Original Research Paper Medicine

Evaluation of Cardiovascularabnormalities in Chronic Kidney Disease Utilising Ecg and Echocardiography

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KEYWORDS :

Coronary artery disease including myocardial infarction, congestive heart failure (CHF) and pericardial disease are the common manifestations of major cardiovascular abnormalities in the ESRD. 30% of patients reaching ESRD already have clinical evidence of ischemic heart disease or CHF. Heart failure accounts for 15%, myocardial infarction for about 10% and pericarditis for about 3% of dialysis associated mortality. Sudden cardiac death may be related to the high prevalence of left ventricular dysfunction secondary to the LVH in dialysis patients.

AIMS AND OBJECTIVES OF THE STUDY

- To assess the prevalence of cardio vascular abnormalities in 100 chronic kidney disease patients admitted in Nephrology unit of ASRAM General Hospital, Eluru from December 2014 to August 2016.
- To make an evidence-based evaluation of the relationship between chronic kidney disease and cardiovascular risk.
- To aid in prompt diagnosis and effective management of cardiovascular complications in chronic kidney disease patients.

SOURCE OF DATA

The data for this study was collected from One hundred subjects fulfilling the inclusion/exclusion criteria. The patients admitted in Nephrology unit of ASRAM General Hospital during the period - December 2014 to August 2016 were taken into study.

TYPE OF STUDY- Prospective Observational study

INCLUSION CRITERIA:

The following criteria were used in selection of cases:

1. Patients more than 18 years of age
2. Patients who were known chronic kidney disease patients.
3. Patients who were symptomatic for 3 months or more.
4. Patients with S.creatinine >1.5 mg/dl
5. Patients with Renal Parenchymal changes (Grade I/II/III/Poor cortico-medullary differentiation) on Renal Ultrasound. Patients with Autosomal Dominant Polycystic Kidney Disease and Obstructive Nephropathy were also included in the study.

EXCLUSION CRITERIA:

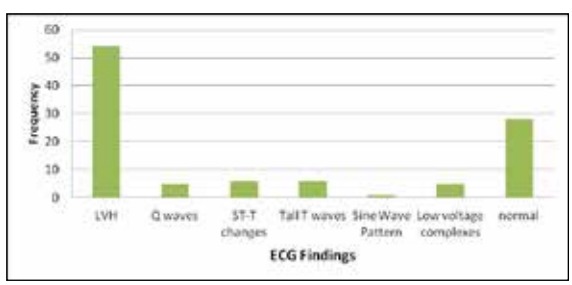
1. Patients with other cardiac disorder such as valvular heart disease, congenital heart disease.
2. All pediatric cases of chronic kidney disease.
3. Patients who were Alcoholics

ELECTROCARDIOGRAPHIC CHANGES IN CKD: Majority of the patients had LVH (54%).Q waves were present in 5%, ST Elevations were present in 3% of patients, ST depressions in 3% of patients, Tall T waves were present in 6% of patients, Sine wave pattern was present in 1 patient, Low voltage complexes were present in 5 patients.ECG was normal in 28%of patients.

TABLE : SHOWING THE ELECTROCARDIOGRAPHIC CHANGES

Particulars	Frequency	Percentage
LVH	54	54 %
Q waves	5	5%
ST-T changes	6	6%
Tall T waves	6	6%
Sine Wave Pattern	1	1%
Low voltage complexes	5	5%
Normal	28	28%

GRAPH: SHOWING THE ELECTROCARDIOGRAPHIC CHANGES



2D ECHOCARDIOGRAPHIC ABNORMALITIES IN PATIENTS WITH CKD- Most common abnormality on 2D Echo is LVH (69%). Fractional Shortening of <25% was present in 9% of patients, Moderate LV Dysfunction was present in 21% of patients, Severe LV Dysfunction was present in 2% of patients. Mild Diastolic dysfunction was present in 53% of patients and Severe Diastolic Dysfunction was present in 7% of patients. RWMA was present in 12% of patients. Pericardial effusion was present in14% of patients. Valvular Calcification was present in 7% of patients and Mitral Regurgitation was present in 10% of patients.

TABLE- SHOWING 2D ECHO ABNORMALITIES

2D Echo Finding	Frequency	%
Left Ventricular Hypertrophy	69	69%
Fractional Shortening (<25%)	9	9%
Ejection Fraction (<50%)	23	23%
Moderate LV Dysfunction (30-44%)	21	21%
Severe LV Dysfunction (<30%)	2	2%
Abnormal E/A Ratio	60	60%
Mildl Diastolic Dysfunction(E/A<0.75)	53	53%

Severe Diastolic Dysfunction(E/A>1.5)	7	7%
RWMA	12	12%
Pericardial effusion	14	14%
Valvular Calcification	7	7%
Mitral Regurgitation	10	10%

LVH IDENTIFIED BY ECG AND 2D ECHO- LVH was identified in ECG in 54% of patients and in 2D Echo in 69% of patients.

TABLE - LVH IDENTIFIED BY ECG AND 2D ECHO

LVH	Identified in no. of patients
ECG	54
2D ECHO	69

COMPARING STAGES OF CKD WITH PRESENCE OF LVH ON 2D-ECHO:
In CKD Stage III, IV, V - 40%, 48.48%, 82.25% of patients had LVH respectively.

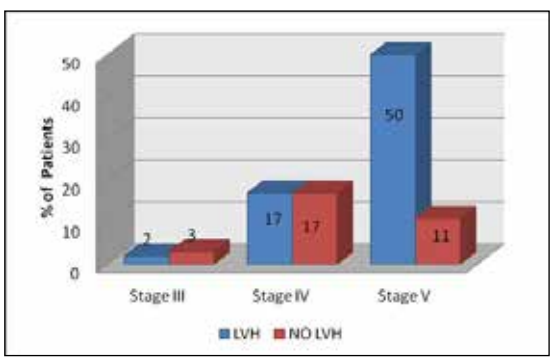


TABLE : SHOWING THE DATA COMPARING STAGES OF CKD WITH PRESENCE OF LVH ON 2D-ECHO:

SEVERITY OF CRF	LVH	%	NO LVH	%
Stage III	2	40 %	3	60 %
Stage IV	17	48.48 %	17	51.52%
Stage V	50	82.25 %	11	17.75 %
TOTAL	69	100 %	31	100 %

GRAPH : GRAPH SHOWING COMPARISION OF CKD WITH PRESENCE OF LVH ON 2D-ECHO:

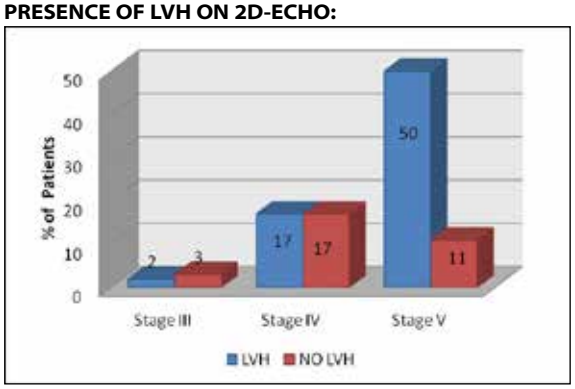
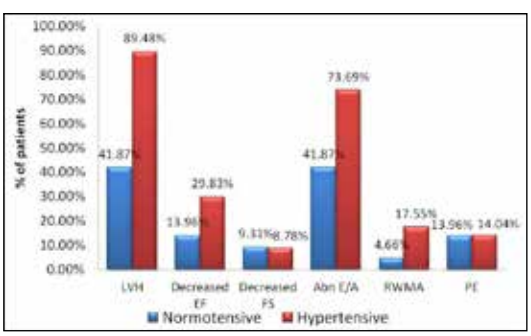


TABLE-CORRELATION ANALYSIS ACCORDING TO ECHO-CARDIOGRAPHY
FINDING IN HYPERTENSIVE AND NORMOTENSIVE CKD STUDY CASES

	Normotensive		Hypertensive		Chi	
2D ECHO	group (n=43)		group(n=57)		Square	P value
					Test	

	n	%	N	%		
LVH						
Absent	25	58.13%	6	10.52%	23.799	<0.0001
Present	18	41.87%	51	89.48%		
DECREASED EF						
ABSENT	37	86.04%	40	70.17%	2.648	0.1037
PRESENT	6	13.96%	17	29.83%		
DECREASED FS						
ABSENT	39	90.69%	52	91.22%	0.008	0.92
PRESENT	4	9.31%	5	8.78%		
ABNORMAL E/A						
RATIO						
NO	25	58.13%	15	26.31%	9.059	0.0026
YES	18	41.87%	42	73.69%		
RWMA						
ABSENT	41	95.34%	47	82.45%	2.734	0.0982
PRESENT	2	4.66%	10	17.55%		
PERICARDIAL EFFUSION						
NO	37	86.04%	49	85.96%	0.00	0.99
YES	6	13.96%	8	14.04%		

GRAPH-CORRELATION ANALYSIS ACCORDING TO ECHO-CARDIOGRAPHY
FINDING IN HYPERTENSIVE AND NORMOTENSIVE CKD STUDY CASES



SUMMARY AND CONCLUSIONS
In the present study the Age variation was from 31 to 90 years. Majority of the patients were in the age group of 51-60 years that included 30 patients (30%).The mean age is 57.34 years. The study group consisted of 65% males and 35% females. Among the Electrocardiographic changes, Majority of the patients had LVH (54%).Q waves were present in 5%, ST Elevations were present in 3% of patients, ST depressions in 3% of patients, Tall T waves were present in 6% of patients, Sine wave pattern was present in 1 patient , Low voltage complexes were present in 5 patients.ECG was normal in 28% of patients.

Most common abnormality on 2D Echo is LVH (69%). Fractional Shortening of <25% was present in 9% of patients, Moderate LV Dysfunction was present in 21% of patients, Severe LV Dysfunction was present in 2% of patients. Mild Diastolic dysfunction was present in 53% of patients and Severe Diastolic Dysfunction was present in 7% of patients. RWMA was present in 12% of patients. Pericardial effusion was present in 14% of patients. Valvular Calcification was present in 7% of patients and Mitral Regurgitation was present in 10% of patients. LVH was identified in ECG in 54% of patients and in 2D Echo in 69% of patients.

On comparing the echocardiographic findings in Hypertensives (n=57) and Normotensives (n=43), statistically significant number of patients had LVH: 89.48% Vs 41.87% respectively with p value <0.0001. Diastolic Dysfunction was present in 73.69% Hypertensives and in 41.87% Normotensives, which was statistically significant (p value-0.0026). Decreased EF was present in 29.83% among Hypertensives when compared to 13.96% among normotensives and was not statistically significant (p=0.922). RWMA was present in 17.55% amongHypertensives and 4.66% among normotensives and is not statistically significant (p=0.85). Pericardial effusion was present in 14.04% among hypertensives and13.96% among normotensives and was not statistically significant (p=0.99).

CONCLUSION

LVH was the most common echocardiographic abnormality in patients with CKD. Diastolic function was deranged in more number of patients as compared to systolic function in patients with CKD. Major contributing factors for left ventricular hypertrophy and diastolic dysfunction were hypertension and anemia. Major contributing factor for systolic dysfunction was RWMA due to ischemic heart disease.

Echocardiography was more sensitive for detecting LVH and minimal pericardial effusion prior to clinical detection.

Echocardiography is a cost effective non invasive diagnostic test which can detect early changes in the cardiac parameters The high prevalence of Left ventricular hypertrophy in these populations on echocardiography implies that these patients require detailed cardiovascular evaluation despite absence of symptoms, and also that various efforts aimed at prevention and control of left ventricular hypertrophy should be started early during the course of renal insufficiency, such as effective control of hypertension, anaemia. LVH has got prognostic implications, because this group of ESRD patients will die of diastolic dysfunction or sudden cardiac death.

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