A STUDY ON CARDIOVASCULAR MANIFESTATIONS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

ABSTRACT

Chronic kidney disease (CKD) affects around 10-13% of the general population. The risk for cardiovascular disease (CVD) remains high in all stages of chronic kidney disease. It has been documented that CKD patients have an extremely high risk of developing CVD compared to the general population. CKD patients in early stages are more likely to develop CVD than progress to ESRD. This study showed that most common symptoms were dyspnoea followed by orthopnea, pedal edema, palpitation and chest pain. Risk factors for cardiovascular complications in CKD include hyperension, dyslipidemia, diabetes mellitus, albuminuria, anaemia and metabolic changes. The most common type of cardiovascular disease in CKD patients was found to be dilated cardiomyopathy followed by left ventricular hypertrophy, ischemic heart disease and pericardial effusion.

INTRODUCTION

Chronic kidney disease (CKD) refers to either glomerular filtration rate (GFR) <60 ml/min/1.73 m² for more than three months, or other pathological abnormalities/ markers of kidney disease, including abnormalities in blood, urine tests or imaging studies. Patients with CKD have a marked increase in incidence of cardiovascular disease (CVD) compared with age matched counterparts in the general population. Individuals with early CKD are much more likely to die with CVD than to develop end stage renal disease (ESRD). Initial evidence indicating a relationship between renal dysfunction and adverse cardiovascular events becomes apparent in those on dialysis, where the number of CVD deaths is found to be raised. Almost 50% of those suffering from established ESRD are unlikely to survive a CVD event. Compared to the age adjusted CVD mortality in the general population, this is approximately 15-30 times higher.

Risk factor for CVD in chronic kidney disease include traditional risk factors such as old age, male sex, hypertension, higher LDL cholesterol, lower HDL cholesterol, diabetes, smoking, physical inactivity, menopause and family history of cardiovascular disease, whereas non-traditional risk factors include albuminuria, homocysteinuria, lipoprotein(a) and apolipoprotein(a), anaemia, extracellular volume overload, electrolyte imbalance and oxidative stress. This study aims to evaluate the different cardiovascular manifestations in patients of CKD while also throwing some light on associated risk factors.

MATERIALS AND METHODOLOGY

This study was done on patients admitted in medicine ward of RIMS, Ranchi over a period of one year. This was a cross sectional study and included 30 patients who fulfilled the inclusion criteria of clinical and pathological abnormalities/ markers of kidney disease, including abnormalities in blood, urine tests or imaging studies. Clinical findings included symptoms and signs of cardiovascular diseases while echocardiographic findings included left ventricular hypertrophy, pericardial effusion, global hypokinesia and dilation of all chambers of heart, left ventricular ejection fraction <45%, LAD territory hypokinesia, RCA territory hypokinesia, L CX territory hypokinesia. The patients with valvular and congenital heart diseases were excluded from the study. Other investigations done were chest radiogram, CBC, blood glucose, HbA1C, renal function test, lipid profile, electrolytes, routine examination of urine and electrocardiography.

Observations and Results

Sex distribution:-
In our study, 66% patients were males and 34% were females.

Age distribution:-
20 to 30 years – 7%
30 to 40 years-10%
40-50 years – 13%
50 to 60 years- 40%
>60 years - 30%

Distribution of different cardiovascular disease in CKD patients:-

<table>
<thead>
<tr>
<th>Cardiovascular complication in CKD patients</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left ventricular hypertrophy</td>
<td>8</td>
<td>26.6%</td>
</tr>
<tr>
<td>Dilated cardiomyopathy</td>
<td>14</td>
<td>46.6%</td>
</tr>
<tr>
<td>Pericardial effusion</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>4</td>
<td>13.3%</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

The most common type of cardiovascular disease in CKD patients was found to be dilated cardiomyopathy (46.6%) followed by left ventricular hypertrophy (26.6%), ischemic heart disease (13.3%) and pericardial effusion (10%).

Symptoms profile in the present study:-
Most common symptoms were dyspnoea (66.67%) followed by pedal edema (56.6%), orthopnea (43.3%), Chest pain (23.3%) and palpitation (20%).

Types of heart failure:-
Most common heart failure seen was LVF (50%) followed by RVF (16.6%)

Electrocardiographic and echocardiographic profile:-

<table>
<thead>
<tr>
<th>Electrocardiographic profile</th>
<th>Echocardiographic profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinus tachycardia</td>
<td>LVF=45%, Global hypokinesia</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>Pericardial effusion</td>
</tr>
<tr>
<td>Complete heart block</td>
<td>LVH</td>
</tr>
<tr>
<td>Ventricular tachycardia</td>
<td>LAD territory hypokinesia</td>
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<tr>
<td>LBBB</td>
<td>RCA territory hypokinesia</td>
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Risk factors:-
Hypertension 65%
Anaemia 70%
Dyslipidemia 32%
Diabetes mellitus 11%
Metabolic derangement 13%
Albuminuria 90%

DISCUSSION
In this study, CVD with CKD was mostly seen in age group 31-60 years followed by in those above 60 years. Most patients presented with the complaint of dyspnoea followed by pedal edema, orthopnea, chest pain and palpitation. On clinical examination, most patients had bilateral basal crepitations, raised JVP, pedal edema and hypertension. The study also showed that 70% patients had anaemia and all patients had raised serum creatinine level. On routine examination of urine, 90% patients had albuminuria out of which 30% patient had macroalbuminuria. In 11% of the patients, blood sugar and HbA1c were raised.

The National Kidney Foundation Task Force on Cardiovascular Disease in Chronic Kidney Disease issued a report which showed that there was high prevalence of CVD in CKD and that mortality due to CVD was 10-30 times higher in CKD patients than in general population. Zhang et al. (2006) in their study found that the prevalence of CVD was markedly increased in early stages of CKD in individuals older than 40 years. Essig et al. (2007) showed that there was an association between GFR decline and LVH in 58% of stage-1 and 68% of stage-2 CKD. Reduced GFR was also associated with common carotid remodelling and increased aorta stiffness. Levin (2008) reported that the increase in CVD burden is present in patients prior to dialysis, due to both conventional risk factors as well as those specific to kidney disease. Even in patients with mild kidney disease, the risk of cardiovascular events and death was increased relative to patients without evidence of kidney disease. At least 35% of patients with CKD had evidence of an ischemic event (myocardial infarction or angina) at the time of presentation to a nephrologist. The prevalence of LVH increased at each stage of CKD, reaching 75% at the time of dialysis initiation.

CONCLUSION
In our study, dilated cardiomyopathy was the most common cardiac complication in CKD patients followed by left ventricular hypertrophy, ischemic heart disease and pericardial effusion. Risk factors leading to cardiovascular complication in CKD were found to be hypertension, anaemia, diabetes mellitus and dyslipidemia. The most commonly affected age group was 50-60 years and they, like patients of other age groups, presented with symptoms of dyspnoea, orthopnea, pedal edema, chest pain and palpitation. Clinical signs seen in patients included bilateral basal crepitations, raised JVP, hypertension and hepatomegaly. Echocardiography findings were LVEF <45%, global hypokinesia, left ventricular hypertrophy, ischemic heart disease and pericardial effusion.

REFERENCES