Shunt such as shown in **graph 3.10.**

First use after treatment in 167 (82.2%) patients occurred after 3 months, 1 (0.5%) patients after 1 month, 11 (5.4%) patients after 2 months, 5 (2.5%) patients after 4 months of installation, 6 months 1 (0.5%) patient, 13 (6.4%) patients after 5 months of installation, and 5 (2.5%) patients after 7 months of AV Shunt.



Graph 3.9 Complications of AV Shunt Actions



Graph 3.10. Distance of Use of AV Shunt Since it was first installed

Discussion

In this study, chronic renal failure patients who were treated in the Vascular Surgery Division, Dr. Mohammad Hoesin General Hospital Palembang were collected from 1 January 2018 to 31 December 2018, The age distribution of the most patients is in the age range 51-60 years as many as 63 (31%) patients out of 140 patients compared with other age ranges with the average age of patients with chronic kidney failure with hemodialysis vascular access is 50.53 years. This is in line with research conducted by Suryadi (2014) where 51 of the 300 study samples aged 50-59 years showed an increase in the incidence of chronic kidney disease with age. After the age of 30 years, the kidneys will experience atrophy and the thickness of the renal cortex will decrease by about 20% every decade. Other changes that will occur with increasing age include thickening of the glomerular basement membrane, expansion of glomerular mesangium and the occurrence of extracellular matrix protein deposits, causing glomerulosclerosis.[10]

Gender is one of the variables that can provide differences in the incidence of men and women. The incidence of male kidney failure is two times greater than in women, because predominantly men often experience systemic diseases (diabetes mellitus, hypertension, glomerulonephritis, renal polycystics and lupus), and a family history of inherited diseases[11] so that in this study patients with chronic renal failure sufferers with hemodialysis vascular access with male sex as many as 114 (56%) people and women as many as 89 (44%) people.

Lifestyle such as smoking as a risk factor for vascular disorders in this study was recorded in as many as 9 (4.4%) patients, while in 114 (96.6%) others did not smoke. Smoking is a major health problem in many developing countries (including Indonesia). Cigarettes contain more than 400 types of chemicals, some of which are carcinogenic and affect the vascular system. This data could have been biased because many patients did not confess that he had smoked before.

Patients with kidney failure who underwent hemodialysis at Mohammad Hoesin General Hospital Palembang mostly experienced mild anemia with hemoglobin levels <7 (1%) in 2 people, 7-8.9 (33%) 67 people, 9-10.9 (53%) 108 people, > 11 (13%) 26 people. Suwitra (2014) explains that anemia occurs in 80-90% of patients with chronic kidney disease.

Anemia in chronic kidney disease is mainly caused by erythropoietin deficiency, other things that can play a role in anemia in chronic kidney failure patients are iron deficiency, blood loss, shortened erythrocyte life span, folic acid deficiency, as well as acute and chronic inflammatory processes.[12]

Patients with kidney failure who underwent hemodialysis at Mohammad Hoesin General Hospital Most of the history of the disease in the form of hypertension were 115 patients (56.6%). Hypertension also has a close relationship with kidney health. Hypertension is a major trigger factor for kidney disease and kidney failure. Conversely, when kidney function is disrupted, the blood pressure will increase and can cause hypertension.[11] So it can be concluded that a person can suffer from hypertension first and then suffer from kidney failure or vice versa. The second rank is occupied by diabetes in 81 patients (40%). Diabetes is a predisposition to atherosclerosis and calcification of arterial walls resulting in impaired arterial dilatation and low blood flow. High blood sugar levels are thought to influence the outcome. Patients with diabetes can have the same AVF outcome as non-diabetic patients by controlling the patient's sugar levels and preoperative vascular mapping. 7 (3.4%) subjects had a history of other diseases.

In this study, there were patients with a history of double lumen catheter recorded. 128 (63%) patients installing double lumen catheters in the jugular dextra, 5 (2%) patients installing in the jugular sinister, and 70 (34%) patients did not do a double lumen catheter. While for history of AV Shunt usage. The following data were obtained 169 (83%) patients had a history of AV Shunt use and 34 (27%) patients had never used AV Shunt.

Brachiocephalic and brachialbacilli access are traditional or commonly used access options for autogenous upper arm access and are associated with better patency levels than autogenous arteriovenous access in forearm. In a study conducted by Dorobanţu et al (2013)[11] the incidence of peripheral venous hypertension was higher in patients with brachiocephalic access. In a study conducted by the author, it was found that patients with brachiocephalic arteriovenous fistula who underwent hemodialysis at Mohammad Hoesin General Hospital in December 2017 to December 2018 there were several types of use of vascular access for hemodialysis. There were 71 (35%)

patients with radiochepalica anastomosis, 132 (65%) patients with brachiobasilic and braciocephalica anastomosis (cubital region).

Color Doppler Ultrasound (CDU) examination and vascular mapping are performed on patients with difficult physical examinations such as: obesity, absence of pulse, repeated surgery for vascular access, possible arterial disease: old age, diabetes, cardiovascular disease, and possible venous disease, there is a history of previous venous cannulation.[12] Of the 203 patients who had previously had an ultrasound examination to see blood vessels that were viable for anastomosis, 202 (99.5%) patients had native AV shunt and only 1 (0.5%) patient with Graft, 99 (48.8%) patients did not require intervention, 51 (25.2%) patients required branch ligase, 23 (11.3%) repaired the AV shunt rupture, 18 (8.8%) had venography, 1 (0.5%) thrombectomy, and 11 (5.4%) had debridement due to infection.

A total of 167 (82.2%) patients took AV shunt for the first time after 3 months, 1 (0.5%) patients after 1 month, 11 (5.4%) patients after 2 months, 5 (2.5%) patients after 4 months of installation, 6 months 1 (0.5%) patients, 13 (6.4%) patients after 5 months of installation, and 5 (2.5%) patients after 7 months of AV shunt. Based on research, the use of AVF before 14 days is made, increasing the risk of failure. This study also showed that using AVF any time after 14 days were made, did not show a significant increase in risk.

Conclusion

During the span of time between 1 January 2018 to 31 December 2018 at Dr. Mohammad Hoesin General Hospital Palembang found 203 patients with the use of AV Shunt.

The youngest age of patients with chronic renal failure is 16 years. While the oldest age is 77 years. With an average age of 50.53 years.

Based on sex there were 114 (56%) patients with male sex and 89 (44%) patients with female sex.

There were 9 (4%) patients with risk factors for lifestyle smoking and 194 (96%) other patients did not smoke

The most prior history of chronic kidney failure was hypertension in 115 patients (56.6%) and Diabetes in 81 (40%) and other illnesses in 7 (3.4%) subjects.

Hb before being admitted by AV Shunt there were 69 patients with the following data Hb <7 (1%) 2 people, 7-8.9 (33%) 67 people, 9-10.9 (53%) 108 people,> 11 (13%) 26 people

Historical Usage of Double Lumen Cathteher recorded that 128 (63%) patients had a double lumen catheter in the external jugular, 5 (2%) patients had a sinus jugular, and 70 (34%) patients did not have a double lumen catheter.

History of use of vascular access for hemodialysis. There were 169 (83%) had a history of AV Shunt use and 34 (17%) patients had never used AV Shunt.

There were 71 (35%) patients with the Wrist anastomosis region, 132 (65%) patients with elbow and arm anastomosis (cubital region).

Type of AV Shunt of 202 (99.5%) patients Performed native AV shunt and only 1 (0.5%) patients with Graft.

Complications after AV Shunt insertion were recorded 99 (48.8%) no complications, 51 (25.2%) AVF branches, 23 (11.3%) AV Shunt rupture, AVF Stenosis 18 (8.8%), Central Stenosis 1 (0.5%) Thrombus 1 (1%) 0.5%), and 11 (5.4%) infections.

The first cannulisation after the procedure was 167 (82.2%) patients took AV Shunt after 3 months, 1 (0.5%) patients after 1 month, 11 (5.4%) patients after 2 months, 5 (2.5%) patients after 4 months installation, 6 months 1 (0.5%) patient, 13 (6.4%) patients after 5 months of installation, and 5 (2.5%) patients after 7 months of AV Shunt.

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