

STUDY OF CARDIOVASCULAR INVOLVEMENT IN ESRD PATIENTS IN A TERTIARY CARE CENTERKarunakar Das¹, Aswini Kumar Sahoo²¹Associate Professor, Department of General Medicine, Maharajah's Institute of Medical Sciences, Vizianagaram, Andhra Pradesh.²Associate Professor, Department of General Medicine, Maharajah's Institute of Medical Sciences, Vizianagaram, Andhra Pradesh.**ABSTRACT**

The increased prevalence of vascular disease in CKD patients derives from both traditional and CKD-related risk factors. Traditional risk factors include hypertension, hypervolemia, dyslipidemia, sympathetic over-activity and hyperhomocysteinemia. The CKD-related risk factors comprise anemia, hyper-phosphatemia, hyper-parathyroidism and generalized inflammation. Other abnormalities seen in CKD may augment myocardial ischemia including left ventricular hypertrophy and microvascular disease. Patients with chronic kidney disease are at significantly increased risk for both morbidity and mortality from cardiovascular disease. Diabetes (36%) was leading cause of end stage renal disease followed by hypertension (20.5%). Symptoms and signs related to cardiovascular system are evident in majority of patients. Mean serum creatinine level was 10.15 ± 4.95 mg/dl. Mean serum cholesterol level was 205.13 ± 48.82 ; it was elevated in 58% of patients. Mean serum triglyceride level was 180.79 ± 39.61 ; it was elevated in 82.5% of patients. Mean serum LDL level was 120.37 ± 34.49 ; it was elevated in 88% of patients. Mean serum HDL level was 35.87 ± 6 ; it was decreased in 77% of ESRD patients. X-ray finding showed cardiomegaly in 34.55 patients; pulmonary edema was present in 25.5% and pleural effusion was noted in 18% patients clinically evident cardiovascular abnormality in ESRD was observed in majority of patients. Left ventricle dysfunction was the commonest cardiovascular abnormality. Diastolic function was deranged in more number of patients compared to systolic function suggesting that diastolic dysfunction was first to appear in patients with ESRD. Major contributing factors for left ventricle hypertrophy and diastolic dysfunction were hypertension and anemia. Major contributing factor for systolic dysfunction was due to regional wall motion abnormality due to ischemic heart disease. Echocardiography was more sensitive in detecting LVH, diastolic dysfunction and minimal pericardial effusion prior to clinical detection.

KEYWORDS

CKD, ESRD, Cardiovascular Involvement.

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INTRODUCTION

Patients with chronic kidney disease are at increased risk for both morbidity and mortality from cardiovascular disease. Dialysis patients have 10-30 fold increase risk for cardiovascular mortality compared to general population and is the single most important cause of death among patients receiving long-term dialysis accounting for 44% of overall mortality.¹ The magnitude of the problem has more apparent as patients survive longer on maintenance hemodialysis. Coronary artery disease, congestive heart failure and pericardial disease are common manifestations of major cardiovascular manifestations in the end stage renal disease.

Premature cardiovascular disease is a significant cause of morbidity and mortality among patients with CRF. Premature atherosclerotic coronary disease is driven by multiple risk factors including dyslipidemia and oxidative stress. Four main structural abnormalities of the heart have been described in patients with CRF. LV hypertrophy, expansion of the nonvascular cardiac interstitium leading to inter-myocardiocytic fibrosis, changes in vascular architecture and myocardial calcification. All these abnormalities promote systolic as well as diastolic LV dysfunction, which predisposes to symptomatic heart failure, which is a factor for premature death.

Prospective cohort studies have demonstrated that Left Ventricular Hypertrophy (LVH) is the most frequent cardiac abnormality in ESRD with 74.5% of patients demonstrating LVH by the time of starting dialysis.² This compares to a prevalence of 20% in the general population.³ Various diagnostic modalities, both invasive and non-invasive such as electrocardiography, echocardiography and chest X-ray are utilized for diagnosing left ventricular hypertrophy and dysfunction.

MATERIALS AND METHODS

Two hundred patients of chronic kidney disease who were admitted in the medical wards and dialysis unit of Maharajahs Institute of Medical Sciences, Vizianagaram, during Jan 2013 to June 2014. Patients with chronic kidney disease with stage 3, stage 4 and stage 5 exclusion criteria, 2 chronic Alcoholics, Acute renal failure patients.

Detailed history; General and Systemic examination; Investigations like Hemoglobin, blood Sugar, Urea, Creatinine, serum Calcium, Phosphorus, Sr. Electrolytes: Sodium, Potassium, Lipid profile, Serum protein, 24-hour urine protein estimation. Renal biopsy to be done if etiology is not clear.

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OBSERVATIONS AND RESULTS

Etiology of CRF	No. of Cases	Percentage (%)
Diabetes	72	36.0
Hypertension	41	20.5
Diabetes/ Hypertension	33	16.5
Chronic glomerulonephritis	21	10.5
Analgesic nephropathy	8	4.0
Polycystic kidney disease	15	7.5
Unknown	10	5.0
Total	200	100

Table 1: Etiology of ESRD study cases

Diabetes (36%) was leading cause of end stage renal disease.

Symptoms	No. of Cases	Percentage (%)
Breathlessness	170	85.0
Swelling of legs/face	144	72.0
Easy fatigability	95	47.5
Chest pain	28	14.0
Palpitation	20	10.0
Giddiness	50	25.0

Table 2: Symptoms suggesting cardiovascular involvement of ESRD study cases

The most common symptom in ESRD patients was breathlessness (85.5%).

Signs	No. of Cases	Percentage %
Pallor	200	100.0
Oedema	149	74.5
Hypertension	140	70.0
JVP	78	39.0
Pericardial rub	29	14.5
Murmur	29	14.5
Bilateral pleural effusion	33	16.5

Table 3: Signs suggesting cardiovascular involvement of ESRD study cases

Pallor is included in signs suggesting of cardiovascular involvement; it is indirectly related and was most common finding. Edema (75.5%), HTN (70%), raised JVP (39%), pericarditis (14%), murmur (14.5%) and bilateral pleural effusion (16%) were present in ESRD patients.

DISCUSSION

In this study, diabetes (36%) was the leading cause of end stage renal disease followed by hypertension (20.5%), both diabetes and hypertension (16.5%), chronic glomerulonephritis (10.5%), polycystic kidney disease (7.5%), analgesic nephropathy (5%) which is consistent with study done by Sanjay Kumar, et al. (2005).⁴ The mean serum cholesterol level was 205.13+/-48.82. Serum cholesterol level was elevated in 58% of patients. Mean serum triglyceride level was 180.79+/-39.61; it was elevated in 82.5% of patients.

Mean serum LDL level was 120.37+/-34.49; it was elevated in 88% of patients. Mean serum HDL level was 35.87+/-6.00; it was decreased in 77.0% of patients. The findings were consistent with study done by Daniel J Brotman et al. (2010).⁵ Chi-yuan Hsu et al. (2009).⁶ Beman-ali et al. (2000).⁷ and Arsalan N Habib, et al. (2006).⁸

The X-ray findings showed cardiomegaly in 34.5% patients; pulmonary edema was present in 25.5% and pleural effusion was noted in 16.5% patients, which was consistent with study done by Debasish Banerjee et al. (2007).⁹ In this study ECG changes were tachycardia (48.5%), left ventricular hypertrophy (64%), ST-T changes (29%), ventricular ectopics (8.5%) complete heart block (1.5%) and low voltage pattern (5.5%) in pericardial effusion, tall T-wave (37.5%) and ventricular tachycardia (1.5%) in hyperkalemia, QT prolongation (6.0%) patients, which is consistent with study done by Roy et al. (1994).¹⁰ There is statistically significant association between the clinical findings of ECG and patients having hypertension, since $p < 0.05$ except for LVH.

In the present study LVH was present in 87.15%, diastolic dysfunction was present in 72.1% (abnormal E/A ratio). Systolic dysfunction (EF <60%) was present in 29.3% and pericardial effusion observed in 16.3% hypertensive patients. In normotensive group LVH was present in 45%, diastolic dysfunction in 45% and systolic dysfunction in 15%, pericardial effusion was observed in 15% patients. There is statistically significant association between the clinical findings of 2D Echo and patients having hypertension in cases of LVH, RWMA, decreased EF and abnormal E/A ratio parameters since $p < 0.05$ and < 0.01 respectively. For rest of findings, no significant association observed. But hypertensive group is dominant in case of remaining findings than normotensive group, i.e. Proportion of patients is more in hypertensive group than normotensive group for each remaining parameter. The above findings were consistent with study done by Robert N. Foley et al. (1995).² NP Singh et al. (2000).¹¹ Patrick S et al. (1999).¹² Wang et al. (2003).¹³

CONCLUSION

Patients with chronic kidney disease are at significantly increased risk for cardiovascular disease and sudden cardiac death. Early attention to be given to all risk factor to decrease morbidity and mortality.

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