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Original Research Paper

Nephrology

PREVALENCE OF PULMONARY HYPERTENSION IN CHRONIC KIDNEY DISEASE

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ABSTRACT **Background:** Pulmonary hypertension (PH) is a recently recognized complication of chronic kidney disease (CKD), especially in end-stage renal disease. Cardiovascular disease is the most important cause of morbidity and mortality in CKD. This study was done to assess the prevalence of Pulmonary Hypertension in CKD patients and to assess the severity of Pulmonary Hypertension in different stages of CKD. **Materials And Methods:** The study was performed on 140 patients. At M. L. N. medical college prayagraj. All patients were evaluated by clinical, laboratory and imaging. All patients were subjected to echocardiography for assessment of Pulmonary arterial Hypertension. **Results:** A total of 140 patients were included. Mean age of statics was 55.61±11.65 years. Male: Female was 2.33:1. Out of 140 study subjects, PH was found in 45 patients (32.1%.). Amongst which 26 had mild PH, 13 moderate and 6 had severe PH. Prevalence of Severe PH was significantly higher in stage 5 CKD subjects (23.5%) compared to stage 3(1.3%) & 4(2.3%).**Conclusion:** As CKD progresses the prevalence and severity of PH increases.

KEYWORDS : CKD, Pulmonary Hypertension

INTRODUCTION

Pulmonary hypertension (PH) is a recently recognized complication of chronic kidney disease (CKD), especially in end-stage renal disease. Cardiovascular disease is the most important cause of morbidity and mortality in CKD. It has prevalence of around 30%–50% and is an independent predictor of increased mortality in CKD patients[1].

Prevalence of CKD in Indian population is very high and factor determining morbidity and mortality in such patients are yet to be discovered. Some major factors such as cardiovascular events or PH and other complications may leads to major problems and early detection of risk factor with early clinical intervention in such patients may improve life quality and prognosis of such patients[2]

In Majority of the patients with CKD there is hypertension with diastolic dysfunction, arteriovenous fistulas (AVF) , anemia , uremic lung, volume overload and a high cardiac output state, all of which can lead to increased risk of Ph[3]

Proper understanding of the relation between CKD and PH and early intervention of targeted therapy to reduce the complications in these patients and reduce their hospital stay and prevents further progression of these diseases and their complications[4]

AIMS AND OBJECTIVES

To analyse the prevalence of Pulmonary Hypertension in the patients with CKD.

To analyse the severity of Pulmonary Hypertension in different stages of CKD.

MATERIALS AND METHOD

The study was carried out at the Department of general Medicine of SRN Hospital, MLN Medical College, Prayagraj, Uttar-Pradesh, India. From January 2020-june 2021 (18 month) After taking approval from the Scientific Research and Ethics Committee, patients who fulfilled the inclusion criteria were taken up for the study. First, the purpose of the study was explained to the caregiver of study subjects admitted in Medicine emergency and ICU unit in the local language with the help of the information sheet.

Study Procedure – Patients who were diagnosed as having CKD on the basis of

1- Renal function test – increase BUN and serum creatinine .
2- USG -loss of corticomedullary differentiation .
3- Clinical sign – Anemia ,pedal edema and HTN

These patients was screened for PH on the basis of echocardiography. Based on TR jet velocity we calculated RVSP by the formula. RVSP =P9ASP =4(TR velocity)^2 +RAP (right atrial pressure).When IVC diameter $\leq$ 2.1 cm and collapse > 50 % , RAP is 3 mmhg . And if IVC diameter > 2.1 cm and collapse $\leq$ 50 % , RAP is 15 mmhg , and RAP is 8 mmhg for all other condition. Once we have value of RVsP we calculated mPAP by formula **mPAP =.61 X RVsP +2.** on the basis of mPAP we classified these patients into two groups. No PH (mPAP <25 mm hg)and PH group (mPAP≥ 25 mmhg) with Mild 25-35 mmhg Moderate 35-45 mmhg Severe >45 mmhg . The statistical analysis was done using SPSS Version 21.0 statistical Analysis Software.

Inclusion Criteria:

- Cases of CKD based on Kidney Disease Improving Global Outcome 2012 criteria, including CKD patients on haemodialysis
- Age ≥18 years.

Exclusion Criteria:

- Age <18 years
- Congenital heart diseases
- Pulmonary obstructive and restrictive diseases
- HIV-infected patients
- Chronic liver disease
- Connective tissue diseases

- Hypothyroidism and hyperthyroidism.

RESULTS

Mean age was 55.61±11.65 years . Majority of subjects were 51-60 year (45 %). Male: Female ratio 2.33:1. Out of 140 study subjects 79 (56.4%) patients were in stage 3, 44 (31.4%) were in stage IV and rest 17 (12.1%) subjects were in stage V CKD. Mean age with severity of PH Mean age in subjects with no PH was 55.23±11.52 years, in mild PH group was 57.81±14.56 years, in moderate PH was 56.15±6.90 years and in severe PH group was 51.0±7.12 years. Hypertension was more commonly observed in severe PH Patients (83.3 %). Similarly t2dm with pulmonary hypertension in CKD patients was present in 26 %

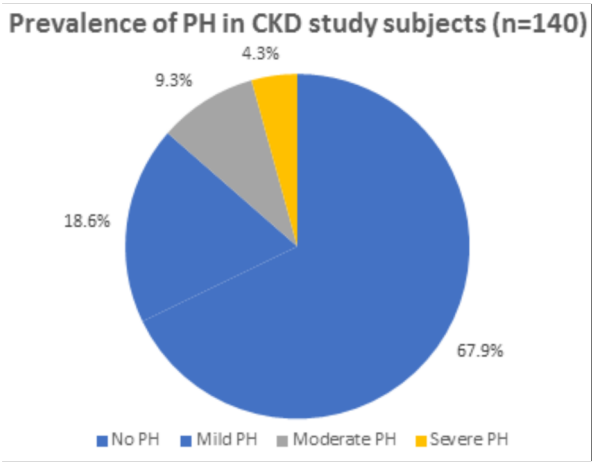

Fig.1: This pie chart shows , prevalaence of PH in CKD study subjects , overall Prevalence of PH in CKD study subjects was 32.1%. Amongst which 26 had mild PH, 13 moderate and 6 had severe PH.

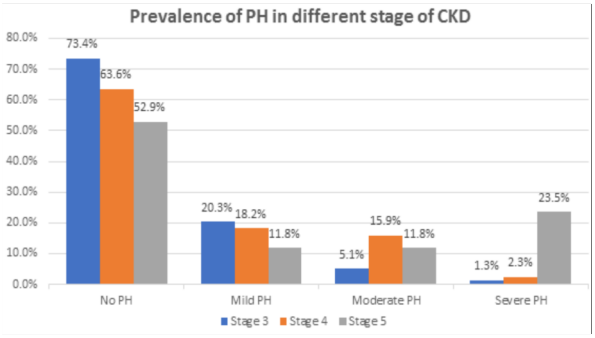

Fig.2: Stage 3 CKD patients 26 .7 % (mild -20.1 %, moderate - 5.1 %, severe -1.3 %) patients have PH ,and in stage 4 patients 36.4 % (mild 18.2 % ,moderate – 15.9 % ,severe - 2.3 %) and in stage 5 CKD patients 47 . 1 % (mild -11. 8 % ,moderate – 11.8 % , severe – 23 .5 %) have PH (p value = .001)

DISCUSSION

Patients with CKD manifest an elevated cardiovascular risk as coronary artery disease , heart failure arrythmia and the newly added pulmonary hypertension ,for which various studies conducted , in our study we are concerned for pulmonary hypertension in CKD patients.

In our study out of 140 study subjects, PH was found in 45 patients . Amongst which 26 (18.6 %) had mild PH, 13 (9.3 %) moderate and 6 (4.3 %) had severe PAH. In our study, 26 .7 % with stage 3 CKD patients had PH (mild -20.1 %, moderate -5.1 %, severe -1.3 %) and 36.4 % in stage 4 CKD patients had PH(mild 18.2 % ,moderate – 15.9 % ,severe - 2.3 %) and in stage 5 47 . 1 % had PH (mild -11. 8 % ,moderate – 11.8 % , severe – 23 .5 %) (p value = .001) . Study conducted by Sankar D. Navaneethan et al[5] showed that, PH was present in 21.1% (625 of 2959) of the study population. Prevalence of PH was 5.88%, 10.9%, 20.97%, 21.85%, 26.5%, and 32.8% in those with stages 1, 2, 3a, 3b, 4, and 5, respectively Similarly the study conducted by, qian zhang et al[6] , prevalence of PH was 47.38% . PH in CKD stage 1, 2, 3 ,4 ,5 was 14.29, 33.33, 38.89, 40.91 and 64.47%. Study conducted by Reque J. et al[7] , found that Prevalence of PH increased with the decline of renal function: 21.6, 24.1, and 31.7% in stages 3, 4, and 5, respectively. Above studies findings are consistent with our study that as the stage of CKD progresses the prevalence and severity of PH gradually increases.

The present study was performed at a single centre, thus the results may lack wider applicability. Bigger population with probably sampling technique ideally in community based study is needed.

CONCLUSION

As the stage of CKD progresses the prevalence and severity of PH gradually increases.

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