INTRODUCTION

Chronic Kidney disease (CKD) is associated with significantly increased morbidity and mortality. Cardiac disease is the major cause of death in dialysis population accounting for 40% of deaths in international registries.[1] Chronic Kidney Disease (CKD) is defined as either kidney damage for > 3 months, as confirmed by kidney biopsy or markers of kidney damage, with or without a decrease in glomerular filtration rate (GFR), or (2) GFR < 60 mL/min per 1.73 meter square for > 3 months, with or without kidney damage. Patients with end-stage renal disease (ESRD) are at much higher risk of CV disease than the general population.

In addition to the traditional risk factors for cardiovascular diseases such as hypertension, dyslipidemia, diabetes and obesity in Chronic Kidney Disease populations non traditional factors such abnormal Mineral bone metabolism & vascular calcification increases the CV risk. In the cardiovascular system, left ventricular hypertrophy (LVH) is the most frequent finding.[2] Echocardiogram allows for the evaluation of ventricular mass and volume, and has an excellent accuracy for the detection of hypertrophy and quantification of systolic function.

Aim of the study

To assess the prevalence of systolic and diastolic dysfunction in patients of End stage renal disease (ESRD) on haemodialysis

Study Design

The study was conducted in Dept Of Nephrology, in MGMGH & KAPV Medical college hospital, Trichy with the help & support of Department of Cardiology. The institution Ethical committee clearance was obtained & protocol followed. 42 ESRD (End stage renal disease / CKD stage 5) patients irrespective of underlying etiology who were admitted in MGMGH KAPV Medical College Trichy and were on maintenance hemodialysis for more than 1 month who took part in the study. Males 31/Females 11. The CKD stage - 3 patients were on weekly twice or thrice Hemodialysis. The patients were on Anti Hypertensives, IV Erythropoeitin & IV iron.Diuretics, Phosphate binders, Soda bicarbonate. The mean age was 51.6 years & 38.1 years in male & female patients respectively.

The prevalence of Hypertension was 93.5% & 90.9% in male & female patients respectively.

Mean age years

Males n=31

17-65

14-55

Females n=11

Mean age years

51.6

38.1

Hypertension

29 (93.5%)

10 (90.9%)

Diabetes

13(41.9%)

2 (18.8%)

The major cause of CKD in the study population was Diabetic Nephropathy (35.4%) followed by Hypertensive Nephrosclerosis(18.1%). There were also significant number cases of Chronic Glomerulonephritis & Chronic Interstitial Nephritis.

RESULTS

There were 42 patients of ESRD on Hemodialysis for atleast one month who took part in the study. Males 31/Females 11. The CKD stage -3 patients were on weekly twice or thrice Hemodialysis. The patients were on Anti Hypertensives , IV Erythropoeitin & IV iron. Diuretics, Phosphate binders, Soda bicarbonate. The mean age was 51.6 years & 38.1 years in male & female patients respectively. The prevalence of Hypertension was 93.5% & 90.9% in male & female patients respectively.

Table 1

<table>
<thead>
<tr>
<th>Age range</th>
<th>Males n=31</th>
<th>Females n=11</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-65</td>
<td>29 (93.5%)</td>
<td>10 (90.9%)</td>
</tr>
<tr>
<td>14-55</td>
<td>10 (90.9%)</td>
<td>2 (18.8%)</td>
</tr>
</tbody>
</table>

Table 2 – CKD etiology

<table>
<thead>
<tr>
<th>Diab Nephropathy</th>
<th>M (n=31)</th>
<th>F (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 (35.4%)</td>
<td>2 (18.1%)</td>
<td></td>
</tr>
<tr>
<td>Hypertensive Nephrosclerosis</td>
<td>6 (19.3%)</td>
<td>2 (18.1%)</td>
</tr>
<tr>
<td>Chronic Glomerulonephritis</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Chronic Interstitial Nephritis</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CKD-U</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

All patients were clinically evaluated and subjected for complete blood count, renal function test, serum cholesterol, ECG, Xray Chest and 2-D echo. M mode recording perpendicular to the long axis of and through the centre of the left ventricle at the papillary muscle level was taken as standard measure of systolic and diastolic wall thickness and chamber dimensions.

Left ventricular ejection fraction (LVEF) and fractional shortening (FS) were taken as a measure of left ventricle systolic dysfunction and ejection fraction <55% was considered as systolic dysfunction & LVFS <25% was also taken as abnormal.

Diastolic dysfunction was determined by measuring E/A ratio by special Doppler inflow velocity (E is peak early diastolic velocity and A is peak atrial filling velocity of left ventricle across mitral valve). E/A ratio less than 0.75 and more than more than 1.8 was considered as diastolic dysfunction. LVH was diagnosed when inter ventricular septum thickness or left ventricular posterior wall thickness was > 12 mm. Tricuspid valve pressure gradient (TRPG) & pulmonary artery systolic pressure was measured to assess Pulmonary Hypertension.

DATAANALYSIS

Data collected was analyzed by using tests like Chi square, Anova and represented in the form of frequency tables.

KEYWORDS

Chronic Glomerulonephritis & Chronic Interstitial Nephritis.
Out of 42 ESRD patients, we observed mild pericardial effusion in 30% patients with severe CKD (S. Cr >6 mg%) and diastolic dysfunction in 23(54.76%) patients. LVH was present in 32/42 (76.1%) patients, systolic dysfunction in 12 (28.4%) patients and RWMA in 5 (11.9%) patients respectively. In a study conducted by Ladhda M, et al. in 2014, reported LVH in 74%, systolic dysfunction in 24.3%, diastolic dysfunction in 61.4% and pericardial effusion in 14.34% ESRD patients on MHD [3] Zoccali C, et al. had reported incidence of LVH and systolic dysfunction in 77% and 22% patients respectively in ESRD patients on MHD [4]. None of our patients had valvular calcifications probably because of small study population. Majority patients had hypertension 39 (92.8%). Even patients with ECG/ECHO findings didn't have symptoms of Angina. Robert N. Foley et al (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 [5], NP singh et al (2000) had found LVH in 76.92%, diastolic dysfunction in 72% but did not find systolic dysfunction in CKD patients.[6] In comparing Diabetic & non diabetic cohorts prevalence of Diastolic dysfunction , RWMA, & Pericardial effusion were significantly higher among Diabetic population when compared to non Diabetic cohort .However the prevalence of Anemia is a confounding factor in assessing LV/RV systolic dysfunction & Pulmonary Hypertension.

Clinical parameters
The incidence of anemia in the study population (Hb<12 gms ) was 95.25%. The mean urea & creatinine concentration on the day of echo was 107 mg/dl & 7.5 mg/dl respectively. The incidence of RR was 43.14%. The mean duration of CKD was 20.8 months . The mean Hemodialysis duration was 3.5 months (range 1-24 m).

<table>
<thead>
<tr>
<th>Clinical parameter</th>
<th>Diabetic n = 14</th>
<th>Non Diabetic N=28</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb %</td>
<td>6.8</td>
<td>8.1</td>
<td>Ns</td>
</tr>
<tr>
<td>LVH%</td>
<td>10</td>
<td>22</td>
<td>Ns</td>
</tr>
<tr>
<td>Impaired LVEF</td>
<td>2</td>
<td>2</td>
<td>Ns</td>
</tr>
<tr>
<td>Impaired LVFS</td>
<td>2</td>
<td>1</td>
<td>Ns</td>
</tr>
<tr>
<td>Diastolic dysfunction</td>
<td>9</td>
<td>14</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Pericardial effusion(mild rim)</td>
<td>7</td>
<td>5</td>
<td>Ns</td>
</tr>
</tbody>
</table>

DISCUSSION
In our study in MGMGH & KAPV Medical college hospital, out of 42 ESRD patients, majority of them had anemia of renal origin . Majority of them had Hypertension treated with 2 or 3 drugs . Diabetes was present in 41.9% & 18.8% of male & female patients respectively. The major etiology of CKD/ESRD in our cohort was diabetes (30.9%) followed by Hypertensive Nephrosclerosis . In patient from rural areas CKD-U (Unknown etiology) is much more prevalent.

LVH was present in 32/42 (76.1%) patients, systolic dysfunction in 3/42 (7.1%) patients and diastolic dysfunction in 23/42(54.76%) patients. Agarwal S, et al. had observed diastolic dysfunction in 53.2% and systolic dysfunction in 30% patients with severe CKD (S. Cr >6 mg%) [2]. Out of 42 ESRD patients, we observed mild pericardial effusion in 12 (28.4%) patients and RWMA in 5 (11.9%) patients respectively. In a study conducted by Ladhda M, et al. in 2014, reported LVH in 74%, systolic dysfunction in 24.3%, diastolic dysfunction in 61.4% and pericardial effusion in 14.34% ESRD patients on MHD [3] Zoccali C, et al. had reported incidence of LVH and systolic dysfunction in 77% and 22% patients respectively in ESRD patients on MHD [4]. None of our patients had valvular calcifications probably because of small study population. Majority patients had hypertension 39 (92.8%). Even patients with ECG/ECHO findings didn't have symptoms of Angina. Robert N. Foley et al (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 [5], NP singh et al (2000) had found LVH in 76.92%, diastolic dysfunction in 72% but did not find systolic dysfunction in CKD patients.[6] In comparing Diabetic & non diabetic cohorts prevalence of Diastolic dysfunction , RWMA, & Pericardial effusion were significantly higher among Diabetic population when compared to non Diabetic cohort .However the prevalence of Anemia is a confounding factor in assessing LV/RV systolic dysfunction & Pulmonary Hypertension.

REFERENCES