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Original Research Paper

Cardiology

ECHOCARDIOGRAPHIC EVALUATION OF LEFT VENTRICULAR FUNCTION IN CHRONIC KIDNEY DISEASE PATIENTS ON MAINTENANCE HEMODIALYSIS.

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KEYWORDS :

INTRODUCTION:

Chronic kidney disease (CKD) patients have a higher chance of developing heart problems, such as coronary artery disease,heart failure, arrhythmias, and sudden cardiac death.Patients with late CKD stages (CKD stages 4-5) demonstrate adramatically heightened risk, even though the incidence and prevalence of cardiovascular events are already markedly higher in patients with early CKD stages (CKD stages 1-3) compared to the general population. In this high-risk group, cardiovascular disease rather than renal disease—is the major cause of mortality (CKD stage 5). Myocardial fibrosis, valvular calcification, vascular calcification, and vascular senescence, as well as atherosclerotic lesions, are all outcomes of CKD-induced systemic, chronic proinflammatory states that contribute to vascular and myocardial remodelling processes.According to Manjunath et al., those with GFRs below 59 mL/min/1.73 m2 have a 38 percent higher risk of developingcardiovascular disease (CVD) than people with GFRs over 90mL/min/1.73 m2[1].More than 50% of CKD patients' deaths are attributed to CVD.One of the frequent structural cardiac abnormalities in CKD patients is left ventricular hypertrophy (LVH). In CKD patients, LVH greatly raises the risk of myocardial ischemia and heart failure and is a reliable predictor of mortality[2].LV dysfunction is the initial sign of CVD and, with time, progresses to LVH[3].

In addition, hemodialysis (HD) patients' cardiomyopathy is brought on by coronary artery obstruction, a decrease in coronary reserves, and physiological-structural ab normalities in the left ventricle brought on by volume and pressure overload[4] .The left ventricle adapts when left cardiac preload is not lowered, which results in a reduction in capillary density, diastolic dysfunction, abnormalities in intrave ntricular conduction, dilatation, and increased compensatory hypertrophy[5].These occurrences make patients more susceptible to electrical excitability, which can result in abrupt cardiac death[6] .

The most reliable diagnostic method for identifying structural and functional problems in the heart is echocardiography. Therefore, determining the risk and prognosis of CVD in CKD patients can be assisted by the examination of echo cardiographic parameters[7].In the present study, we assessed left ventricle function by echo cardiography in CKD patients receiving HD maintenance therapy.

MATERIALS AND METHOD:

This is a cross sectional study and was conducted on the 220 patients visited to our hospital. All study subjects evaluated according to a standardised study proforma. Patients are devided into 3 groups on the basis of GFR like Group 1, Group 2 & Group 3 will have stage 3 , stage 4 & stage 5 CKD Patients respectively. Stages of CKD will be classified on the basis of eGFR calculation by Crockroft-Gault formula for estimating creatinine.

The patients with pre-existing cardiac disease like rheumatic heart disease, congenital heart disease, cardiovascular disease like myocarditis due to infective aetiology, primary heart muscle diseases like cardiomyopathies are excluded.

In the present study ,2D echocardiography was done in the CKD patients using phillips and GE machine by consultant cardiologist.2D-echo was done to determine the left venricular systolic and diastolic function .For systolic function ejection fraction were calculated and for diastolic function E/A,E/E',DT,IVRT were measured and for left ventricular hypertrophy we measured LV dimensions.

RESULTS:

In the present study,we compare the left ventricular function in the later stages of chronic kidney diseases.

Among 220 cases in the present study,41 cases had left ventricular systolic dysfunction in which 14 cases were found in stage III,13 cases in stage IV and 14 cases in stage V CKD.

In the present study,44 cases of left ventricular diastolic dysfunction were found in which 20 cases in stage III,16 cases in stage IV and 8 cases in stage V CKD.

Table:1 shows Comparison of LV Function in different stages of CKD

LV Dysfunctio	Stage-3		Stage-4		Stage-5		Significance
	No	%	No	%	No	%	
Systolic Dysfunction	14	6.3%	13	6%	14	6.3%	
Diastolic dysfunction	20	9 %	16	7.2%	8	3.6%	$\chi 2=8.40$ df=4
Normal	36	16.3%	47	21%	52	23.6%	
Total	70	31%	76	35%	74	34%	P=0.07

Stage III CKD had more left ventricular diastolic dysfunction and stage V CKD had more systolic dysfuction in the present study.

Table:2 shows Comparison of LV Hypertrophy in different stages of CKD

LVH	Stage-3		Stage-4		Stage-5		Significance
	No	%	No	%	No	%	
Present	41	18.6%	32	14.5%	40	18%	$\chi 2=2.36$
Absent	39	17.7%	44	20%	34	15.4%	df=2
Total	70	31%	76	35%	74	34%	P=0.30

In the present study,113 cases were found to have left ventricular hypertrophy in which 41 cases in stage III,32 cases in stage IV and 40 cases in stage V CKD.

Stage III had more concentric left ventricular hypertrophy in the present study

In the present study,38 cases were found to havd left ventricular dialation in which 14 cases in stage III ,14 cases in stage IVand 10 cases in stage V CKD.

Table:3 showsComparison of LV Dialatation in different stages of CKD

LV dilation	Stage-3		Stage-4		Stage-5		Significance
	No	%	No	%	No	%	
Present	14	6.3%	14	6.3%	10	4.5%	$\chi 2=1.17$
Absent	56	25%	62	28%	64	29%	df=2 P=0.56
Total	70	31%	76	35%	74	34%	

DISCUSSION:

In the present study ,we compare the left ventricle function in stages III,IV and V of CKD with other studies.

In Mukesh L etal[8].(2012) study LVH was present in 74.3%, systolic dysfunction was present in 24.3% of patients as suggested by reduced LVEF measurement and diastolic dysfunction was observed in 61.4% by abnormal E/A ratio of ESRD patients

Robert N. Foley et al[9] (1995) had found abnormalities of left ventricular structure and functions were very frequent on baseline echocardiography: 73.9% had left ventricular hypertrophy, 35.5% had left ventricular dilatation and 14.8% had systolic dysfunction in ESRD patients.

NP singh etal[10] (2000) had found LVH in 76.92%, diastolic dysfunction in 72% but did not find systolic dysfunction in CKD patients.

S.Agarwal etal (2003) had observed diastolic dysfunction in 60% and systolic dysfunction in 15% of patients.

Nitin etal[11] found that 30.4% of CKD had systolic dysfunction and 56.5% had diastolic dysfunction.

Singal etal[12].have reported in their study that 23% of CKD had systolic dysfunction.

Avijit Debnath etal[13].found that 48%CKD had systolic dysfunction in late stage .

In the present study,51% of CKD had LVH which is somewhat lesser as compare to Mukesh etal(74.3%),Robert N Foley etal(73.9%) and N.P Singh etal(76.92%) study.

In our study,18.6% CKD had systolic dysfunction which is higher than Robert N Foley etal(14.8%),N.P.singh etal(0%) and S.Agarwal etal.(15%) and lesser as compared to Mukesh etal (24.3%), Nitin etal(30.4%),Singal etal(23%) and Avijit Debnath (48%)study.

In the present study,20% patients had diastolic dysfunction which is lesser as compared to Mukesh etal(61.4%), N.P Singhetal.(72%),Agarwal etal.(60%) and Nitin etal(56.5%).

In the present study,13% CKD had left ventricular dialatation which is some what lesser as compared to Robert N Foley etal (35.5).

CONCLUSION:

In our study, left ventricular dysfunction was found to have increase prevalence and it increases with increase in severity of chronic kidney disease.This necessities cardiac evaluation in all CKD patient is mandatory and 2D-echo is best tool to screen all CKD patients for cardiac evaluation as it helps in early detection of cardiovascular diseases which helps in early management and thereby help to slow progression of cardiovascular diseases in CKD patients and improve prognosis.

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