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Research Article

A CROSS-SECTIONAL RESEARCH ON PULMONARY HYPERTENSION (PHTN) FREQUENCY IN THE PATIENTS OF HEMODIALYSIS ADMITTED AT ALLIED HOSPITAL, FAISALABAD

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Abstract:

Objective: Pulmonic blood pressure also known as PHTN is associated with development of disease and even mortality in some cases of dialysis (HD-Hemodialysis). The purpose of this set up was to explore the incidences of PH in regular dialysis patients.

Methods: The design of the study was cross-sectional and it was conducted during the time span of 1 year (April 16 – April 17) at Nephrology department Allied Hospital, Faisalabad. The sample size comprised of 80 ESRD (End Stage Renal Disease) patients on regular dialysis. The patients' Transthoracic Echocardiography (TTE) was a mandatory pre-requisite for the sample selection. Systolic pressure for lung arteries (SPAP) was noted. PHTN was divided into 3 classes namely severe PHTN (PAP > 65 mmHg), moderate (PAP b/w 45 - 65 mmHg) and mild (PAP b/w 30 - 45 mmHg). The different type of factors such as sex, age and dialysis type & duration and their effect was observed on the PHTN patients.

Results: The prevalence of PH was noticed in each category with a total of 45 patients (56%) suffering from the disease. The distribution among different categories were measured as Mild (13 patients, 29%), Moderate (25 patients, 55.5%) and Severe (7 patients, 15.5%). The hypertensions in lungs' arteries were found in 41 patients (60%) with AVF (Arteriovenous Fistula), 3 patients (27%) patients with catheter and 1 patient with AV graft. PHTN was significantly higher in females 67% (28 female patients) as compared to males 45% (17 male patients) with $p < 0.05$. The mean value for the dialysis of PHTN patients was 20.93 ± 12 (in months). The mean of patients without PHTN was calculated to be 10.29 ± 10 (in months). The difference was again statistically significant ($p < 0.05$). The morbidity of PHTN in dialysis patient was no significantly related to the age of the sample.

Conclusion: End Stage Renal Disease (ESRD) patients undergoing haemodialysis are likely to suffer from pulmonic hypertension. Our research delivered that the prevalence of PHTN is relatively higher in female population. Moreover, arteriovenous access (AV) and stretch of time for dialysis are strongly related with the morbidity of pulmonic hypertension.

Keywords: End stage renal disease (ESRD), Pulmonary hypertension (PH or PHTN), Hemodialysis (HD), Chronic kidney disease (CKD), Pulmonary artery pressure (PAP), Systolic pulmonary arterial pressure (SPAP), Arteriovenous Fistula (AVF)

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INTRODUCTION:

Systolic Pulmonary Arterial Pressure (SPAP) of 30 mm Hg or higher at rest is considered as PHTN. It is measured by echocardiography [1]. In recent years, morbidity of CKD has become a major challenge for the health care services. The rate of mortality in CKD patients even increases more with the prevalence of cardiac diseases [2-4]. Nearly, half of the deaths are caused by the combination of these diseases [5]. The haemodialysis patients are often diagnosed with pulmonic hypertension [6, 7]. A study delivered that the rate of mortality in PHTN patients undergoing dialysis is quite higher as compared to the pulmonic hypertension patients without dialysis [9].

The diagnosis for PHTN is a critical task due to the etiology of the disease. The true estimation of the disease can be achieved by conducting non-surgical Echocardiography [10]. Pulmonic hypertension in end stage renal disease depends upon multiple factors [11, 12].

Pulmonary blood pressure can be elevated by a number of reasons including excessive blood flow from AV graft or AVF, overload, metabolic instabilities and changes in phosphate and calcium metabolism. All these risk factors are neglected during the diagnosis causing the fatal outcome in shape of death. The study in hand is focused on determination of PHTN in haemodialysis patients through echocardiography. The PH cases can be cured by timely kidney transplant, substituted dialysis procedures and reversal of arteriovenous fistula.

METHODS:

The design of the study was cross-sectional and it was conducted during the time span of 1 year (April 16 – April 17) at Nephrology department Allied Hospital, Faisalabad. Informed consent was obtained from the patients for the participation. Ethical approval was granted by the Ethical committee of the hospital. The ESRD patients (38 male and 42 females) under regular dialysis were evaluated through arteriovenous access. The dialysis for the sample was carried out thrice a week and each lasted for 4 hrs. Patients were selected

according to pre-set exclusion/inclusion criteria. The echocardiography for all the members of the sample was conducted by worthy cardiologist. SPAP was noted and analyzed for all the sample. Effect of different demographic and clinical factors was observed on the morbidity of pulmonic hypertension.

Data collection through a pre-set form and analysis through SPSS was performed. Chi square test was enforced to gauge the prevailing incidences of different variables and a value of <0.05 was labelled as significant. The influence of haemodialysis on PHTN patients was evaluated by using the Regression analysis. Difference among different attributes of the research was analyzed by using student t-test.

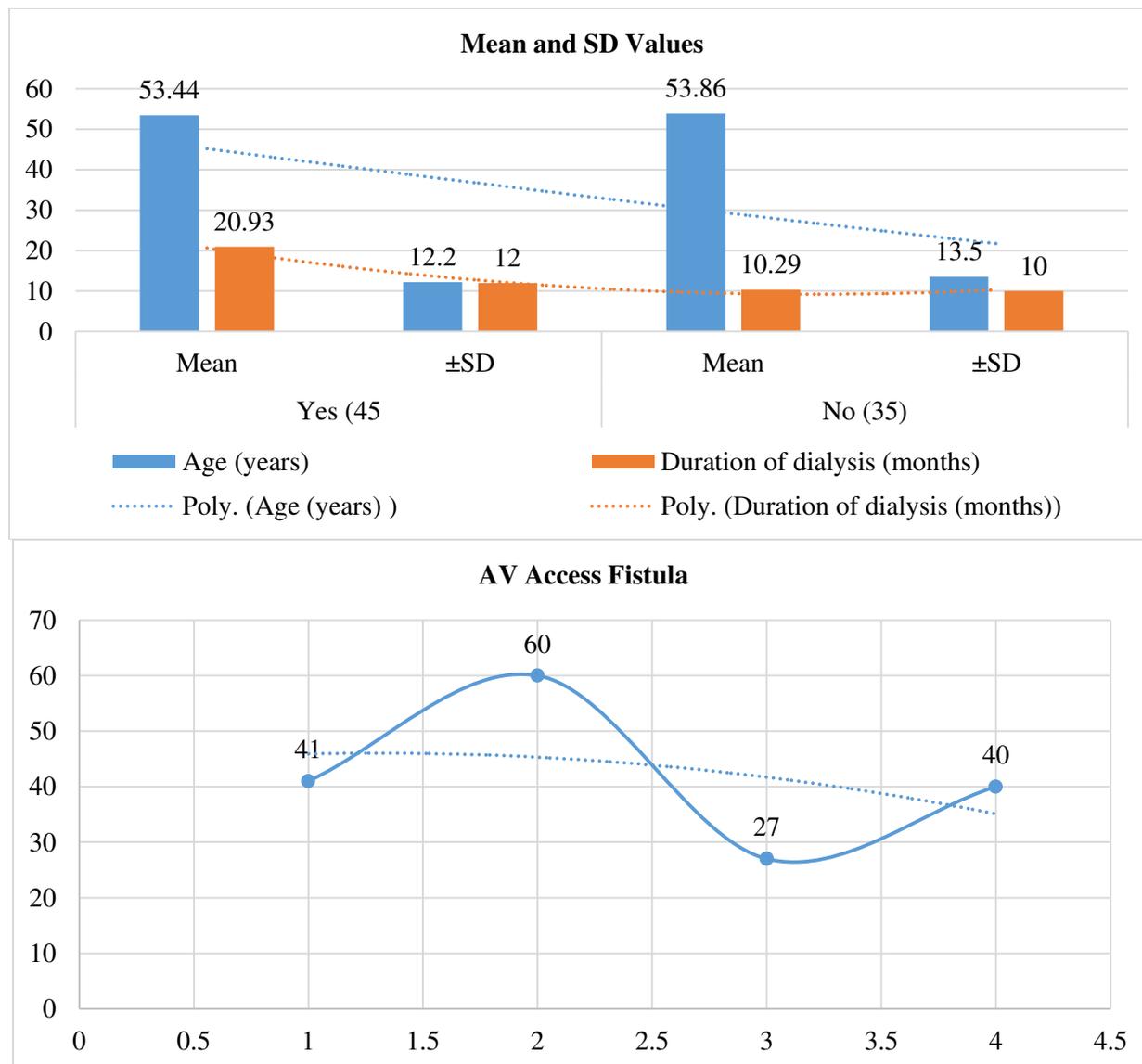
RESULTS:

The sample composition included both males (47.5%) and females (52.5%). The mean value for the duration of dialysis was calculated to be 16.28 ± 12.2 (months) with a range of 2 – 60 months. The PHTN patients were having AVF (85%), tunneled catheter (13.8%) and graft (1.3%). The prevalence of pulmonic hypertension was noticed in 45 (56%) patients. The mean for Pulmonic Arterial Pressure (mmHg) was 38.5 ± 19.17 . The age range of the PH patients was 18 – 72 years with a mean 53.44 ± 12.2 . The mean of dialysis patient's age in the absence of PH was 53.86 ± 13.5 .

The hypertension was more prevalent in females (28 patients) as compared to males (17 patients). Out of the total 85 patients, 45 were diagnosed with PHTN after echocardiography. The patients were categorized into three groups [ending upon the intensity of pulmonic hypertension. 13 patients (29%) belonged to mild PH, 25 patients (55.5%) were moderate PH and 7 patients (15.5%) were marked as severe PH cases. T-test confirmed the significant association between PH and AVF. The PH patients who were on dialysis for 20 months or below. The effect of dialysis duration on pulmonary hypertension. The analysis found that the duration of HD is directly proportional to the severity of PHTN.

Table: Characteristics of patients with and without PH

Characteristics	Pulmonary Hypertension				P-value
	Yes (45)		No (35)		
	Mean	±SD	Mean	±SD	
Age (years)	53.44	12.2	53.86	13.5	0.22
Duration of dialysis (months)	20.93	12	10.29	10	<0.001
Male / Female	17	28	21	14	0.048 (<0.05)
AV access Fistula	41	60	27	40	<0.05



DISCUSSION:

Morbidity of some diseases which contribute to the ESRD (like Hypertension and Diabetes) are increasing irrespective of the geographical location. The mortality rate of kidney patients suffering from cardio vascular diseases is more than 50% [13]. Some risk factors including uremia, homocysteinemia and dyslipidemia pose a greater threat on the mortality rate. The effect of calcium and phosphates, AVF and some other conditions on kidney patients undergoing haemodialysis was investigated in this study [14]. In the end stage of the disease, patient is left with two options, dialysis or kidney transplant. Though dialysis has a very important pre-transplant role in renal therapy yet its effects are a little critical in long term. The dialysis is often seen with pulmonic hypertension in ESRD patients. By overlooking the

associated PHTN in ESRD patients, mortality and morbidity of the patients increases [8].

Different studies have reported the incidences of PHTN in the range of 25% - 51% [14 – 16]. Among these, the highest prevalence (58.6%) was discovered by Fabio Fabbian [16]. The results of most of these studies were biased because these were carried out with the purpose of survey / review. Current research is perhaps the first of its nature for the local population. Our study produced comparable results with the international studies conducted earlier. The study found 56% dialysis patients with pulmonary hypertension.

The findings of our study have produced the matching results with international studies.

Significant association was observed between AVF and PH ($p < 0.05$). The effect of tunneled catheter and AV bridge graft on the PH morbidity was also analyzed in our study.

Most of the ESRD patients suffering from PH were females. This shows the significant association of gender in the prevalence of PH in HD patients. Another study conducted by Mona Amin *et al* [18] delivered the matching results for PH prevalence in female patients. Havlucu [7], in his research on 25 patients, stated 60% of the PH patients were females. The findings of current study have showed that 52% females were diagnosed with PH as compared to males (48%). Moreover, no association was observed in patients' age and pulmonic hypertension.

Pulmonary hypertension is directly related to the duration on haemodialysis [19]. Our study confirmed the relationship between PH and HD. Moreover, patients who were under dialysis for relatively longer periods (more than 30 months) included mild and severe PHTN patients (3 and 4 respectively). This shows the higher the duration, higher will be the pulmonic hypertension.

Most of the PH victims were seen with 20 months or below HD duration. The mean value was 20.93 ± 12 which is contrary to the findings of other studies (60 ± 36 months by Mona Amin [11] & 40 ± 48 months in a study by Fabio Fabbian [16]). The difference in mean values is perhaps due to the fact that in our country HD is started as a last option (when they are diagnosed with ESRD). The delay may be attributed to economic, social and cultural reasons. More researches on this issue are required for validation of the reasons in PH patients under dialysis for start of early HD to avoid any unpleasant consequences associated with the etiology of the disease.

CONCLUSION:

End Stage Renal Disease (ESRD) patients undergoing haemodialysis are likely to suffer from pulmonic hypertension. Our research delivered that the prevalence of PHTN is relatively higher in female population. Moreover, arteriovenous access (AV) and stretch of time for dialysis are strongly related with the morbidity of pulmonic hypertension.

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